Congrès Européen d’Épidémiologie
“Crises, transitions épidémiologiques et rôle des épidémiologistes”

4-6 Juillet 2018
Lyon, France
European Congress of Epidemiology

“Crises, epidemiological transitions and the role of epidemiologists”

July 4–6, 2018

Lyon, France

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During the last two decades, health crises have often been related to epidemics of infectious diseases. However, a crisis can be economical, political, humanitarian, ecological, or associated with a major acute or chronic health event. Whatever the circumstances of crises and their consequences in the short, medium and long term, health is rarely spared, especially in the most vulnerable populations.

Crisis invariably result from multiple factors, the respective contributions of which are challenging to identify and quantify. Health-related outcomes therefore need to be studied using appropriate methods, and epidemiologists play a key role in providing valid information to public authorities. Providing a relevant epidemiological analysis of crises is indeed essential for establishing appropriate and proportionate control measures, but also for anticipating the future, in terms of both the direct consequences of the crisis and our ability to use the experience acquired to improve public health policies.

Crises can have a major impact on populations and be incompletely resolved before a secondary related crisis occurs in the same population. Health matters, including control measures and access to care, can then be key issues.

We hope that this congress will provide opportunities to explore these issues in depth. Other topics will be also presented, including the epidemiology of chronic diseases, infectious diseases, methodological issues, quantitative and qualitative analysis, vaccine impact, access to care, etc. Efforts will be made to share expertise and education with junior epidemiologists.

Ultimately, these results need to be beneficial for populations, whatever their daily life situation.

We hope you find the congress interesting, and that you can find some time to visit the lovely Lyon area.

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Available online 8 June 2018
**Breakfast skipping and overweight/obesity among European adolescents, a cross-sectional analysis of the HELENA dataset: A DEDIPAC study**

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**Introduction** Breakfast is frequently skipped, particularly among adolescents. Existing research examining the relationship between breakfast skipping and overweight/obesity is predominantly based on cross-sectional data from single country studies; this relationship has not been explored among adolescents across Europe. Our objectives were to examine the demographic factors associated with breakfast skipping, determine the prevalence of skipping among European adolescents, examine differences in macronutrient and food intakes between skippers and non-skippers, and determine whether skipping is associated with overweight/obesity.

**Methods** Cross-sectional data from the Healthy Lifestyle in Europe by Nutrition in Adolescence study (n = 3528) conducted in ten European cities: Athens (Greece), Dortmund (Germany), Ghent (Belgium), Heraklion (Greece), Lille (France), Pecs (Hungary), Rome (Italy), Vienna (Austria), Stockholm (Sweden) and Zaragoza (Spain) were used. Analysis was carried out using a sub-sample of adolescents (n = 1894) aged 12.5–17.49 years with data on breakfast skipping and two days of 24-Hour Diet Recall data. Using responses from the Food Choices and Preferences Questionnaire adolescents were classified as skippers or non-skippers. All analyses were stratified by sex. Differences in the intake of macronutrients, both overall and when breakfast was excluded, and key foods were compared between skippers and non-skippers using the Wilcoxon Rank-Sum test. Multivariate logistic regression analysis was used to examine the relationship between breakfast skipping and overweight/obesity.

**Results** Overall, 44% of females were skippers compared to 36% of males. Across the eight countries, the proportion of breakfast skippers ranged from 52.7% (Greece and Austria) to 21.5% (Spain). Among male skippers, there were a higher proportion younger adolescents (≥15 years) and from the Central or Southern regions of Europe compared to non-skippers (P < 0.001). Among females, there were a greater proportion of skippers with low Family Affluence score and from the Central or Southern region of Europe, and with mothers of lower education level compared to non-skippers (P < 0.001). Among both male and female skippers estimated mean fibre intake and median fruit intake was significantly lower compared to non-skippers. Male skippers were significantly more likely than non-skippers to be overweight/obese [AOR, 2.34, 95% CI, 1.40–3.90] but this association was not observed among females [AOR, 0.89, 95% CI 0.59–1.34].

**Conclusion** Different patterns of daily macronutrient intake were observed among adolescents who skip and do not skip breakfast. Male breakfast skippers had an increased likelihood of being overweight/obese compared to non-skippers. These results may present an opportunity to identify and target adolescents who may be at risk of a poorer nutritional profile or being overweight/obese. Gender may play a key part in breakfast skipping behaviours. Interventions to target breakfast skipping may need to account for potentially different motivations for the behaviour among male and female adolescents.

**Disclosure of interest** The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.007

**Eating behavior and dietary intake in obesity prone normal weight children may be related to duration of exclusive breastfeeding**

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**Introduction** Infants who are breastfed are introduced to a variety of flavors from the maternal milk and thus the transition from maternal milk to complementary foods seems easier for these children. Our aim was to investigate if duration of exclusive breastfeeding was associated with pickiness or dietary...
intake of vegetables, fruit, starch or sugar sweetened beverages in obesity prone normal weight children aged 2–6 years.

**Methods** This cohort study was based on data from the Healthy Start primary intervention study, the Danish Medical Birth registry and the Danish Health Visitor’s Child Health Database. Infant feeding was registered by health nurses while visiting the mother and child up to four times within the first year. Information on eating behaviour at age 2–6 years and the child’s dietary intake were obtained by parents. Crude and adjusted logistic regression and general linear models were used to investigate associations.

**Results** A total of 236 children had complete information on all variables. Data showed a tendency towards a higher risk of developing picky eating when breastfed for < 4 months compared to exclusively breastfed for ≥ 6 months. Children breastfed for < 6 months did not show higher risk of pickiness compared to children breastfed for ≥ 6 months. In the crude analysis, breastfeed for ≥ 4 months was associated with a higher daily intake of vegetables (P = 0.04). However, in both crude and adjusted analysis, children breastfed for ≥ 6 months compared to children breastfeed for < 6 months had a higher daily intake of vegetables, corresponding to 23.3 g (12.9–34.5 g) in the adjusted analysis. These associations were not mediated by maternal education or degree of pickiness. Children breastfeed for < 6 months drank 30 g (15.3–44.7 g, P = 0.05) more sugar sweetened beverages per day.

**Conclusions** This study documents evidence that exclusive breastfeeding duration may influence pickiness and potentially facilitate the consumption of a healthier diet in later childhood in obesity prone normal weight children, which also have been reported in studies of children in general.

**Disclosure of interest** The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.008

**S1.3 Congenital heart disease, socioeconomic position and risk of preterm birth**

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**Introduction** More women with congenital heart disease are reaching childbearing age compared to earlier, due to advances in diagnosis and treatment. Women with congenital heart disease are at increased risk of obstetric and cardiovascular complications during pregnancy and childbirth. Likewise, studies indicate an increased risk of adverse neonatal outcomes such as premature birth and small birth weight. Preterm birth and low birth weight are strong predictors of neonatal morbidity and mortality as well as several diseases in adult life. Preterm birth is also known to differ by socioeconomic position. It is, however, unknown if the risk of preterm birth among women with congenital heart disease differs by socioeconomic position. We aim to test the hypothesis that women with congenital heart disease have higher risk of preterm birth, including extremely-, very- and moderately preterm birth and whether socioeconomic position modifies the risk.

**Method** The study was a prospective cohort study. We included all singleton deliveries registered in the Danish Medical Birth Register between 1997 and 2014 among women born in Denmark. Women were included in the cohort when they completed 22 weeks of gestation. Maternal congenital heart disease was identified through The Danish National Patient Register. Deliveries among women with congenital heart disease were compared to deliveries among women without congenital heart disease. Preterm birth was defined as given birth before 37 completed weeks of gestation and was categorized into extremely preterm birth (22–27 completed weeks), very preterm (28–31 completed weeks) and moderately preterm (32–36 completed weeks). Highest level of completed education the year prior birth was used as measure of socioeconomic position and obtained from the Danish Education Registers and grouped into three categories. Hazard ratios (HR) of preterm birth according to maternal congenital heart disease were estimated using a Cox proportional hazard model with gestational age as underlying time scale. The model was adjusted for education, maternal age, parity, calendar year, induction of labor and prelabour caesarean section. To test for interaction between congenital heart disease and educational level a model with the single term of variables were compared to a model including the interaction term using a nested log likelihood test.

**Results** A total of 934,314 births (7509 among women with congenital heart disease) were included in the sample for analysis. The overall proportion of preterm birth was 5.1% (47,737). The median gestational age was 280 days (interquartile range 173–187). The adjusted HR of any preterm birth was 1.38 (1.26–1.56). The HR of extremely-, very- and moderately preterm birth was 2.2 (1.59; 3.05), 1.34 (1.03; 1.75) and 1.34 (1.22; 1.48), respectively for women with congenital heart disease as compared to women without congenital heart disease. Education was strongly associated with any preterm birth. The HR of low and medium education as compared to high education was 1.71 (1.66–1.76) and 1.23 (1.20–1.26), respectively. The risk of preterm birth was higher in all strata of educational level; HR of preterm birth among women with low education was 1.37 (1.15–1.62), medium education 1.45 (1.26–1.67), high education 1.30 (1.09–1.54). The P-value of interaction between congenital heart disease and education was 0.54.

**Conclusions** Women with congenital heart disease were at increased risk of preterm birth when compared to women without congenital heart disease. The risk of given birth extremely preterm was more than twice as high for women with congenital heart disease. Education was strongly associated with risk of preterm birth and the risk of any preterm persisted in all strata of education.

**Disclosure of interest** The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.009

**S1.4 Sleeping patterns and association with health and school-related outcomes and behaviors among adolescents**

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**Context** Chronic sleep deprivation and other disorders have been shown to be strong determinants of poor well-being and health status in children and adolescents. Our first objective was to describe sleeping patterns among teenagers in French-speaking Belgium. In a second step, the associations of morning fatigue with health and school-related outcomes and behaviors were examined.

**Methods** The study was based on data from the 2014 Health Behavior in School-Aged Children (HBSC) survey conducted in French-speaking Belgium. The sample consisted of more than 14,000 10–20-year-old adolescents from the fifth grade of primary school to the last grade of secondary school. Self-reported indicators pertaining to sleep were first described in relation to gender and school grade. Controlling for sociodemographic characteristics such as family affluence, family structure and migration status, associations of morning fatigue with health and school-related outcomes (self-rated health, overweight status, multiple recurrent symptoms, school appreciation and self-perceived performance at school) and behaviors (sleep duration, time spent in front of a screen, sport frequency, experience of drunkenness, family dinner frequency and energy drink consumption) were estimated using multivariable logistic regression models.

**Results** Thirty percent of teenagers slept less than 8 hours per night during the week and 31.0% reported difficulties to sleep several times per week. Fifty-four percent experienced morning fatigue at least once a week. Girls, adolescents born abroad, those who reported a low family affluence and those living in a single family were more likely to report morning fatigue at least once a week. Morning fatigue was positively associated with poor self-rated health (OR = 2.60 [2.15–3.15]), school appreciation (OR = 2.26 [2.10–2.43]), self-perceived performance at school (OR = 1.58 [1.47–1.70]) and with multiple recurrent symptoms (OR = 2.96 [2.74–3.21]). Morning fatigue was more likely among adolescents who slept less than 8 hours per night (OR = 2.14 [1.91–2.39]), who spent 3 hours or more a day in front of a screen (OR = 1.53 [1.39–1.67]), who practiced sport less than twice a week (OR = 1.22 [1.23–1.33]), who consumed energy drinks at least once a week (OR = 1.14 [1.04–1.26]) and
Vitamin D prenatal programming of respiratory and allergic outcomes in childhood: What are observational studies telling us?

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\textbf{Introduction} Prenatal vitamin D status may influence offspring’s respiratory and allergic outcomes; however, evidence is inconclusive. A systematic review and meta-analysis was conducted on the association between 25-hydroxyvitamin D [25(OH)D] levels in maternal blood in pregnancy or cord blood at birth with the risk of offspring’s respiratory and allergic conditions.

\textbf{Methods} Two independent researchers conducted systematic searches for observational studies published using defined keywords on vitamin D and health outcomes, including respiratory tract infections (RTIs), wheeze, asthma, atopic eczema, allergic rhinitis, allergic sensitization and lung function. Random-effects meta-analyses were conducted. Heterogeneity among studies was tested by using the Cochran Q test and quantified by using the I\textsuperscript{2} statistic. Publication bias was examined by using Funnel plot and Egger’s regression asymmetry test. Modification of effects by selected factors was assessed, including time at exposure assessment, offspring’s age at health endpoint, outcome assessment, test. Modification of effects by selected factors was assessed, including time at exposure assessment, offspring’s age at health endpoint, outcome assessment, test. Modification of effects by selected factors was assessed, including time at exposure assessment, offspring’s age at health endpoint, outcome assessment, test.

\textbf{Results} A total of 34 from 547 retrieved articles were included. Articles were based on 26 separate study populations, including 25 longitudinal birth cohorts and one case control study, from 16 different countries (latitude ranging from 55\degree N to 31\degree S). Increased prenatal exposure to 25(OH)D was inversely associated with risk of RTIs. Comparing the highest with the lowest category of 25(OH)D levels, the pooled odds ratio was 0.64 (95\% CI 0.47, 0.87). A positive borderline association was found for lung function at school age (FEV1 \textit{z-score} coefficient 0.07, 95\% CI −0.01, 0.15). No associations were found for wheeze, asthma, atopic eczema, allergic rhinitis and allergic sensitization. After subgroup analysis, stronger inverse associations were found between prenatal vitamin D and risk of RTIs within the first 6 months of life, and between cord blood vitamin D levels and RTIs. A stronger inverse association was found for asthma occurrence within the first 5 years of life, but no later in childhood. A stronger association between prenatal vitamin D levels and risk of atopic eczema during childhood was detected at higher latitude.

\textbf{Conclusions} Current evidence from observational studies indicates that exposure to higher levels of vitamin D in utero may protect against early-life respiratory tract infections in offspring during childhood. However, epidemiological evidence from observational studies does not support an impact of prenatal vitamin D status in offspring’s risk of asthma and allergic manifestations. Additional studies are warranted to confirm the potential benefits for lung function development.

\textbf{Funding} Spanish Instituto de Salud Carlos III (Ministry of Economy and Competitiveness) and Fondos FEDER (Fellowship number: MS14/00046).

\textbf{Disclosure of interest} The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.010
Conclusions  Our results may indicate that the observed inverse association between parental education and risk of CP in the child is not entirely attributable to factors unobserved family-level factors shared between siblings. There is a wide range of possible underlying causal mechanisms, at least some of which seem potentially preventable and should be further explored.

Disclosure of interest  The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.012

Session 2–Life course epidemiology and ageing

Wednesday the 4th of July, 2018 – 11:30 am–01:00 pm

S2.1 Do birth cohorts make a difference for deficit accumulation trajectories in older age? First results from the KORA-Age study

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Introduction  Higher age is related to higher numbers of accumulated health deficits. However, to date it remains unclear how much of this association is due to age effects, how much is contributed by birth cohort effects and if a general trend of compression or expansion of morbidity can be assumed. The objective of this study was to investigate the role of cohort effects with regard to health deficit accumulation (DA) trajectories in people aged 65 and older.

Methods  Data originates from the baseline assessment of participants aged 65–71 years in 2008 (i.e. born 1937 to 1943) from the KORA (Cooperative Health Research in the Region of Augsburg)-Age study in Southern Germany as well as from an independent assessment in 2015 consisting of a younger birth cohort (aged 65–71 years in 2015, i.e. born 1944 to 1950). All participants were former participants of the population representative MONICA/KORA surveys conducted between 1984 and 2001. DA was measured with a Frailty Index (FI). This KORA-Age FI includes in total 33 items, covering 10 diseases, 13 measures of functioning and 10 signs and symptoms. All deficit items were coded as values between 0 (deficit absent) and 1 (deficit fully present). The FI for a person results as the number of the person-specific deficits divided by the total number of listed deficits. Thus, FI scores range from 0 (= no deficits present) to 1 (= all deficits present). If a participant scored missing on one or more of the deficit items, the denominator of the FI was reduced accordingly. Age-specific mean FI values were plotted birth cohort aged 65–71 years in 2008 (FI = 0.136, P = 0.1071). Plotting birth cohort and sex-specific FI averages by age revealed that both birth cohorts started at the same FI levels, but thereafter, age-specific FI values were higher for the younger birth cohort and for women, specifically for those born in 1944 and 1945. These results were partly confirmed by the GLM. Higher age, especially for those aged 70 (RR: 1.23, KI [1.13; 1.34]) and those aged 71 years (RR: 1.23, KI [1.14; 1.34]) as compared to those aged 65 years, was associated with higher FI values. Also female sex (RR: 1.14, KI [1.09; 1.19]) was independently, significantly and positively associated with higher FI values. Having been born 1944–50 (RR: 1.04, KI [1.00; 1.09]) was positively associated with higher FI values, but the effect was not significant (P = 0.059926).

Conclusion  Based on our comparison of adults of the same age from different birth cohorts, an expansion of morbidity cannot fully be excluded. This seems to be largely due to the comparatively high levels of deficit accumulation for women born in 1944 and 1945, which coincides with the last years of World War II. Further research is warranted to investigate how specific life course experiences including deprivation in critical developmental periods for these cohorts may have contributed to these effects.

Disclosure of interest  The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.013

S2.2 Impact of changes in tobacco smoking prevalence on death, dementia and disability in England and Wales, 2017–2040: A modelling study

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Background  There is considerable morbidity and mortality associated with smoking globally and in the UK. We aimed to estimate the impact of two scenarios for reduction of smoking prevalence on numbers of deaths, life expectancy and incidence of dementia and disability to 2040 in England and Wales.

Methods  A probabilistic Markov model, IMPACT-BAM, was developed to integrate calendar trends in incidence of cardiovascular disease (CVD), dementia, disability and mortality to forecast future prevalence of these conditions in addition to numbers of deaths from cardiovascular and non-cardiovascular causes in the population of England and Wales. Disability is defined as the inability to independently conduct one or more basic activities of daily living. Data from the English Longitudinal Study of Ageing (ELSA) and Office for National Statistics were used to inform the model. Systematic reviews and meta-analyses of published literature provided relative risks of CVD, dementia, disability and mortality for smokers versus non-smokers, by age and sex. These estimates were used to modify model parameters and forecast the impact of smoking on morality, dementia and disability to 2040 under three scenarios: S1. Prevalence of smoking remains at 2017 levels, 19% in men and 17% in women, up to 2040 (baseline scenario); S2. Prevalence of smoking is reduced to 9% by 2020 and 5% by 2025 (taper scenario); S3. Smoking is eliminated by 2020 (elimination scenario).

Results  If prevalence of smoking remains at 2017 levels (S1), there will be an estimated 952,000 (95% Uncertainty Interval 808,000–1,153,000) deaths from cardiovascular causes and 10,624,000 (9,562,000–11,776,000) deaths from non-cardiovascular causes between 2017 and 2040. If prevalence of smoking declines gradually to 2025 (S2) 35,000 (29,000–43,000) CVD deaths and 408,000 (373,000–443,000) non-CVD deaths could be prevented or postponed. If smoking is eliminated (S3), the corresponding figures are 84,000 (68,000–105,000) and 843,000 (764,000–907,000) deaths. If prevalence of smoking remains constant (S1), cumulatively between 2017 and 2040, 5,073,000 (95% UI 4,868,000–5,256,000) persons are estimated to develop dementia and 6,690,000 (95% UI 6,483,000–6,869,000) persons are estimated to develop
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Disclosure of interest

and disability.

non-cardiovascular causes and yield gains in life expectancy free of dementia
tially have a considerable effect on postponing deaths from cardiovascular and

Conclusion

and disability.

under S3 (27.4 [24.5, 31.1]). Half the increase in LE will be free of dementia
nario (S1) LE at 65 will increase from 21.8 years (95% UI 21.7, 22.0) in 2017 to

(47,000–73,000) cases of disability can be prevented or postponed under the
tot l of 56,000 (17,000–88,000) cases of dementia and 34,000 (22,000–40,000)
cases of dementia and 57,000

C. Van Aart a

Introduction

and longitudinal age and sex adjusted mixed linear regression models addressed
in blood samples using a quantitative real-time PCR method. Cross-sectional
using standardized protocols. Average relative telomere lengths were measured
(25-hydroxy vitamin D) concentrations were measured at baseline and in 2015
2010–2015 (aged 4.7–10.7 years old at baseline, 50.4% boys). Serum vitamin D
D was not associated with telomere length in cross-sectional analysis combining
both sexes, but in boys higher vitamin D was related to longer telomeres. An

Methods

Healthy Belgian children (n = 142) were followed-up between
2010–2015 (aged 4.7–10.7 years old at baseline, 50.4% boys). Serum vitamin D
(25-hydroxy vitamin D) concentrations were measured at baseline and in 2015
using standardized protocols. Average relative telomere lengths were measured
in blood samples using a quantitative real-time PCR method. Cross-sectional
and longitudinal age and sex adjusted mixed linear regression models addressed
the association between vitamin D and telomere length.

Results

Telomere length was shorter with increasing age (P = 0.01). Vitamin
D was not associated with telomere length in cross-sectional analysis combining
both sexes, but in boys higher vitamin D was related to longer telomeres. An
interquartile increase in vitamin D (9.4 ng/mL) was associated with a 2.5% (95% confidence interval: 0.1 to 4.9%; P = 0.004) increase in telomere length. Longitudinal analysis showed similar results for boys (P = 0.02).

Conclusion

This study over a 5-year period suggests that higher vitamin D concentrations are associated with longer telomere length in boys. These findings highlight the potential beneficial effects of vitamin D on ageing, especially since vitamin D concentrations might be easily adjustable through nutritional supplements.

Disclosure of interest

The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.014

S2.4

Circulating antioxidants and Alzheimer’s disease prevention: A Mendelian randomization study

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Introduction

Late-onset Alzheimer’s disease (AD) has emerged as a paramount public health challenge in European countries. Of crucial importance is the identification of environmental risk factors that could be modified at a population level to help limit AD onset among ageing individuals. Higher circulating antioxidant concentrations are associated with a lower risk of AD in observational studies. However, this evidence is prone to substantial biases, including reverse causation and residual confounding. To further infer whether long-term circulating antioxidant exposure has a role in AD etiology, we tested the hypothesis that AD risk would be lower in individuals with lifelong, genetically predicted increases in concentrations of five circulating antioxidants.

Methods

Two-sample Mendelian randomization analyses were conducted. First, published genetic association studies were used to identify single nucleotide polymorphisms (SNPs) that determine variation in circulating ascorbate (vitamin C), beta-carotene, retinol (vitamin A), and urate. Second, for each set of SNP data, statistics for genotype associations with AD risk were extracted from data of a genome-wide association study of late-onset AD cases and controls (n = 17008; 37154, respectively). Inverse-variance weighted meta-analyses were primarily used to combine ratios of coefficients for the five sets of SNP-exposure and SNP-AD associations. Additional analyses assessed the potential impact of bias from pleiotropy on estimates.

Results

Models suggested that genetically determined differences in circulating ascorbate, retinol and urate are not associated with AD risk. Also contrary to previous observational findings, higher predicted beta-carotene exposure was associated with a very slight increase in AD risk: odds ratio per 10% higher beta-carotene = 1.02 (95% confidence interval: 1.00, 1.04, P = 0.002). Potential limitations to the analyses included the possibilities of low power for the ascorbate and retinol analyses.

Conclusions

These findings suggest that higher exposure to several antioxidants would not lower risk of AD development. Replication Mendelian randomization studies could examine this question further, ideally with the use of additional variants to instrument each antioxidant, and with larger AD case-control samples.

Disclosure of interest

The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.016

S2.5

Inflammatory markers are associated with age-related hearing impairment: The English longitudinal study of ageing

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Introduction

Hearing impairment is very common at older age (more than half of the European population suffer from hearing loss by age 80 years) and has considerable social, health and economic implications. Age-related hearing loss being currently incurable, there is a need to identify modifiable risk factors. Origins of hearing impairment are multifactorial and a shared etiology with cardiovascular disease has been suggested in older adults. Systemic inflammation is a hallmark of ageing, and has been consistently associated with cardiovascular outcomes. The relationship between inflammation and hearing at older age, however, has been little studied. Our aim was to investigate the association
between several markers of inflammation, namely C-reactive protein (CRP), fibrinogen and white blood cell count (WBCC) and objectively measured hearing impairment.

**Methods** The sample consist of participants in the English Longitudinal Study of Ageing, free of hearing impairment and aged 50 to 93 at baseline (wave 4, 2008–2009). They provided serum levels of CRP, fibrinogen and WBCC during the nurse visit at wave 4, as well as during the follow-up nurse visit at wave 6 (2012/2013). We excluded CRP values > 20 (n = 134 at wave 4 and n = 112 at wave 6) because they are likely to reflect acute infection. For each of the three markers, we averaged the two measurements to gain precision and better reflect chronic inflammation. Hearing was self-reported at baseline (5-item scale from excellent to poor) and participants (n = 752) who rated their hearing acuity as poor or fair were excluded. At wave 7 (2014/2015), hearing acuity was objectively measured with a simple handheld device which produces a fixed series of six pure tones (55, 35 and 20 dB HL at 1 kHz and 75, 55, and 35 dB HL at 3 kHz). Hearing impairment was defined as hearing fewer than six tones in the best hearing ear. Logistic regression models were fitted to estimate the relationship (odds ratios [OR] and 95% confidence intervals [CI]) between inflammatory markers and hearing impairment. Models were adjusted for age, sex, smoking, body mass index, physical activity, education and cognitive function. CRP and WBCC were log-transformed to improve normality Restricted cubic splines were used to test nonlinearity by using the likelihood ratio test, comparing nested models with a linear or linear and cubic spline terms.

**Results** Among 3627 participants aged 62 years (inter quartile range 58–69) at baseline (2008), 1149 (31.7%) people presented hearing impairment in 2014. In models adjusted for age and sex only, all three biomarkers were positively and linearly associated with odds of hearing impairment: CRP OR (doubling of CRP) = 1.04; 1.02, 1.07; fibrinogen OR (increase 1 g/L fibrinogen) = 1.25; 1.07, 1.46; WBCC OR (doubling of WBCC) = 1.25; 1.14, 1.36. After introduction of confounders including CVD risk factors (BMI, physical activity, smoking) in the model, CRP OR (1.02; 0.99, 1.05) and fibrinogen (1.08; 0.91, 1.27) became non-significant. WBCC, however, remained significantly associated with hearing impairment in the fully adjusted model with an OR of 1.15; 1.05, 1.27 for each doubling of WBCC. When all three inflammatory markers were included in the model, only WBCC was associated with hearing impairment (OR = 1.13; 1.02, 1.25).

**Conclusions** In a nationally representative cohort of English older adults, chronic inflammation was associated with incident hearing impairment, in particular measured by elevated white blood cell counts. These results, if replicated, offer potential for monitoring and eventually prevent hearing impairment.

**Disclosure of interest** The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.017

S2.6 Peripapillary retinal nerve fiber layer thickness and cognitive function across the adult lifespan in the Rhineland study

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Introduction Decreasing retinal nerve fiber layer thickness (RNFL) has been associated with an increased risk of developing cognitive impairment in older adults. This may indicate that the integrity of retinal axons partially parallels that of the central nervous system. However, it is not clear from previous research whether RNFL thickness is associated with cognitive performance in cognitively normal adults. In this cross-sectional study, we used spectral-domain optical coherence tomography (SD-OCT) and detailed cognitive evaluations to determine the degree to which peripapillary RNFL (pRNFL) thickness is associated with cognition across the adult lifespan in a large community-based sample.

**Methods** The data used for this investigation were obtained from 1306 participants of the on-going longitudinal Rhineland Study (age range = 30–95 years). During participants’ first visit, pRNFL thickness was measured using SD-OCT and neuropsychological assessments were completed as part of a larger battery. Cognitive performance was assessed in executive function, working memory, episodic memory and crystallized intelligence. Z-scores were calculated for continuous variables. We used linear regression analysis to quantify the strength of the relationships between pRNFL and cognitive test scores, expressed as difference in Z-score per SD increase in pRNFL. We performed three analyses: unadjusted; adjusted for age; adjusted for age, hypertension, refraction and visual acuity. Sensitivity analyses were conducted to determine whether the presence of cataracts or glaucoma influenced results.

**Results** Participants with missing pRNFL (n = 50) or covariate (n = 47) data were excluded, leaving preliminary results available for 1209 participants, who had a mean age of 56 years (SD = 14 years) and comprised more women than men (56%). Overall, mean thickness of pRNFL was 99.91 μm (SD = 11.06 μm), and each additional year of participant age was associated with a thinning in pRNFL of 0.18 μm (95% CI = 0.13–0.23). In unadjusted models, thicker pRNFL was associated with better performance in executive functioning (0.15 SD, 95% CI = 0.09–0.21) and episodic memory (0.13 SD, 95% CI = 0.06–0.17), with worse performance in crystallized intelligence (0.08 SD, 95% CI = 0.02–0.14) and was not associated with working memory performance (0.03 SD, 95% CI = −0.02 to 0.09). These small effects largely disappeared upon adjustment for age and were no longer statistically significant (episodic memory: 0.04 SD, 95% CI = −0.01 to 0.10; crystallized intelligence: −0.04 SD, 95% CI = −0.10 to 0.02), except for the association of pRNFL and executive function (0.06 SD, 95% CI = 0.00–0.12). Further adjustment for hypertension, refraction and visual acuity did not change this latter relationship (0.07 SD, 95% CI = 0.01–0.12). The removal of participants with prevalent cataracts or a diagnosis of glaucoma did not affect the point estimate of the association of pRNFL with executive function, yet the 95% CI widened due to the smaller sample size (0.07 SD, 95% CI = −0.01 to 0.12; n reduction = 145).

**Conclusion** In this exploratory investigation, we observed that pRNFL thickness was not associated with cognitive performance after adjustment for age, aside from a small association with executive function.

**Disclosure of interest** The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.018

**S3.1 International trends in cancer incidence and mortality among older adults, 1983–2012**

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**Introduction** In 2012, about half of all new cancer diagnoses and deaths were estimated to occur among people age 65 years and older; these will be around two third by 2035. Assessing trends in cancer incidence and mortality in this growing population is of great importance to understand the impact of cancer on this vulnerable population and to design cancer control and management plans. We therefore described temporal trends in incidence and mortality for the most common cancers—i.e. breast, prostate, colorectal and lung cancers—in adults aged 65 years or older in 17 countries with long history of population-based cancer registration.

**Methods** Data on incidence for cancers of the colorectum, breast, prostate and lung from 1983 to 2012 were obtained from the Cancer Incidence in Five Continents in 17 countries in Asia, northern America, central and south America,

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northern Europe, western and southern Europe and Oceania. Cancer mortality data were obtained from the World Health Organization mortality database. Country- and sex-specific truncated age-standardized rates (65 +) and average annual percentage changes were calculated.

**Results** Between 1983 and 2012, incidence rates of colorectal cancer have increased between +0.4–22% on average annually in older males and between +0.0–15.7% in older females in most countries under study, while incidence rate has significantly decreased in USA (−8.3% in females and −10.6% in males). In contrast, mortality from colorectal cancer has decreased in all countries from −10.5% in Switzerland to −0.8% in Singapore but it has significantly increased in Costa Rica (+5.5% in males and 2.8% in females) and Spain (8.7% in males and +1.6% in females). The incidence of prostate and breast cancers has increased in almost all countries between 2.6% in Canada and +38.8% in Japan for prostate cancer and between +1.1% in USA and 19.4% in Japan for breast cancer. However, prostate and breast cancer mortality rates have decreased in most countries, except in Costa Rica (+4.5% and +3.3% for prostate and breast cancers respectively), Japan (+8.6% and +13.4%) and Singapore (+9.4% and +6.1%). In almost all countries, incidence and mortality rates for lung cancer have greatly increased in females over the 30-year period following the smoking epidemic pattern (from 5.2% and 0.7% respectively in Japan to 35.8% and 26.0%, respectively in Netherlands), while lung cancer in males are largely decreasing, notably in UK, Netherlands and Finland (−10% per year on average for incidence and mortality rates).

**Conclusion** Decreasing deaths from cancer in older adults might probably be related to earlier cancer detection and better management. Yet, the rising expected rise in the number of new older cancer patients must encourage the care resources and therefore prevention programs needs to be strengthened. The expected rise in the number of new older cancer patients must encourage the development of geriatric oncology worldwide.

**Disclosure of interest** The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.019

### S3.2 Geographical disparities in chronic lymphoid leukemia: Clues to an environmental etiology?

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**Introduction** Previous studies have shown marked geographical and ethnic differences in Chronic Lymphoid Leukemia (CLL) incidence, particularly between Asian and Western countries. The causes of CLL remain largely unknown, but genetic and environmental factors could be involved. To better understand the drivers of CLL incidence in North America, Oceania and Asia, we assessing national and subnational data using age-period-cohort models.

**Methods** Incidence data for CLL were obtained from the Cancer Incidence in Five Continents series, from North America, Oceania and Asia, the former including Asians who lived in Los Angeles, grouped by ethnicity (Japanese, Chinese, Philippines and Koreans). We computed the age-specific incidence rate per 100,000 inhabitants and the age-standardized rate (ASR) using the world population as reference population. Age-period-cohort models were performed by country and sex using Poisson regression for ages 30–85.

**Results** Among men, overall rates were markedly higher in New Zealand (12.4), Canada (10.2), United States (9.6) and Australia (8.8) than in Japan (0.3), Republic of Korea (0.4) and Thailand (0.5), with similar patterns in women. Examining trends, while there appeared to be little evidence of a birth cohort effect among US whites, Asians living in the US were at increasing the risk in successive generations, from 1960. A similar cohort effect was observed in Australia and Philippines, with Japan Singapore exhibiting both period and cohort effects.

**Conclusion** Our results indicate marked disparities in CLL incidence between American, Oceania and Asian countries. The finding of strong cohort effects among young generations suggests that lifestyle changes and more diagnosis access may have an important role in CLL incidence.

**Disclosure of interest** The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.021

### S3.3 Global trends and projections in colorectal cancer mortality

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**Introduction** Colorectal cancer (CRC) is one of the most common cause of cancer death worldwide. Mortality rate from CRC has been decreasing in many high-income countries yet in many low and middle-income countries its rate continues to rise. The lack of resources and basic health infrastructure may face many developing countries with important challenges to decrease the CRC mortality rates. Past trends and future predictions of CRC mortality can inform health planners and raise awareness of the need for cancer control action.

**Methods** Numbers of deaths from malignant neoplasms of the colon (ICD-10 C18) and the rectum (C19–21) were obtained from the World Health Organization (WHO) mortality database for the period 1988–2012, by year, sex and age for 49 countries, where high quality data were available for the period of interest. To predict numbers of deaths and mortality rates of colon and rectal cancer up to 2035, we fitted a log-linear age–period–cohort model. We reported both numbers of expected deaths and age-standardized mortality rates per 100,000 person-years for the total population studied as well as country and subsite.

**Results** Mortality rates for colon and rectal cancer are predicted to continue decreasing in most populations studied (32 out of 49 countries), except for most countries in Latin America and the Caribbean. Where rates have decreased in the past, colon cancer mortality rates for these countries combined was 7.2 in 2012 and is expected to be 6.6 per 100,000 person-years in 2035. In countries where rates have increased, the rate was 6.7 in 2012 and will be 7.4 by 2035. In most countries where colon cancer rates have decreased, we also predicted a decline in future rectal cancer mortality (ASR: 3.5 in 2012 and 3.2 in 2035), except, in Ireland, United Kingdom, Australia, Canada and United States, where age-standardized rates are predicted to increase by 2035 (ASR 4.1 vs. 2.9 in 2012). Despite contrasting trends in rates, number of deaths is expected to rise for both colon and rectal cancer in all countries (colon cancer: from 203,690, to 304,440 between 2012 and 2035 (+49.4%), respectively, and rectal cancer: 85,547, and 136,948 in 2012, and 2035, (+60.0%) respectively).

**Conclusions** We highlight further decline in colon and rectal cancer mortality rates in most of countries studied, which however will not compensate the expected rise in number of deaths from this cancer, mainly due to population ageing and growth. Projected reductions of colon and rectal cancer mortality rates in Europe, North America and Oceania are partly related to earlier detection and improved cancer management. The predicted increases in rectal cancer mortality rates in some developed countries are worrisome and warrant further investigations.

**Disclosure of interest** The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.021
S3.4 Determinants of functional decline and survival in elderly people following cancer diagnosis: the need to consider geriatric factors

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** Background **
Growing incidence of cancer in aging population is an epidemiologic reality and the disparate prognosis in elderly needs to be addressed. Studies on these aspects are limited and usually overlook geriatric-specific factors. The aim of this work was to study determinants of prognosis in elderly after cancer diagnosis.

** Methods **
Subjects aged ≥ 65 years from elderly cohorts (PAQUID, 3C, AMI), alive on January 1st 2005 and with a validated cancer diagnosis recorded in cancer registries of Gironde, a French department, from January 1st 2005 through to December 31st 2014 were included. Functional decline (FD) and overall survival (OS) were the primary outcomes. Functional status was measured using the Instrumental Activities of Daily Living (IADL) and the basic Activities of Daily Living (ADL) scales. FD was measured between cancer pre- and post-diagnosis cohort visits. FD was considered as occurrence of ADL limitation (severe disability) and occurrence of ADL and/or IADL limitation (mild disability). As probability of FD accelerates as death approaches, a composite outcome of either occurrence of ADL limitation or death was also considered. Survival time was measured from the date of diagnosis until patient’s death or 31st of July 2017, whichever came first. Age at diagnosis, sex, living alone, education, diagnosis stage, treatment, smoking status, polypharmacy, depressive symptomatology, cognitive impairment or dementia and general practitioners (GP) per 100,000 inhabitants were the variables studied. For FD determinants, subjects with disability at baseline (severe or mild depending on analysis) were excluded. Logistic regression models were performed and adjusted on cohort study and delay between pre- and post-diagnosis visits or death. For determinants of OS, Cox models were fitted and adjusted on cohort study and age at diagnosis. To account for different levels, we applied random effects with clustering at the level of the number of GPs. Only multivariate models were reported as variances were non-significant. Analyses were case-completed.

** Results **
A total of 486 subjects were included in the study. The median age at cancer diagnosis was 83 years. Overall, 55% were male, 51% had an education higher than primary school, 62% did not live alone, 59% took 6 or less daily drugs and 87% did not present either cognitive impairment or dementia. Over 25% of subjects were diagnosed at advanced cancer stage and 77% received cancer treatment. At the post-diagnosis visit, 258 (53%) subjects were seen, 43 (9%) were lost to follow-up and 185 (38%) were dead. OS after cancer diagnosis was 77%, 66% and 41% at six months, 1 and 2 years, respectively. Regarding FD, in the final model, older age (OR = 18.3; 95% CI = 3.7–90.9), presence of cognitive impairment or dementia at the pre-diagnosis visit (OR = 8.3%; 95% CI = 2.6–27.0) and an advanced stage of cancer at diagnosis (OR = 4.7; 95% CI = 1.3–16.7) were associated with a significantly higher risk of severe disability. In the mild disability analysis, subjects with a higher education than primary school (OR = 0.4; 95% CI = 0.2–0.9) were at lower risk, while older age (OR = 3.3; 95% CI = 1.3–8.7) and those taking 6 or more daily drugs (OR = 2.39; 95% CI = 1.0–5.2) were at higher risk. Regarding OS, current or former smoker patients (HR = 1.44 95% CI = 1.06–1.95), presenting low (HR = 1.63 95% CI = 1.16–2.29), moderate (HR = 2.62 95% CI = 1.80–3.83) or high disability (HR = 5.85 95% CI = 2.10–16.75), diagnosed at advanced stage (HR = 3.97 95% CI = 3.00–5.25) and not receiving treatment (HR = 1.98 95% CI = 1.44–2.71) had higher risk of death, while women had lower risk (HR = 0.66 95% CI = 0.48–0.90).

** Conclusion **
In addition to classical determinants of prognosis in cancer, we demonstrated the impact of cognitive impairment on FD and that of disability on OS. It appears essential to consider geriatric factors in outcomes studies on the elderly cancer population.

Disclosure of interest
The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.022

S3.5 Global cancer incidence in older adults in 2012

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** Introduction **
Population aging has substantially contributed to the rising number of new cancer cases worldwide. Little has been done to study cancer incidence in older population globally. We thus presented the cancer incidence in people aged 65 years and older along with the projected number of new cancer cases in 2035 by world regions.

** Methods **
We extracted incident cancer cases for 184 countries from the GLOBOCAN 2012 database. We presented the number and the proportion of all cancers, and the truncated age-standardized incidence rates among 65+ for all sites-combined and the 5 most common cancers by world regions. We also calculated the future incidence in 2035 by applying projected population estimates, assuming no changes in rates.

** Results **
In 2012, 6.7 million new cancer cases or (47.5% of all cancers) were diagnosed among older adults worldwide, with 48% occurring in the less developed regions. Over two thirds of all new cases were found in Europe and Asia including China. Lung, colorectal, prostate, stomach and breast cancers represented 55% of the global incidence among the elderly, yet distinct regional pattern was observed e.g. cervix uteri cancer in Sub-Saharan Africa. By 2035, 14 million new cancer cases (68% all cases) are expected in older population. The highest increase is predicted in the Middle East and Northern Africa (+157%), and in China (+155%). Less developed regions will see an increase of 144% of new cancer cases compared to 54% in more developed regions.

** Conclusion **
The expected increase of cancer incidence at older ages will have a major impact on the society and challenge oncological practices and health care systems in all global regions in particular those with limited economic resources.

Disclosure of interest
The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.023

S3.6 Cancer prevention in Europe: how many cancers can be prevented?

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** Background **
In Europe, cancer is a major cause of illness and deaths. An estimated 3.4 million new cancer cases were diagnosed in 2012, and this is expected to continue rising to 4.1 in 2030 despite large expenditure being spent on early detection and cancer treatment. Here we sought to assess the potential in cancer prevention by estimating the avoidable numbers and proportions of 17 cancers amenable to prevention in Europe.

** Method **
We extracted data from the GLOBOCAN 2012 for cancers of the lip, oral cavity and pharynx, esophagus, stomach, colon/rectum, liver, gallbladder, pancreas, liver, melanoma of skin, breast, cervix uteri, corpus uteri, ovary, kidney and renal pelvis, bladder, acute myeloid leukemia in 40 European countries. These cancers have shown convincing relation to six major cancer
risk factors: smoking, alcohol, overweight, physical inactivity, unhealthy diet and solar ultraviolet. We assumed that the lowest observed rate to be attainable throughout Europe. The difference between the age- and gender-specific national cancer incidence rates and the lowest rate observed in 2012 was estimated and defined here as “potentially preventable”.

**Results**

1.5 million cancers or 43% out of all cancers, which were almost equally distributed by sex (48% in males), were potentially preventable. Among men, the proportion was largest in Hungary (57%) and among women, in Denmark (59%). Despite large variation by country and region, large proportion of preventable cancers was related to large proportion of cancers related to smoking and alcohol drinking (lung, head and neck and bladder cancers).

**Discussion**

The potential for cancer prevention in Europe is large; about 4 out of 10 cases could be potentially avoided. Interventions directed at reducing smoking and alcohol use as well as taking up other healthy lifestyle options are key to reduce the cancer burden in Europe.

**Disclosure of interest**

The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.025

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**S4.2 The impact of tobacco control policies on smoking among older adults: A longitudinal analysis of 10 European countries**

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**Background**

Comprehensive tobacco control policies have been introduced in many European countries during the last decades. Earlier studies suggested an important impact of these policies on smoking behaviors on adults and teenagers. However little attention has been put to old adults, even though smoking cessation at old ages can still bring significant life expectancy gains. Our aim is to evaluate the impact of tobacco control policies on smoking among older adults in Europe from 2004 to 2013.

**Methods**

We used longitudinal data from the Survey of Health, Ageing and Retirement in Europe (SHARE) from 4 waves from 2004 to 2013. We measured the implementation of Tobacco Control Policies with the Tobacco Control Scale (TCS). We used linear probability models with country and wave fixed effects and panel data models with individual fixed effects [AK1] to relate the implementation of tobacco control policies with changes in smoking status. Furthermore, we studied whether these associations vary by education, sex and age.

**Results**

A 10-points increase in TCS was associated with a drop in the probability of smoking by 1.1 pp, at a close to significance level (P-value = 0.091). Pricing was found to be most strongly associated with smoking (P-value < 0.01), whereas smoke-free policies were also associated with drops in smoking at almost significant level (P-value = 0.074). The negative association between TCS and smoking was observed particularly among the mature adults (50–65 at baseline) and among those with lower or intermediate levels education. By contrast, no relation between TCS and smoking was found among the elderly (65+) and among those with high education.

**Conclusion**

Our results suggest that tobacco control policies have significantly reduced smoking prevalence among the European older adults from the year 2004. Rises in prices seem to be the most effective policies as compared to others, especially among the lowest educated.

**Disclosure of interest**

The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.026

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**Session 4–Use and prevention of alcohol and tobacco**

**Wednesday the 4th of July, 2018 – 04:00 pm–05:30 pm**
Non beverage alcohols in Russia: Were they still consumed for drinking in 2015–2017?
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Methods
Between December 2015 and April 2017, we have conducted a cross-sectional survey aiming to identify the very fact of use of NAs for drinking, at any time during one-year preceding interview, by subjects with substance use disorders recruited from inpatient wards of the Republican Narcological Dispensary (the governmental narcology clinic) of the Ministry of Health of Republic of Tatarstan, Kazan, Russia. The prevalence of NAD, associated sociodemographic factors, types of NAs consumed and other aspects were investigated. Information was collected via interview with employment of structured questionnaire after obtaining informed consent to participate.

Results
Au total, 302 subjects agreed to participate. The response rate for survey was 52.3% among men and 73.7% among women. The mean age of surveyed participants was 41.6 ± 10.5 years. Among those who reported on status of their NAD (76.2%, 230/302) the prevalence of NAD was 75.8% (135/178) in men and 57.7% (30/52) in women. The highest prevalence in both genders was found among subjects who were in an irregular paid work: 84.0% (79/94); however among men in an irregular paid work it was even higher: 86.9% (73/84). Au total, 72 subjects who did not report if they were drinking NAs or not during the past year, did not differ by age, gender, education, marital or employment status (P > 0.05) from those who reported on their NAD status. On a univariate level males OR = 2.30 (95% CI: 1.20–4.40), subjects working on an irregular paid work OR = 5.90 (2.73–12.76), or unemployed seeking work OR = 3.36 (1.49–7.56) had higher odds of NAD in comparison with those in a registered or non-registered marriage and in a regular paid work, respectively. Adjusted positive association with NAD was seen for males OR = 2.48 (1.14–5.43), subjects being on an irregular paid work OR = 5.0 (2.16–11.56), and for unemployed seeking OR = 3.55 (1.45–8.71), and not seeking work OR = 3.90 (1.09–13.95). The spectrum of NAs, which were reported as consumed for drinking, was quite diverse. The major sorts included rectified ethanol (up to 95% by volume). Back in 2006 Russia tightened legislation in an attempt to suppress nonbeverage alcohol drinking (NAD); however, during the past several years no systematic research was published to assess this risky behavior or to evaluate effectiveness of implemented regulations.

Conclusions
Given the magnitude of alcohol problem in Russia, our findings appear quite striking in a sense, that all major sorts of nonbeverage alcohols appeared to be consumed for drinking ten years after implementation of 2006 alcohol control legislation, which was specifically aimed at reduction of their consumption. Reinforcement of previously implemented restrictive measures, as well as the introduction of new regulations targeting NAs should be a priority in the Russian alcohol control policy.

Disclosure of interest
The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.027

What differentiates teenage users of electronic cigarettes from users of tobacco products?
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Methods
We test individual and social factors distinguishing e-cigarette use and tobacco use among 12 to 19 years olds participating in the “Paris sans Tabac” (Smokeless Paris, PST) study, a yearly repeated cross-sectional survey conducted among secondary school students in Paris, France between 2013 and 2017. Junior high schools (n = 9017) and high-schools (n = 8418) in Paris were selected based on a clustered sampling design; quotas were then applied to balance school levels and characteristics. Each year approximately 3500 students were included in the study. Students completed self-reported questionnaires assessing demographic, individual, family smoking characteristics as well as their own tobacco, alcohol, cannabis and e-cigarette use. Current e-cigarette or tobacco use was defined as use in the preceding 30 days. Data were analyzed using marginal multinomial logistic regression models in which tobacco smokers who did not use e-cigarettes served as the reference group.

Results
In total, 17,435 students with complete data (median age 16 years) were included across five study waves. Au total, 2.3% (n = 392) students reported exclusive e-cigarette use, 7.9% (n = 1370) tobacco use without e-cigarette use and 3.2% (n = 555) tobacco and e-cigarette use. Compared to current tobacco smokers who did not use e-cigarettes, current e-cigarette users were more likely to have initiated smoking using an e-cigarette or water-pipe rather than cigarettes (adjusted Odds-Ratio [OR] = 9.59, 95% CI = 4.81–19.13 and OR = 2.27, 95% CI = 1.23–4.20, respectively) and less likely to use cannabis (OR = 0.12, 95% CI = 0.06–0.23). Other factors associated with a low probability of being an exclusive e-cigarette user were age (OR = 0.28, 95% CI = 0.14–0.55 among ≥ 17 years old vs. 11–13 years old), having a best friend who is a smoker or former smoker (OR = 0.35, 95% CI = 0.23–0.56). Exclusive tobacco use was associated with survey year, alcohol consumption, perception of peer smoking and parental ban on smoking. Compared to tobacco smokers who did not use e-cigarettes, tobacco smokers who concurrently used e-cigarettes were more likely to use cannabis (OR = 1.84, 95% CI = 1.24–2.73) and older (OR = 0.39, 95% CI = 0.21–0.72 among ≥ 17 year old vs. 11–13 years old). We found no statistically significant school effect.

Conclusions
Adolescents who exclusively use e-cigarettes differ from those who use tobacco, with or without e-cigarettes. The strongest discriminating factors between these groups are (1) the product of smoking initiation, (2) cannabis use, (3) age and peers’ smoking status. We found no identifiable differences
between tobacco users using or not e-cigarettes, with the notable exception of concurrent cannabis use. Future studies need to examine the way in which these profiles evolve over time.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.028

S4.5

Parental alcohol problems and socioeconomic differences in emotional symptoms among young people

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Introduction Children of parents with parental alcohol problems have been found to be at increased risk of adverse mental health outcomes. The aim was to test if there is a social gradient in emotional symptoms among young people with parental alcohol problems. We hypothesized that the shared burden of parental alcohol problems and low socioeconomic position would be associated with higher odds of frequent emotional symptoms.

Methods Data came from Danish National Youth Study 2014, a web-based national survey, merged with register-data on family socioeconomic position. Participants consisted of 68,623 high school and vocational school students. Multilevel logistic regression models (nesting participants within 131 schools) were used to assess the association between perceived parental alcohol problems and frequent emotional symptom and effect-modification by financial strains in the family, family equivalent income or parental educational level. All analyses were adjusted for age, sex, education, immigration status, and cohabitation with parents.

Results A higher proportion of young people from low socioeconomic position reported parental alcohol problems and young people with parental alcohol problems had higher odds of frequent emotional symptoms (OR = 1.50 95% CI: 1.41–1.60), as compared to those without parental alcohol problems. Odds ratios for emotional symptoms were similar in strata of financial strains in the family; young people with parental alcohol problems and no financial strains in the family had an OR of 1.37 (95% CI: 1.26–1.49) and 1.33 (95% CI: 1.20–1.49) in those with financial strains in the family (P for interaction = 0.358). Same pattern was seen for parental educational level and family equivalent income.

Conclusion Parental alcohol problems and low socioeconomic position were associated with higher odds of frequent emotional symptoms, but no sign of effect-modification by socioeconomic position was found.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.029

S4.6

Cost-effectiveness of tobacco control strategies towards youths across seven European countries: Measurement, challenges and results

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Background Tobacco consumption among adolescents is a major public health concern as it is highly related to smoking addiction in adulthood and, thus, to morbidity and premature mortality. In order to reduce smoking prevalence and its consequences, tobacco control strategies targeting adolescents have been suggested, but only a few have been fully implemented at a large scale. This insufficient implementation is, in part, linked to the concern that some strategies have a high implementation cost, not compensated by their effectiveness. In this study we aimed at estimating the costs and cost-effectiveness of five smoking prevention strategies targeting adolescents (bans on smoking in public places, bans on sales to minors, bans on point-of-sale advertising, bans on smoking at school premises, and school prevention programs), across seven European countries (Finland, Ireland, Netherlands, Belgium, Germany, Italy, and Portugal) in 2016.

Methods We retrospectively collected costs related to (1) the inspection activities and legal procedures related to public bans, (2) the monitoring of school bans and sanctioning of non-compliant students, and (3) school-based education activities related to smoking prevention programs. We used an “ingredients-based” approach, identifying each resource used, quantity and unit value for one full year, under the State perspective. Annual costs were measured at national, local, or school-level, for the year 2016 and were complemented with qualitative data on how these activities were performed in reality, through interviews to key informants at the school, local, regional, and national level. The effectiveness was estimated using the DYNAMO-HIA tool, departing from data on short-term smoking prevalence reduction, collected from the literature. The simulation followed the whole population of each of the seven countries, since year 0 until when the last person of the cohort died, estimating the number of healthy life years (HLY) gained by each intervention, comparing with a no-intervention scenario. The HLY were calculated using estimates for the relationship between smoking and several diseases, as ischemic heart disease, stroke, chronic obstructive pulmonary disease and lung, oral, oesophageal, breast and colorectal cancer and for the relationship between these diseases and mortality. Baseline data was adapted to each country, using country-specific epidemiological data. Long-term costs were obtained by multiplying annual cost estimates for a 17-years’ time horizon, in order to reflect the total number of years of implementation for the cohort (to cover all groups that have 0 to 17 years old at year 0). Costs were discounted at a 3.5% annual rate.

Results Costs varied between € 0.07 to € 1.08 per person for public non-school bans, from € 2.28 to € 29.06 for school bans and from € 0.17 to € 3.16 for school programmes, according to the number of person-hours allocated to the implementation of these strategies. Italy was the country with the smallest annual investment on these tobacco-control strategies (€ 2.84 per person), while Ireland had the highest (€ 29.77 per person). Effectiveness estimates ranged from 0.003 HLY gained per person in Portugal, for a 1% short-term relative reduction of smoking prevalence, to 0.39 HLY in Ireland, for a 50% reduction. Public non-school bans were the most cost-effective interventions, with € 0.18 to € 399.21 per HLY. School bans costed from € 173.41 to € 4315.78 per HLY, and school programmes from € 9.66 to € 11015.38 per HLY.

Conclusions These five smoking prevention strategies targeting adolescents are low cost and, considering the WHO cost-effectiveness threshold ratio of each country GDP per capita, highly cost-effective interventions. Hence, investing in tobacco control strategies targeting adolescents may be an economically advantageous approach to tackle one of the main causes of mortality and morbidity in Western Europe.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.030
Session 5–Maternal and population environmental exposures

Wednesday the 4th of July, 2018 – 04:00 pm–05:30 pm

S5.1 Multiple pregnancies and environmental exposure: An impact of air pollution on fetal growth?
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Introduction
Multiple pregnancies display all the complications of singletons, but in highest frequencies, especially for fetal growth abnormalities. In singletons, air pollution seems to be negatively associated with fetal growth. A similar relationship in multiple pregnancies can be expected. However, multiple pregnancies are systematically excluded from the studies of the impact of air pollution on pregnancy outcomes. This study aims to analyze in a population of multiple pregnancies the relationship between fetal growth restriction (FGR), small for gestational age (SGA) and environmental chronic exposure to air pollution in moderately polluted cities.

Methods
All the multiple pregnancies of women living in the city of Besançon (121,671 inhabitants) or in the urban unit of Dijon (243,936 inhabitants) and who delivered in a university hospital between 2005 and 2009 were included. Births were classified as SGA if birth weight was < 10th centile for gestational age and sex in one or more newborns of the pregnancy. FGR was defined by the association of SGA and a defect in fetal growth. FGR was retained according to the ICDC10 codes in medical records. Outdoor nitrogen dioxide (NO2) exposure was assessed using the mother’s address, in front of the residential building and within 50 m around the building. Several time periods were defined: each trimester, entire pregnancy and two months before delivery. All variables available in the medical records were analyzed to detect potential confounders: maternal socioeconomic characteristics, obstetrical history, complications of pregnancy and characteristics of the newborns. Multivariate logistic regression was used as proxies of fetal adiposity development.

Results
Among the 249 pregnancies, 64 presented a FGR and 94 a SGA in one or more newborns. Multivariate logistic regression analysis of exposure and outcome with maternal socioeconomic characteristics, obstetrical history, complications of pregnancy and newborn vitamin E was negatively correlated with newborn protein car-

Conclusions
In our study, environmental exposure to NO2 was associated with FGR in multiple pregnancies, especially during the 2nd trimester and the two last months before delivery. However, no association between NO2 exposure and SGA was identified. These results are in line with an impact of NO2 on fetal growth in multiple pregnancies for an exposure under the European legislation threshold.

Disclosure of interest
The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.031

S5.2 Effects of prenatal oxidative stress levels on fetal programming: Results from the NELA birth cohort
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Introduction
The Developmental Origins of Health and Diseases (DOHaD) hypothesis states that both the pre- and postnatal environments shape health and disease later in life. Prenatal oxidative stress can have long term health consequences in the offspring through developmental programming, including an increased risk of adiposity; however studies in humans are limited. We aim to investigate the effects of prenatal oxidative stress levels on birth size measures used as proxies of fetal adiposity development. Data come from the Nutrition and Early Life Asthma (NELA) study, a population-based birth cohort set up in 2015 in Spain. Maternal fasting blood samples were drawn at 24 weeks of gestation and newborn cord blood samples were collected at birth to analyze for oxidative stress markers, including protein carbonyl (protein oxidation), hydroperoxides (lipid oxidation), and 8-hydroxy-2’-deoxyguanosine (DNA oxidation). Maternal and newborn antioxidant status was assessed by glutathione peroxidase, catalase, the trolox equivalent antioxidant capacity (TEAC), and the ferric reducing ability of plasma (FRAP). In addition, vitamin A and E levels were assessed as a measured of exogenous antioxidant markers. In multivariable regression models we assessed the association between maternal and newborn biomarkers with birth size measures including weight and length-derived anthropometric indicators: weight-for-age z score, weight-for-length z score, and BMI-for-age z score as proxies of body composition; skinfold thickness as a proxy for subcutaneous adiposity; and length z score, which is considered as a proxy for lean mass.

Methods
Maternal and newborn FRAP, TEAC and protein carbonyl levels were positively correlated (correlation coefficients range 0.45–0.63, P-values < 0.05) and newborn vitamin E was negatively correlated with newborn protein carbonyl levels (correlation coefficient −0.212, P-value < 0.05). After adjustment for confounders, FRAP levels measured in cord blood were positively associated with birth weight (coefficient = 0.238, P-value = 0.053), weight-for-age z-score (coefficient = 0.493, P-value = 0.059), and BMI-for-age z-score (coefficient = 0.625, P-value = 0.045). In addition, higher levels of newborn vitamin A were positively associated with birth weight (coefficient = 0.014, P < 0.001, weight-for-age z-score (coefficient = 0.029, P-value < 0.001), BMI-for-age z-score (coefficient = 0.028, P-value < 0.001) and length z-score (coefficient = 0.021, P-value = 0.005).

Conclusions
Fetal antioxidant capacity and exogenous antioxidant levels (i.e. vitamin A) may influence body composition at birth. These results could help to unravel the link between prenatal oxidative stress with fetal programming and long term health consequences for the offspring. In addition, the results will shed new light on prenatal factors that may perturb maternal and fetal oxidative
S5.3 Circulating levels of perfluoroalkylated compounds and breast cancer risk: Evidence from a nested case-control study
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Introduction The incidence of breast cancer is continuing to rise in Western countries, and there has been increasing interest in understanding the contribution of exposure to endocrine disrupting chemicals (EDCs) to this increase. A large group of EDCs, for which the long-term health effects remain uncharacterized with regards to breast cancer, are perfluoroalkylated compounds (PFAS). PFAS are a group of synthetic compounds that are stable, persistent and bioaccumulative. Among PFAS, perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA) are the most frequent compounds found in food and are ubiquitously present in the blood of Western populations. The objective of this study was to investigate the associations between serum levels of PFOS and PFOA and the risk of breast cancer in a nested case-control study.

Methods E3N (“Étude Épidémiologique auprès de femmes de l’Éducation Nationale”) is a French prospective cohort that enrolled 98,995 women aged 40–65 years at inclusion in 1990. After inclusion, women were followed-up every 2–3 years through self-administered questionnaires. We identified 198 cases of incident invasive breast cancer with available blood samples, collected between 1994 and 1999. For each case, one control was randomly sampled from women in the cohort who were free of breast cancer at the time of diagnosis of the corresponding case. Controls were matched to cases by age and menopausal status at blood collection, study center, and year of blood collection. Serum levels of PFOS and PFOA were measured for each woman included in the study (n = 396) by liquid chromatography coupled to tandem mass spectrometry. Women were divided into quintiles based on serum levels of PFOS and PFOA separately. Conditional logistic regression models were used to estimate odds ratios (ORs) and 95% confidence intervals (95% CIs). After running univariate models, all models were adjusted for total serum lipids, body mass index, smoking status, physical activity, education level, family history of breast cancer, history of benign breast disease, parity/age at first full-term pregnancy, total breastfeeding duration, age at menarche, age at menopause, current use of menopausal hormone therapy, use of hormonal contraceptives, adherence to a Mediterranean dietary pattern and adherence to a Mediterranean dietary pattern.

Results The average serum levels of PFOS and PFOA were 19.08 ng/mL (Standard deviation [SD] 8.19) and 7.32 ng/mL (SD 3.49), respectively. Since serum levels were right skewed, all values were log-transformed in order to achieve a normal distribution. In univariate analyses, no statistically significant association was found between PFOS or PFOA serum levels and breast cancer risk. After adjustment, PFOA serum levels were positively and linearly associated with breast cancer risk (highest quintile: OR 3.46, 95% CI 1.40–8.52, compared with the lowest: Ptotal = 0.006). In contrast, when considering PFOA levels, only women in the 2nd quintile group had a significantly increased risk of breast cancer (OR 2.41, 95% CI 1.08–5.35), suggesting a non-monotonic dose-response pattern.

Conclusions This study provides evidence of an association between circulating levels of PFAS and breast cancer risk. In particular, PFOA was linearly associated with breast cancer risk starting from internal values equal to 13.3 ng/mL, while only a low dose effect was highlighted for PFOA, with an increased risk for values between 4.7 and 5.8 ng/mL. This study reflects real-life exposure of a non-professionally exposed population of women in France. Our results highlight the importance of focusing on low-dose effects when studying EDCs, as well as the importance of considering exposure to EDCs, and in particular to PFAS, as a relevant risk factor for breast cancer, thus as a serious public health issue.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.032

S5.4 Airborne dioxin exposure and breast cancer risk in a case-control study nested within the French E3 N prospective cohort
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Introduction Dioxins are a mixture of related chemicals emitted by industrial chlorinated combustion processes, including chemical manufacturing of pesticides, and activities from metallurgy, steel and municipal solid waste incineration. TCDD (2,3,7,8-tetrachlorodibenzo-p-dioxin) is the most potent dioxin congener and has been classified as a group 1 carcinogen by the International Agency for Research on Cancer, with sufficient evidence for all cancers combined. As a persistent endocrine disrupting chemical, TCDD is suspected to be involved in breast cancer (BC) etiology and may influence estrogen- and progesterone-mediated pathways. The long-term nature of airborne dioxin exposure may imply variations in exposure intensities over time and given their tumor promoting properties, the impact of dioxin exposures close to the time of diagnosis needs to be considered. We aimed to estimate BC risk associated with airborne dioxin exposure in a case-control study nested within the E3 N cohort (“Étude Épidémiologique auprès de femmes de la Mutuelle Générale de l’Éducation Nationale”), improving the method for the assessment of low-dose airborne dioxin exposure and considering temporal dimensions of exposure in the risk estimates.

Methods We designed a case-control study nested within the French E3 N prospective cohort and restricted to the Rhône-Alpes region, France. Between 1990 and 2008, 429 invasive BC cases were diagnosed and matched to 716 controls on relevant factors. Assessment of airborne dioxin exposure was based on a detailed inventory of dioxin emitting sources and residential history of the study subjects. Exposure was evaluated at the individual address level with a geographic information system (GIS)-based exposure metric that included proximity to dioxin emitting sources and their technical characteristics, exposure duration and wind direction. We first estimated odds ratios (OR) and 95% confidence intervals (CI) for BC in relation to cumulative airborne dioxin exposure using conditional logistic regression models adjusting for main BC risk factors. We then estimated time-dependent effects of annual airborne dioxin exposure on overall BC risk according to time prior to diagnosis with a flexible time-dependent weight function.

Results We observed no linear trend across quintiles of airborne dioxin exposure (P = 0.81) and no increased risk of overall BC for higher dioxin exposure levels (OR for Q5 versus. Q1: 1.12, 95% CI: 0.69–1.82). We however observed a statistically significant OR for Q2 vs. Q1 (OR: 1.61, 95% CI: 1.04–2.49). For an increase of 0.1 μg·TEQ/m3 in annual airborne dioxin exposure, risk estimates for overall BC according to time prior to diagnosis did not vary
S5.5 Impact of mean temperature on daily mortality in seven different bioclimatic regions in Tunisia, 1991–2011

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Impact of mean temperature on daily mortality in seven different bioclimatic regions in Tunisia, 1991–2011

Our study aimed to investigate the impact of mean temperature on daily mortality in seven different bioclimatic regions in Tunisia over a period of 21 years (1991–2011). We used a Poisson regression model to analyze the data, adjusting for potential confounders such as age, gender, and socioeconomic status.

Results

The results showed a significant increase in daily mortality with higher mean temperatures. The maximum risk of death was observed at temperatures above 30 degrees Celsius. The effect was more pronounced in the coastal regions compared to the interior regions.

Conclusions

These findings highlight the importance of temperature in understanding mortality patterns in Tunisia. They also suggest the need for public health interventions to mitigate the effects of heat-related mortality.

Disclosure of interest

The authors declare that they have no competing interest.

https://doi.org/10.1016/j.resspe.2018.05.035

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Introduction In the context of a possible role of chronic inflammation in cancer risk, Non-Steroidal Anti-Inflammatory Drugs (NSAIDs) have received attention for their potential as chemopreventive drugs against cancer. Therefore, we investigated the role of NSAIDs use in relation to prostate cancer aggressiveness among African and European Americans using data from the North Carolina-Louisiana Prostate Cancer Project (PCAP).

Methods PCaP is a population-based, case-only study of incident prostate cancer in two southern U.S. states. Overall, 2258 men (1130 African Americans and 1128 European Americans) newly diagnosed with prostate cancer between 2004 and 2009, aged 40 to 79 years and residing in North Carolina or Louisiana at diagnosis have been visited in their home by trained nurses who administered a standardized questionnaire on background characteristics, occupation, comorbid conditions and medications, health care access, prostate cancer diagnosis and screening history, diet, vitamins and supplements use and physical activity. Nurses also collected information of historic (five years prior to prostate cancer diagnosis) and current (within the two weeks prior to the in-home visit) use of NSAIDS. Historic NSAIDs use was self-reported by the patient (frequency, duration and product name) and current use was obtained by a review of all medications and their bottles used in the two weeks prior to the in-home visit (product name and concentration). Cancer aggressiveness was achieved using Gleason Sum abstracted from medical records. Aggressive prostate cancer was defined by Gleason sum > 7 or Gleason sum = 7 when the two most frequently represented grades in the tumor analyzed were 4 + 3. Multivariate unconditional logistic regression models were used to estimate Odds Ratios (ORs) and their 95% confidence interval (95% CI). Analyzes were performed in all men as well as stratified by race and age (< 60 years, ≥ 60 years).

Results NSAID use 5 years prior to diagnosis was not associated with aggressive prostate cancer (OR = 0.97, 95% CI: 0.77–1.21), whether among African Americans or European Americans. Those results need further investigations to be confirmed.

Disclosures of interest The authors declare that they have no competing interest.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.036

S6.2 Non-steroidal anti-inflammatory drug use and breast cancer risk in a prospective cohort study

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Introduction In past decades, evidence from both experimental and observational studies has accumulated suggesting that chronic inflammation could promote breast cancer development. Therefore, nonsteroidal anti-inflammatory drugs (NSAIDs), a class of drugs commonly used to treat pain, fever and inflammation, has been proposed as potential chemo-preventive agents for breast cancer. Although inverse associations between NSAIDs and breast cancer risk have been reported in most case-control studies, results from cohort studies are less consistent. Our objective was to assess the association between NSAID use and breast cancer risk within the European Prospective Investigation into Cancer and Nutrition (EPIC).

Methods EPIC is a prospective cohort study initiated in 1992 in 10 European countries. Self-reported information on NSAID use at baseline has been collected in five EPIC countries (France, Denmark, United Kingdom, the Netherlands and Germany). Multivariable Cox regression models were used to estimate hazard ratios (HRs) for the association of NSAID use with breast cancer incidence with adjustment for potential confounders. We also assessed effect modification by breast cancer risk factors and examined the associations within specific breast cancer subtypes.

Results Among the 140,981 women included in the analysis, 7% were regularly using NSAIDs at baseline. During a median follow-up time period of 13 years, 7,379 incident breast cancer cases were diagnosed (816 in situ and 6563 invasive). In multivariable models, there was no statistically significant association between regular NSAID use and breast cancer risk overall. Compared with women who were not regular users at baseline, the HR for regular users of NSAIDs was 0.99 (95% CI: 0.90 to 1.08). Risk estimates did not vary significantly by histological subtypes, by hormone receptor status of the tumor, by breast cancer risk factors or by country (all interaction/heterogeneity between 0.10 and 0.92). However, among postmenopausal women, a statistically significant interaction was observed between NSAID use and ever use of menopausal hormonal therapy (MHT) for invasive breast cancer cases among MHT ever users: HR NSAID use = 0.84 (0.73–0.96); among MHT never users: HR NSAID use = 1.08 (0.93–1.25); interaction = 0.05), but not for in situ cases [among MHT ever users: HR NSAID use = 1.25 (0.82–1.92); among MHT never users: HR NSAID use = 1.18 (0.81–1.73); interaction = 0.99].

Conclusions and perspectives Our results indicate potential effect modification of MHT use on the association between use of NSAIDs and breast cancer risk which deserves in-depth investigation in studies with accurate data on both NSAID and MHT use, including type, dosage, frequency and duration of use. We are currently exploring this further in a study within the French-EPIC cohort (E3N cohort) including 61,107 women with individual drug-reimbursement data available from years 2004 to 2011, including dose, duration and subtypes of NSAIDs. If the interaction between MHT use, NSAIDs and breast cancer risk is confirmed, this could have public health implications with respect to how MHT is administered.

https://doi.org/10.1016/j.respe.2018.05.037
Disclosure of interest The authors declare that they have no competing interest.
https://doi.org/10.1016/j.respe.2018.05.038

S6.3 Intake of nuts and long-term risk of upper gastrointestinal cancer: a 30-year follow-up study in the Linxian general population trial cohort
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Introduction Previous studies showed intake of nuts may affect the risk of upper gastrointestinal (UGI) cancers, but most current evidence comes from Western populations and data from Asia are limited. Cancer rates differ between countries as does nutritional status, which may lead to different associations in different populations. Therefore, we evaluated the association between intake of nuts and the risk of esophageal squamous cell carcinoma (ESCC), gastric cardia adenocarcinoma (GCA), and gastric non-cardia adenocarcinoma (GNCA) in a Chinese cohort.
Methods In 1984, 29,584 study participants aged 40–69 completed a baseline questionnaire that included demographic characteristics, lifestyle factors and some dietary questions, including intake of nuts. The Linxian general population trial cohort was actively followed-up through 2016 to collect death endpoints from all causes of death. Adjusted hazard ratios and confidence intervals for UGI cancers by intake of nut frequency groups were estimated by multivariate Cox regression models adjusted for age, sex, BMI, education level, tobacco smoking, and alcohol drinking.
Result A total of 5470 incident UGI cancers were identified, including 3128 ESCC, 1712 GCA and 630 GNCA. Sixty-three percent of participants did not consume nuts, while 27% had nuts once per month, 8% consumed nuts 1–3 times/week, and 2% had nuts 4+ times/week. Compared to no nut consumption, no effect for any category of nut consumption was observed on risk of UGI cancer. The HRs for the highest nut consumption group (4+ times/week) compared to no nut consumption were 0.93 (95% CI: 0.72–1.21), 1.23 (95% CI: 0.86–1.76), and 1.12 (95% CI: 0.62–2.03) for risk of ESCC, GCA, and GNCA, respectively. Further, no monotonic trends were seen between level of nut consumption and risk of any specific UGI cancers.
Conclusion We observed no association between intake of nuts and the risk of ESCC, GCA, or GNCA in a nutrition-deprived rural population in China.
Disclosure of interest The authors declare that they have no competing interest.
https://doi.org/10.1016/j.respe.2018.05.039

S6.4 Abdominal obesity and prostate cancer risk: epidemiological evidence from the EPICAP study
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Introduction Obesity is associated with an increased risk of several cancers, such as breast or colorectal cancers. However, the relationship between obesity and prostate cancer (PCa) remains controversial. Indeed, inconsistent results have been reported between body mass index (BMI) and PCa risk, while some associations have been reported with other anthropometric indicators, such as waist circumference (WC) or waist-hip ratio (WHR), which would better illustrate the concept of body fat distribution. Therefore, we assessed a possible association between anthropometric indicators and PCa risk based on data from the EPICAP study.
Methods EPICAP is a French population-based case-control study that enrolled 819 incident cases of PCa diagnosed in 2012 and 2013, aged less than 75 years old and residing in the department of Hérault, France. Controls were 879 age-matched (± 5 y) individuals living in the same geographic area. Face-to-face interviews, using a standardized computerized questionnaire, gathered information about sociodemographic characteristics, personal medical history, lifestyle factors, physical activity, residential and occupational history. Anthropometric indicators have also been collected through the questionnaire (self-report of height at 18 years old and weight every decades) or anthropometric measures at time of interview (height, weight, waist and hip circumferences). Logistic regression models were used to assess odds ratios (ORs) for the associations between anthropometric indicators (BMI, WC and WHR) and PCa risk. Analyses were systematically adjusted for age (5-year period), family history of prostate cancer in first-degree relatives and race (Caucasians, others). Analyses were also adjusted for other potential confounding factors such as educational level or physical activity. Separate analyses were conducted by prostate cancer aggressiveness according to the Gleason score (low or intermediate score ≤ 7 [including 3 + 4], high score ≥ 7 [including 4 + 3]). Seeking for relevant interaction between BMI and WC or WHR, we performed stratified analyses according to BMI overweight cut-point (25 kg/m2) defined by the World Health Organization.
Results Overall, 47.8% of men were overweight and 23.4% were obese, similarly distributed between cases and controls (OR 0.98, 95% CI 0.78–1.23, OR 0.91 95% CI 0.67–1.23, respectively). We observed a slight, but not significant increased risk of PCa for men with a BMI above 94 cm (OR 1.20, 95% CI 0.95–1.51) and an increased risk of PCa for men with a WHR greater or equal to 0.95 (OR 1.27, 95% CI 1.01–1.60), with more pronounced associations after adjustment for BMI (OR 1.48, 95% CI 1.11–1.97, OR 1.39, 95% CI 1.09–1.79, respectively). In addition, analyses stratified on BMI showed that men with a BMI < 25 kg/m2 had a higher risk of PCa, either for WC > 94 cm or WHR ≥ 0.95 (OR 1.63, 95% CI 1.05–2.52, OR 1.76, 95% CI 1.18–2.63, respectively). Nevertheless, interactions were not significant for WC (P = 0.23) and close to significance for WHR (P = 0.07). Associations regarding central obesity indicators, adjusted for BMI, were more pronounced in men with aggressive prostate cancer, either for WC > 94 cm (OR 2.30, 95% CI 1.38–3.83) or WHR ≥ 0.95 (OR 1.51, 95% CI 0.98–2.32).
Conclusions Our results suggest that BMI itself is not associated with prostate cancer, while central obesity is associated with an increased risk of prostate cancer, especially aggressive prostate cancer.
Disclosure of interest The authors declare that they have no competing interest.
https://doi.org/10.1016/j.respe.2018.05.040
A case-control study on cervical cancer and frequency of participation in screening

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S6.5

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Introduction

Since 1971, all women in Germany have been entitled to an annual free Pap smear for cervical cancer screening (CCS), starting at age 20. Despite the existence of an opportunistic program, cervical cancer still occurs at somewhat elevated rates (9.3 cases per 100,000 women, age-standardized rate, European Standard Population) in Germany in comparison to other Western European countries. Few previous studies reported on the association between participation in CCS and cervical cancer. The TeQaZ study is a population-based case-control study investigating the association between participation in CCS, other risk factors and cervical cancer in Germany.

Methods

Incident cases of cervical cancer (ICD-10 C53), diagnosed between 2012 and 2016 in the German states of Saxony, Rhineland-Palatinate and the neighboring regions of Baden-Württemberg, Hesse, North-Rhine Westphalia, Saarland, Brandenburg, Saxony-Anhalt and Thuringia, were recruited. Cases were matched in a 1:3 ratio with randomly selected population-based controls, recruited via population registries based on age (± 2 years of birth date) and region of residence. Via computer-assisted telephone interviews (CATI, Voxco), cases and controls reported their frequency of CCS participation during the past ten years as well as socioeconomic characteristics, such as income, schooling and other risk factors, namely tobacco smoking, body mass index (BMI, calculated from reported weight, height), use of oral contraceptives, history of chlamydia, condyloma and herpes. Univariable and multivariable conditional logistic regression analyses were performed to estimate the association between CCS participation and cervical cancer using the statistical software SAS.

Results

A total of 218 cases and 654 controls were included in the analysis. Over 60% of cases and controls were aged 20–39 years. In the ten years prior to the interview, 56.7% of cases and 86.0% of controls attended CCS at least every three years. Fifteen cases (6.9%) and one control (0.2%) had never attended CCS activity at least once a week (OR 0.50; 95% CI 0.36–0.70) and a net household income of ≥3000 or more (OR 0.29; 95% CI 0.19–0.45) were shown to be protective. In the adjusted conditional logistic regression, participating in CCS less frequently than every three years (OR 5.39; 95% CI 3.57–8.14), having ever smoked (OR 1.87; 95% CI 1.34–2.61), having a BMI ≥30 (OR 1.69; 95% CI 1.11–2.57), having at least four children (OR 6.96; 95% CI 1.71–28.37) and having had more than one sexual partner (OR 3.11; 95% CI 1.78–5.42). Completing secondary education (OR 0.35; 95% CI 0.23–0.51), engaging sporting activity at least once a week (OR 0.59; 95% CI 0.36–0.70) and a net household income of €3000 or more (OR 0.29; 95% CI 0.19–0.45) were shown to be protective. In the adjusted conditional logistic regression, participating in CCS less frequently than every three years (OR 4.94; 95% CI 2.74–8.91), having at least four children (OR 6.96; 95% CI 1.71–28.37), having had more than one sexual partner (OR 3.91; 95% CI 1.86–8.23) and having ever had a herpes infection (OR 4.62; 95% CI 1.16–18.40) were statistically significantly associated with developing cervical cancer. Completing secondary education (OR 0.42; 95% CI 0.24–0.73) and a net monthly household income of €3000 or more (OR 0.43; 95% CI 0.25–2.75) remained protective factors.

Conclusion

Although infrequent participation (less than every three years) was strongly associated with cervical cancer, more than half of cases had attended CCS in the three years prior to diagnosis, suggesting that it is necessary to further investigate the quality of cytology and adequate treatment and monitoring of precancerous lesions in Germany.

Disclosure of interest

The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.041

Effect of organized mammography screening on breast cancer mortality: a population-based cohort study in Norway

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Introduction

Background

Reviews of the randomized controlled trials (RCTs) of mammography screening conducted during the 1970s and 1980s reported a 15–21% reduction in breast cancer mortality. Improved cancer treatment and enhanced awareness may however have reduced the potential net benefit from mammography screening. New RCTs are no longer feasible and observational studies yield widely varying estimates of the reduced breast cancer mortality (0% to 43%), depending on study design. In Norway, mammography screening was introduced gradually during the period 1996–2004. Using this as a natural experiment, we aimed to estimate the effect of organized mammography screening on incidence-based breast cancer mortality by comparing changes in mortality among women eligible for screening to concurrent changes in younger and older ineligible women. The use of un-screened age-groups as control groups allowed us to conduct a balanced incidence-based mortality study in which we aimed to distinguish the screening effect on breast cancer mortality from the effect of the concomitantly established diagnostic centers, which may also have improved treatment.

Methods

In a national county-wise balanced, open-cohort study in Norway, we used birth cohorts (1896–1982) to construct three age groups in both the historical and screening period: women eligible for screening and younger or older women ineligible for screening. We included women diagnosed with breast cancer who died within the same age-period group during 1987–2010 (n = 4903). We estimated relative incidence-based mortality rate ratios (relative MRR) comparing temporal changes in eligible women to concurrent changes in ineligible women. Additionally, we conducted analyses comparing the change in eligible women to younger, ineligible women with either continued accrual and follow-up period (eligible women only) or continued follow-up period. Finally, we checked for unbalanced confounding in two negative control analyses expected to produce a null result (relative MRR = 1). First, we compared the mortality change in younger women to the concurrent change in older women. Second, we extended the study period to include the period 1987–2010 for all counties and repeated our analysis as if screening had been introduced at the midpoint of the actual pre-screening period and the actual screening period in each county, respectively.

Results

All three age groups experienced a reduction in mortality when screening was introduced, but the decrease among eligible women was about the same among ineligible women (relative MRR = 1.05, 95% CI: [0.94–1.18]). Varying the definition of follow-up yields similar results. The negative control analyses all had relative MRRs close to 1 (estimates ranged from 0.91 to 1.04 and with all 95% CIs overlapping 1).

Conclusion

Mammography screening was not associated with a larger breast cancer mortality reduction than that of women ineligible for mammography screening. Based on the negative control analyses we found limited uncontrolled confounding in the applied observational design.

Disclosure of interest

The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.042
S7.1 Assessing causality in associations between maternal adiposity and obstetric and perinatal outcomes: A Mendelian randomization study

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Background Observational studies consistently suggest that maternal obesity is related to a number of adverse perinatal outcomes. However, which of these are causal or due to confounding is unclear. We aimed to carry out Mendelian randomization (MR), which uses genetic variants robustly associated with the exposure of interest as instrumental variables (IV), to determine the causal effect of maternal BMI on clinically important obstetric and perinatal outcomes.

Methods Data from White European individuals in nine cohorts (ALSPAC, BiB, DNBC-PTB, HAPO, EFSOCH, Generation R, GOY A, Project Viva and INMA) were used (n = 5230 to 24,875 for different outcomes). First, multivariable regression associations between maternal BMI (pre-pregnancy or at the start of pregnancy) and 23 outcomes were examined adjusting for a range of potential confounders. Second, we combined 32 or 97 (depending on availability in cohorts) established genetic variants that have been shown to be robustly associated with BMI in a weighted allele score and used this in IV analyses to obtain causal estimates (allele score Wald ratios) of maternal BMI on each of the outcomes. We used MR-Egger, inverse variance weighting and weighted median IV analysis in sensitivity analysis to explore potential bias due to horizontal pleiotropy. When available, MR analyses for outcomes that could be influenced by offspring genetic predisposition to higher BMI were adjusted for offspring genotype.

Results In standard multivariable analysis, a 1 standard deviation (SD, ~4.95 kg/m²) higher maternal BMI was associated with a 0.12 SD (95% CI 0.11–0.14) higher offspring birthweight, 1.73 (95% CI 1.64–1.84) odds ratio (OR) of gestational hypertension and 1.30 (95% CI 1.17–1.93) OR of induced labor. In MR analyses, a 1 standard deviation higher maternal BMI was associated with a 0.11 SD (95% CI 0.06–0.17) higher offspring birthweight, 1.51 (95% CI 1.17–1.93) OR of gestational hypertension and 1.30 (95% CI 1.01–1.72) OR of induced labour. We also found positive associations of maternal BMI with birth length, caesarean delivery, any hypertensive disorder of pregnancy and membrane rupture before onset of contractions in multivariable regression analyses. MR point estimates for effects of BMI on these outcomes were in the same direction and of a similar magnitude to multivariable results, but the 95% confidence intervals were wide and included the null. Lastly, in multivariable regression analyses we found a positive association of BMI with gestational diabetes, which was not supported by MR results. Results from MR Egger regression, inverse variance weighted and weighted median methods were generally consistent and did not suggest strong bias by pleiotropy.

Conclusions Our findings support a causal effect of increased maternal BMI on higher birthweight and greater odds of gestational hypertension and induction of labor. MR causal estimates were consistent with associations for many other outcomes. We are currently working with more studies to provide more precise estimates.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.043

S7.2 Associations between maternal lifestyle factors and neonatal body composition in the screening for pregnancy endpoints (CORK) cohort study

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Background A person’s chronic disease risk can be influenced during their fetal development in ways that are likely mediated by their body composition at birth. A better understanding of how maternal lifestyle is related to newborn body composition could thus inform intervention efforts.

Methods Using Cork participant data (n = 1754) from the Screening for Pregnancy Endpoints (SCOPE) cohort study (ECM5(10)05/02/08), we estimated how pre-pregnancy body size, gestational weight gain, exercise, alcohol, smoking and diet were related to neonatal fat and fat-free mass, as well as length and gestational age at birth, using quantile regression. Maternal factors were measured by a trained research midwife at 15 gestational weeks, in addition to a 3rd trimester weight measurement used to calculate weight gain. Infant body composition was measured using air-displacement plethysmography.

Results Healthy (versus excess) gestational weight gain was associated with lower median fat-free mass (−112 g, 95% CI: −47 to −176) and fat mass (−33 g, 95% CI: −1 to −65) in the offspring and a 103 g decrease in the 95th centile of fat mass (95% CI: −33 to −174). Maternal normal weight status (versus obesity) was associated with lower median fat mass (−48 g, 95% CI: −12 to −84). At the highest centiles, fat mass was lower among infants of women who engaged in frequent moderate-intensity exercise early in the pregnancy (−92 g at the 95th centile, 95% CI: −168 to −16). No other lifestyle factors were strongly related to infant body composition.

Conclusions These results suggest that supporting healthy maternal lifestyles could reduce the risk of excess fat accumulation in the offspring, without increasing the risk of low body fat, or adversely affecting fat-free mass development, length or gestational age.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.044

S7.3 Maternal occupational exposure to unintentional nanoscale particles and small for gestational age outcome in the ELFE cohort

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Introduction Nanoscale particles (NPs) are sized between 1 and 100 nm. Based on experimental animal studies on NPs and epidemiological studies on air pollution particles, maternal inhalation of NPs may constitute a hazard to fetal development. It is plausible that NPs may translocate from the respiratory tract to the placenta and fetus, but also adverse effects may occur following a maternal systemic inflammatory response. The aim of this study was to investigate the
association between maternal occupational exposure to unintentional nanoscale particles (UNP) during pregnancy and small for gestational age (SGA) within the ELFE cohort.

**Methods** Analyzes were based on data from ELFE cohort that included 18,329 infants born at 33 weeks of amenorrhea or more in France in 2011. Sociodemographic characteristics, detailed information on jobs held by mothers during pregnancy, lifestyle and clinical data were collected through a standardized questionnaire administered at birth. Medical files were consulted to supplement relevant maternal and newborn medical information. Mothers who did not work during pregnancy were excluded from analyses. Maternal occupational exposure to UNP was characterized with a job-exposure matrix by frequency and probability of exposure. Mothers who, during pregnancy, held jobs with a probability of exposure greater than 50% were considered to be exposed. Odd ratios (OR) and 95% confidence intervals (CI) were estimated from logistic regression models adjusted for smoking, marital status, maternal education, monthly household income, high blood pressure during pregnancy, gestational diabetes and alcohol consumption during pregnancy.

**Results** The study sample included 11,224 mother-child pairs. Among mothers who worked during pregnancy, 5.07% were exposed to UNP. Maternal occupational exposure to UNP was significantly associated with SGA (OR = 1.63, 95% CI: 1.22, 2.18) in adjusted analyses. In a sub-analysis conducted in exposed mothers group (n = 569), the total duration of work during pregnancy weighted by the frequency of exposure was not associated with SGA (OR = 1.02, 95% CI: 0.97, 1.08) in adjusted analyses.

**Conclusion** This is the first epidemiological study showing a significant association between maternal occupational exposure to UNP and SGA. These results are consistent with those of the toxicological studies that demonstrated the toxicity of NPs on pregnancy. This preliminary research needs to be deepened by further epidemiological studies.

**Disclosure of interest** The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.045

**S7.4** Low socioeconomic status and unhealthy lifestyle habits are associated with premature occurrence of stochastic epigenetic mutations: A meta-analysis within the LIFEPATH project

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**Introduction** Low socioeconomic status (SES) is associated with earlier onset of age-related chronic conditions and reduced life expectancy. Epigenetic variability by SES is one of the proposed molecular mechanisms mediating this association. In a recent study, we found that low SES, in both childhood and adulthood is associated with accelerated epigenetic ageing, independent from other risk factors for non-communicable diseases, and that the effect may be partially reversible. DNA methylation is gradually deregulated during ageing by errors in methylation maintenance, a process referred to as epigenetic drift. The number of stochastic epigenetic mutations (SEMs) increases exponentially with age, most likely because of an accumulation of exposure-related damage. Epigenetic deregulation may play a role in the development of age-related diseases. This study, within the LIFEPATH project, aims to disentangle the biomolecular mechanisms mediating health inequalities by SES. We hypothesized that low education level, a marker of low socioeconomic status, and unhealthy lifestyle habits are associated with an acceleration of the occurrence of SEMs and, as a consequence, with an increased risk of age-related diseases.

**Methods** SEMs are defined as extreme outliers, exceeding three times interquartile ranges the first quartile (lower than Q1 - 3 × IQR) or the third quartile higher than (Q3 + 3 × IQR), in the distribution of DNA methylation values for a CpG across samples. We conducted a meta-analysis including thirteen cohorts with more than 15,000 individuals to investigate the association of low SES, smoking, obesity, high alcohol intake, and low physical activity with the total number of SEMs. Additionally, in three prospective case-control studies nested in cohorts, we investigated whether the total number of SEMs is associated with higher risk of different cancers. Finally, we examined whether SEMs are randomly distributed across the genome, or are enriched in functional genomic regions.

**Results** We found that low SES, smoking, obesity, high alcohol intake, and low physical activity modulate the association of the total number of SEMs with ageing. The effect of risk factors is more pronounced at older ages, supporting the hypothesis of an accumulation of SEMs as a biomarker of accumulation of exposure-related genomic damage. In nested case-control studies, a higher number of SEMs was associated with higher risk of lung and breast cancer, suggesting accumulation of SEMs belongs to the causal pathway linking low SES and unhealthy lifestyle with age-related diseases and longevity. Enrichment analyses revealed that the genomic distribution of SEMs is highly non-random, as they are enriched in transcription factor binding sites (TFBS). The most significantly enriched TF is a member of the Polycomb Repressive Complex 2 (PRC2), EZH2, a crucial regulatory element in cancer and other age-related diseases like mental disorders.

**Conclusions** We found that low SES and unhealthy lifestyle habits are associated with premature accumulation of age-related epigenetic mutations and that DNA methylation dysregulation is associated with the development of cancer and other age-related diseases. We have identified novel biomolecular mechanisms mediating health inequalities, suggesting a crucial role of Polycomb Repressive Complex 2 associated genomic regions.

**Disclosure of interest** The authors declare that they have no competing interest.

**Acknowledgements** The ‘LIFEPATH’ grant to Paolo Vineis (European Commission H2020 grant, Grant number: 633666) supported this research.

https://doi.org/10.1016/j.respe.2018.05.046

**S7.5** Vaccination coverage of adolescents: Results of a 3-years defense and citizenship day-based survey, Île-et-Vilaine, France, 2015–2017

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Introduction Vaccination coverage of adolescents is not routinely measured. Every French adolescent aged between 16 and 18 years must take part in the Defense and Citizenship Day (French acronym JDC). We aimed to assess vaccination coverage among young adults for hepatitis B, group C meningococcal meningitis, human papillomavirus (HPV) and measles. We also aimed to assess the proportion of adolescents who received the pertussis booster between the age of 11 and 13 years.

**Methods** The survey took place one week per year between 2015 and 2017 at the JDC center of Rennes, France. Vaccination coverage data was collected on site from the adolescents’ health records. We collected the number of doses received and the dates of administration for each type of vaccine. A properly vaccinated adolescent was defined as having received the right number of doses according to the vaccination schedule. Results for adolescents born in 1997, 1998 and 1999 are presented.

**Results** A total of 1269 adolescents attended the JDC Day: 1086 (85.6%) had brought their health record or an equivalent document. Among them, 956 were born between 1997 and 1999. Vaccination coverage increased according to the JDC center of Rennes, France. Vaccination coverage data was collected on site from the adolescents’ health records. We collected the number of doses received and the dates of administration for each type of vaccine. A properly vaccinated adolescent was defined as having received the right number of doses according to the vaccination schedule. Results for adolescents born in 1997, 1998 and 1999 are presented.

**Conclusion** This population-based vaccine coverage study provides information about a little studied population group in France. The method used
minimizes recruitment and classification bias. An increase of the vaccine coverage through studied birth cohorts (1997–1999) was observed. Vaccine coverage against measles exceeds the WHO recommendation of 95%. However, it is insufficient for other vaccines. These results will help public health authorities to target specific health promotion vaccination efforts. As vaccine coverage is difficult to estimate in adolescents, this survey is a valuable tool to follow this population and could be extended to other French districts.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.047

Session 8—Cancer epidemiology

Thursday the 5th of July, 2018 – 10:30 am–12:00 am

S8.1 Comprehensive cancer survival comparisons across seven countries, 1995–2014: The ICBP SURVMARK2 project

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Background/Purpose Cancer survival provides a means to assess the effectiveness of early detection strategies and the quality of clinical care and management. The SURVMARK2 project provides comprehensive and updated international benchmarking of cancer survival across seven high-income countries, namely Australia, Canada, Denmark, Ireland, New Zealand, Norway and the UK, with the aim of increasing our understanding of possible drivers of international differences and informing health policy.

Methods Data on primary cancers of the oesophagus, stomach, colon, rectum, liver, pancreas, lung and ovary diagnosed in the period 1995–2014, with follow-up until December 31, 2015, were obtained from population-based cancer registries in 21 jurisdictions in seven countries. Key survival measures, including 1- and 5-year net survival, were calculated by age, sex, period and cancer subtype, using a modelling approach.

Results Considerable variation in net survival from cancer continues to exist across the seven included countries during 1995–2014. Survival was consistently higher in Australia, followed by Canada and Norway and lower in the UK, Ireland and New Zealand. For colon cancer, 5-year net survival ranged from 69% in Australian women to 55% in women from the UK. Large discrepancies were also found for lung cancer, where 22% of all Canadian women survived 5-years after diagnosis, as opposed to only 10% of UK men diagnosed with this cancer. The poorest survival was observed for pancreatic cancer, with 5-year net survival ranging from 11% in Australia to 5% in the UK.

Conclusions/Implications International differences in cancer survival persist, even for poor prognosis cancers. Possible reasons could be related to differences in detection and treatment, but could also be partly due to local registration practices. Unveiling the factors contributing to these differences is crucial to eliminate survival disparities in the future.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.048

S8.2 Basal metabolic rate and risk of colorectal cancer in the European prospective investigation into cancer and nutrition

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Introduction Colorectal cancer (CRC) is associated with obesity. However, recent evidence suggests that metabolic alterations, independent of body size, may be a more relevant etiological factor. Metabolic alterations may impact individuals’ Basal Metabolic Rate (BMR), that is—the rate of energy metabolism required to preserve the integrity of vital functions. BMR is also influenced by other risk factors for CRC such as age, gender, weight and height. However, to our knowledge it is unknown whether BMR may be associated with CRC risk, independent of adiposity. Therefore, this study aimed to assess the relationship between BMR and CRC risk within a large prospective cohort.

Methods This analysis was based on data from 464,912 participants from the European Prospective Investigation into Cancer and Nutrition (EPIC), recruited between 1992 and 2000 from 10 European countries. BMR at baseline was estimated using the gender and age-specific Food and Agricultural Organization/World Health Organization/United Nations equation (FAO/WHO/UNU, 1986). Cox proportional hazards regression models were used to assess the relationships (Hazard ratio [HR] and 95%CI) between BMR and colorectal cancer. Multivariable sex specific models were stratified by country and age at recruitment, and adjusted for smoking status and intensity, physical activity, education, dietary variables (fiber, red and processed meat, fish and shellfish, alcohol and energy intake), diabetes and body mass index (BMI). For women, models were further adjusted for menopausal status, oral contraceptive and hormone therapy use. Potential effect modification was explored by modelling interaction terms between BMR and median follow-up time (< 10 years vs ≥ 10 years); age at diagnosis (< 65 years vs ≥ 65 years); BMI (< 25; ≥ 25 and < 30; ≥ 30 kg/m2) and waist circumference (< 88 vs ≥ 88 cm in women; < 102 vs ≥ 102 cm in men). Sensitivity analyses were performed excluding participants with self-reported chronic disease at recruitment and using an alternative BMR equation (Oxford, 2005).

Results After a mean of 14 years (SD 4.0) of follow-up, 4052 (1663 men and 2389 women) incident colon cancer cases and 2085 (1052 men and 1033 women) incident rectal cancers were identified. Men in the highest quintile of BMR had a 64% (95%CI 1.25; 2.15) and women had a 46% (95%CI 1.17; 1.81) higher colon risk compared to those in the lowest quintile. A positive trend across BMR quintiles was seen for both genders (P < 0.001). In continuous models, a 100 kcal/d increase in BMR was associated with greater in colon cancer risk of 11% (95%CI 1.05; 1.17) in men and 15% (95%CI 1.07; 1.24) in women. A 100 kcal/d BMR increase was associated with greater proximal colon cancer risk in men (HR 1.13, 95%CI 1.04; 1.23) and women (HR 1.25, 95%CI 1.12; 1.39), whereas it was only associated with distal colon cancer among men (HR 1.14, 95%CI 1.05; 1.23). The association of BMR with colon cancer risk was greater among young adults and participants with longer follow-up (P interaction < 0.001). BMR was not associated with rectal cancer risk. Sensitivity results showed similar results.

Conclusions These results suggest that a higher BMR is associated with greater colon cancer risk. This has important preventive implications, as BMR may be a relatively easily measured parameter to identify individuals at risk for colon cancer and direct them to preventive interventions.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.049
S8.3 Tobacco-attributable burden of cancer according to socioeconomic position in France
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Introduction Smoking is a major preventable cause of cancers and is increasingly concentrated among the most deprived individuals leading to increasing socioeconomic inequalities in the incidence of cancers linked to smoking. It has been shown that a higher level of tobacco smoking partly accounted for the higher incidence of tobacco related cancers in low socioeconomic groups. In addition to quantifying the relative contribution of risk factors to socioeconomic inequalities in cancer incidence, assessing the absolute number of cancer cases attributable to smoking by socioeconomic position (SEP) at a national level is important for policy makers to assess the population burden of smoking on social inequalities in cancer. We aimed to estimate the tobacco-attributable cancer burden according to socioeconomic position in France.

Methods The analysis was restricted to cancer sites for which tobacco smoking was recognized as a risk factor. Cancer cases by sex, age group and European Deprivation Index (EDI) among people aged 30–74 between 2006 and 2009 were obtained from cancer registries covering approximately 20% of the French population. Socioeconomic position was assessed using the quintiles of the EDI. The tobacco-attributable burden of cancer according to EDI was estimated applying the population attributable fraction (PAF) computed with the Peto-Lopez method. We quantified the contribution of smoking to socioeconomic inequalities in cancer incidence at the national level by comparing the number of tobacco-related cancers that would be prevented if the four lower EDI quintiles smoked as the least deprived EDI quintile with the number of tobacco-related cancers that would be prevented if the four lower EDI quintiles had the same IRs as the least deprived EDI quintile.

Results The PAF increased from 56% in the least deprived EDI quintile to 70% in the most deprived EDI quintile among men and from 26% to 38% among women. Among men and women, the PAF was higher in the younger age groups i.e. 30–59 years. The age difference was pronounced in the more deprived EDI quintiles whereas the PAFs were almost identical in both age groups in the least deprived EDI quintile. The proportions did not differ by sex in the age group 60–74 (around 30%), but varied across EDI quintiles: the PAF was higher in the younger age group in the least deprived EDI quintile whereas the PAFs were almost identical in both age groups in the least deprived EDI quintile.

Conclusion A substantial smoking-attributable burden of cancer by socioeconomic position was observed in France. The results highlight the need for policies reducing tobacco consumption. More comprehensive interventions integrating the various dimensions of health determinants and proportionate according to socioeconomic position may effectively contribute to the reduction of socioeconomic inequalities in cancer.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.050

S8.4 Exogenous hormone use and cutaneous melanoma risk in women: The European prospective investigation into cancer and nutrition
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Background Several studies reported a positive association between exogenous hormone use and cutaneous melanoma risk in women. However, evidence of an influence of oral contraceptive (OC) or menopausal hormone therapy (MHT) use on melanoma development is still limited. Our objective was to investigate these associations in a large European prospective cohort study.

Methods EPIC is a multicentre prospective cohort involving ∼520,000 participants (367,903 women) from 23 centres in 10 European countries (France, Italy, Spain, the UK, the Netherlands, Greece, Germany, Sweden, and Norway), who were followed-up from 1992–2000. Information on OC and MHT use at baseline was derived from country-specific self-administered questionnaires. We used Cox proportional hazards regression models, stratified on centre and age at recruitment, to calculate hazard ratios (HRs) and 95% confidence intervals (CIs) of melanoma risk. We performed stratified analyses according to melanoma site and histological type using competing-risk models. Country-specific estimates were also computed, and Chi² tests were used to test for homogeneity.

Results A total of 1,696 incident cases of primary melanoma were identified among 334,483 women for the OC analysis and 770 cases among 134,758 postmenopausal women for the MHT analysis. Almost two thirds of women reported to have ever used OCs or MHT, although patterns of use varied across countries. Overall, ever use of OCs was positively associated with melanoma risk (HR = 1.12, 95% CI = 1.01–1.26), with a positive linear association with duration of use (≤ 5 years: HR = 1.12, CI = 0.98–1.28; > 5 years: HR = 1.21, CI = 1.06–1.39 vs. never use, P trend = 0.005). Among postmenopausal women, ever use of MHT was not associated with melanoma risk (HR = 1.08, 95% CI = 0.93–1.27), whether women also previously used OCs or not (P homogeneity = 0.86). However, we observed considerable heterogeneity across countries: ever use of MHT was positively associated with melanoma risk in Spain (HR = 2.42, 95% CI = 1.06–5.52), Germany (HR = 2.91, 95% CI = 1.34–6.34) and France (HR = 1.55, 95% CI = 1.11–2.17), but not in other countries (P homogeneity = 0.0009). Regardless of MHT types, compared to never users, current users of unopposed estriadiol were at increased risk of melanoma (HR = 1.44, 95% CI = 1.05–1.97), regardless of the country (P homogeneity = 0.53). We found no association between duration of MHT, or cumulated duration of MHT and melanoma risk. Among MHT users, age at first use was not associated with melanoma risk. No heterogeneity was found across melanoma subtypes (P homogeneity = 0.52) and sites (P homogeneity = 0.33).

Conclusions The findings from this large prospective study suggest some associations between exogenous hormone use and melanoma risk. The strong heterogeneity across European countries may suggest variability in users' profile across countries or differential effects of specific formulas on melanoma risk. Further research is thus critical to disentangle the links between exogenous hormones and melanoma risk.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.051
**S8.5 Incidence trends and age-period cohort effect on ovarian cancer in high-income countries**

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**Background** Ovarian cancer is the seventh most common cancer worldwide. Historically, the incidence of ovarian cancer in Europe and North America had been higher compared to other regions of the world. Among European countries, the incidence of ovarian cancer has steadily declined over the years, nevertheless, countries in Europe continue to have the highest incidence of ovarian cancer. The aim of the study is to provide an overview of ovarian cancer incidence trends for high-income countries that are currently part of the Cancer Survival in High-Income Countries (SURVMARK-2) project. These countries include Norway, Denmark, Ireland, the United Kingdom, Canada, Australia and New Zealand.

**Methods** Ovarian cancer incidence rates were calculated using data from three sources, namely, SURVMARK-2, the Cancer Incidence in Five Continents (CIS) database (CISplus), and the European cancer registries (EUREG) database. The study contains all available years included in the databases until 2014, with Norway and Denmark having the longest study periods (1953–2014). The overall age-standardized incidence rates for ovarian cancer in women aged 20 and above were computed per year. SURVMARK-2 was utilized to calculate the incidence rates from 1995 to 2014. Incidence rates prior to 1995 were then derived from the CISplus and the EUREG databases. Additionally, the estimated annual percent change (EAPC) between 1999 and 2013 was calculated for all women age 20 and above, women age 25–49 years and 50–74 years. Lastly, the data was grouped into 5-year age groups starting with 20–24 through 70–74 years, and APC analysis was performed to examine the effects of birth cohort and period. In addition, the goodness-of-fit of the models were assessed and the likelihood ratio test was used for APC model comparison.

**Results** In general, Norway, Denmark, Ireland and the United Kingdom, consistently had higher incidence of ovarian cancer compared to non-European countries. Nevertheless, the incidence trends revealed decreasing incidence trends of ovarian cancer in all countries evaluated. Additionally, in the last 15-year period of the study, the overall incidence rate of ovarian cancer has generally been stable. Between 1999 and 2013 the highest decline of ovarian cancer incidence rate was observed in Norway (EAPC: −1.9, 95% CI: −4.0, 0.4). Incidences of ovarian cancer in 25–49 years and 50–74 years age groups have also declined for most countries. Notably, among the age group 25–49 years, a statistically significant decline of ovarian cancer incidence rate was observed in Norway (EAPC: −4.2, 95% CI: −7.7, −0.6). In contrast, a modest increase in incidence rate in Canada (EAPC: 1.8, 95% CI: −2.2, 5.9) was observed in this age group. Moreover, the United Kingdom (EAPC: −1.8, 95% CI: −3.3, −0.3) had statistically significant decline of incidence rates among women 50–74 years. In addition, the APC analysis yielded the full APC model as the best fitting model for all countries. After adjusting for the period effect, a statistically significant cohort effect ($P<0.001$) was observed in all countries included in the study. Furthermore, the United Kingdom ($P=0.019$), Norway ($P=0.019$) and Canada ($P=0.019$) also exhibited a significant period effect after adjusting for the cohort effect.

**Conclusion** In summary, a gradual decline of ovarian cancer was observed for all countries in the study. The birth cohort effect observed in the study may be linked to the changes in the prevalence of ovarian cancer risk factors, such as the use of oral contraceptive pill. In the other hand, the period effect observed may be explained partly by changes in disease classifications and cancer registry practices.

**Disclosure of interest** The authors declare that they have no competing interest.

https://doi.org/10.1016j.respe.2018.05.052

**S8.6 International and subnational variation thyroid cancer incidence and mortality over 2008–2012**

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**Introduction** Thyroid cancer incidence varies widely by country, but has been reported to increase dramatically since the 1980s in several countries. Meanwhile, thyroid cancer mortality has remained low and stable or even declined. We present the most up to date comprehensive international report on thyroid cancer incidence and mortality.

**Methods** Thyroid cancer (ICD-10 C73) cases for 2008–2012 were extracted from population-based cancer registries in Cancer Incidence in Five Continents (CIS) volume XI (http://www.cis.iarc.fr/CIS-XI) from the International Agency for Research on Cancer. Data from regional registries were combined to obtain a proxy of the national incidence. In total, 56 national or combined regional registries covering at least 0.5 million inhabitants aged 15–74 were selected. National thyroid cancer deaths for 45 of the selected countries were available and were extracted from the WHO mortality database (http://www.who.int/healthinfo/mortality_data/en), for the corresponding period. Age-standardized incidence and mortality rates (ASR) were computed by sex, for ages 15 to 74, using the World Standard population. Incidence ASRs were compared between countries and between regional registries within the same country; mortality ASRs could only be compared between countries.

**Results** Incidence ASRs varied more than 100-fold among the selected countries and were most elevated in some of the highest resource countries worldwide including eastern and western Asia, Northern America, Oceania, and Europe. The Republic of Korea reported, by far, the largest incidence ASRs in both men and women (26.8 new cases and 130.6 new cases per 100,000, respectively). Meanwhile, the lowest incidence ASRs were observed in Africa: 0.2 new cases per 100,000 men in Zimbabwe, Harare and 0.9 new cases per 100,000 women in South Africa, Eastern Cape. In all countries, incidence ASRs were always higher in women than in men. In contrast, mortality ASRs were very low and varied very little between countries: from 0.1 deaths per 100,000 in Saudi Arabia to 0.9 deaths per 100,000 in Philippines among men and from 0.2 deaths per 100,000 in Cyprus to 1.6 deaths per 100,000 in Philippines among women. Within countries differences in incidence ASRs were substantial, with 10-fold differences in some countries. For instance, among women, incidence ASRs of 9.3 in Brazil, Pocos de Calda vs. 97.8 in Florianopolis were observed; 1.2 in both India, Puna and Tripura (a mountainous state with 60% of its land covered by forest) vs. 12.8 in the urban district of Kamrup; 3.7 in Canada, Yukon vs. 34.7 in Ontario.

**Conclusions** The previous observation of very high rates in some high-resource countries is still valid, but now extends to other countries, or some regions of countries with lower resource. Notwithstanding the progress in thyroid cancer treatment over time, the stable and extremely low mortality rates together with the stark variations in incidence within the same country (particularly higher in more urban regions) suggest that the prevalence of thyroid cancer risk factors is not the only driver for the very high observed incidence rates. Rather, the inflated number of new cases could be due to increased detection of tumors that would otherwise cause no symptom or death if left undetected and untreated—also known as overdiagnosis. Notably, incidence ASRs seem to now also be high in some regions of countries in socioeconomic transition (e.g. Brazil and India). This calls for revised guidelines for diagnostic procedures to avoid unnecessary harm in a growing number of populations.

**Disclosure of interest** The authors declare that they have no competing interest.

https://doi.org/10.1016j.respe.2018.05.053
S9.1 The association between socioeconomic deprivation and old-age survival in five European countries—A cross-national ecological analysis
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Introduction Geographical differences in the spatial distribution of old-age survival exist in Europe and might be attributed to socioeconomic deprivation. In this study, we aimed to estimate the association between socioeconomic deprivation and old-age survival in Europe and investigate whether it varies by country and gender.

Methods Our study incorporated five countries (Portugal, Spain, France, Italy, and England) and a total of 11,911 small areas. A ten-year survival rate expressing the proportion of population aged 75–84 years who reached 85–94 years old was calculated at area-level for 2001–11. To estimate associations, we used Bayesian spatial models and a transnational measure of socioeconomic deprivation. Additionally, attributable/prevention fractions were calculated.

Results Overall, there was a significant association between deprivation and survival in both genders. In England that association was stronger, following a clear dose-response relation. Although lesser in magnitude, significant associations were observed in Spain and Italy, whereas in France and Portugal these were weaker/absent. We projected that the elimination of socioeconomic differences between areas would increase survival by 7.1% and even a slight reduction in socioeconomic differences would mean a 1.6% higher survival in these countries.

Conclusions Socioeconomic deprivation was associated with survival among older adults at ecological-level, although with varying magnitude across countries. Reasons for such cross-country differences should be sought. Our results emphasize the importance of reducing socioeconomic differences between areas.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.espe.2018.05.054

S9.2 Socioeconomics differences in absolute cardiovascular disease risk and treatment: Opportunities for reducing inequalities in cardiovascular events in the population
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Introduction A large number of cardiovascular disease (CVD) events in the population can be prevented through appropriate management of absolute CVD risk. CVD disproportionately affects socioeconomically disadvantaged individuals, challenging efforts to reduce overall CVD morbidity and mortality in the population. While there are demonstrated links between socioeconomic position and CVD morbidity and mortality, population-level data on variations in absolute CVD risk and treatment are needed to inform interventions and policies to prevent CVD and address inequalities. We estimated absolute and relative socioeconomic inequalities in absolute CVD risk and the use of guideline-recommended medications in the Australian population to identify opportunities to reduce inequalities in CVD events.

Methods We used cross-sectional representative population-based data on 4751 men and women aged 45–74 from the 2011–12 Australian National Health Survey, including interview, physical measurement and blood and urine sample data. We used Poisson regression with robust standard errors to calculate prevalence differences (PD) and ratios (PR) for prior CVD, high 5-year absolute risk of a primary CVD event and guideline-recommended medication use, in relation to socioeconomic position measured by highest level of education attained. The models were adjusted for age and sex and then additionally for region of residence and region of birth. Weights were applied to the prevalence estimates to account for the sampling strategy and non-response, and a series of sensitivity analyses were done to assess whether the results were robust to using alternative measures of socioeconomic position.

Results Overall, 9.3% of participants had prior CVD and 11.0% had high absolute risk of a primary CVD event. Thirty-four percent of those with prior CVD and 22% of those at high absolute risk of a primary CVD event were using guideline-recommended medications. After adjusting for age and sex, the prevalence of prior CVD and high absolute risk of a primary CVD event increased linearly with decreasing socioeconomic position (test for trend, P = 0.005 and P = 0.001, respectively). People with the lowest (no post-school qualifications) compared to the highest (university degree) socioeconomic position had 1.6 (95% confidence intervals [CI]: 1.1, 2.2) times the prevalence of prior CVD (10.7% vs 6.7%, respectively) and 1.6 (95% CI: 1.2, 2.2) times the prevalence of high absolute risk of a primary CVD event (12.6% vs 7.7%, respectively). In absolute terms, the prevalence of prior CVD and of high absolute risk of a primary CVD event were 4 and 5 percentage points higher, respectively, among the most disadvantaged within the population. Among people with prior CVD those with low compared to high socioeconomic position were 2.1 (95% CI: 1.3, 3.5) times more likely to use lipid- and blood pressure-lowering and antithrombotic medications as recommended in clinical guidelines. Among those at high primary risk there was no clear relationship between socioeconomic position and use of preventive medications. Results were not materially different when additionally adjusted for region of residence and region of birth, or when socioeconomic position was ascertained using measures of income and area-level disadvantage.

Conclusion In this nationally representative population-based Australian study, the prevalence of prior CVD and high absolute CVD risk increased with increasing levels of disadvantage. Socioeconomic differentials in high absolute risk of CVD, combined with low treatment levels among high risk individuals, indicates substantial potential to prevent CVD and reduce inequalities in CVD events through appropriate management of high absolute risk in the population.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.espe.2018.05.055

S9.3 Cerebral palsy among children of immigrants in Denmark and the role of socioeconomic status
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Introduction The proportion of births by immigrants has been increasing rapidly in Denmark during the last decades. Children of immigrants have higher risk of being born preterm and with low birth weight, which are strong determinants for cerebral palsy (CP), compared with children born to Danish women.

Objective To investigate differences in risk of CP between children of Danish-born mothers and children of immigrants and to explore to what degree...
S9.4 Socioeconomic position and alcohol related harm in Danish teenagers

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Introduction Social inequalities in adverse consequences of alcohol consumption, i.e. alcohol-related disease and death, have consistently been found in adult populations with people from lower socioeconomic position experiencing harm more frequently, also when level of alcohol consumption is taken into account. This phenomenon is known as the alcohol harm paradox. Among adolescents, alcohol use is the leading global risk factor for years of life lost due to premature mortality or disability. In Europe, 13% of adolescents aged 15–16 years have been intoxicated within a 30-day period. Therefore, it is relevant to explore if alcohol consumption pattern translates into an alcohol harm paradox already in adolescence. In this age group, alcohol causes acute harms such as violence, accidents, problems with parents or friends, unprotected sexual intercourse and illicit drug use. We aim at testing the hypothesis that in Danish teenagers, lower socioeconomic position is associated with higher odds of experiencing alcohol related harm, also after taking level of alcohol consumption into account.

Methods Data from the Danish National Youth Study 2014 including a total of 70,566 high school students from 119 high schools were included. Socioeconomic position was measured as parents' educational level, family income, parents' occupational status and financial strain. The former three were obtained by linkage to Danish national registers with high validity whereas financial strain was self-reported. Alcohol related harm was measured as having been in a fight, been involved in an accident, had problems with family or friends, had sex that was regretted afterwards, and done drugs that was regretted afterwards. A combined measure was constructed defined as having experienced any of the individual harms more than once. Analyses were adjusted by age, sex, perceived ethnicity, school type and frequency of binge drinking.

Results Higher frequency of binge drinking was associated with higher odds of alcohol related harm in all socioeconomic groups. Lower socioeconomic position measured by parents’ educational level, family income, parents’ occupational status, and financial strain was associated with higher odds of having experienced alcohol related harm more than once as compared to higher socioeconomic position. For example, students having parents with elementary school as the highest education had the highest odds of experiencing alcohol related harm more than once (OR = 1.26, 95% CI: 1.12–1.42) compared to students with parents with long education. Lower socioeconomic position was associated with higher odds of being in a fight, having problems with family or friends, having sex and regretting afterwards, or doing drugs and regretting afterwards. All associations were similar between boys and girls. There was no statistical significant interaction between frequency of binge drinking and socioeconomic position (P = 0.2).

Conclusions A dose-response relationship was observed between frequency of binge drinking and odds of alcohol related harm, and this was consistently observed in all social strata. However, odds of alcohol related harm were generally higher among students whose parents had low socioeconomic position as compared to those with high socioeconomic position.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.056
A reactive mortality surveillance system in France for alert and decision-making

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Background In France, after the 2003 heat wave, a mortality syndromic surveillance system was set up by the National Public Health Agency, with objectives of early detection and reactive evaluation of the impact of expected and unexpected events to support decision makers. This study aims to describe the characteristics of the system and the main excess mortality period detected by the system since 2011 that led to alert decision makers for actions.

Methods Anonymized data from the administrative part of death certificate were daily collected from 3042 computerized city halls and were transmitted to the agency in routine. Representativeness was measured as the proportion of death registered by the system among the exhaustive number of deaths and analyzed by age, month, and region. Deaths were described by gender, age group at national and regional levels using proportion. Mortality surveillance is performed routinely based on the comparison of the weekly observed and expected number of deaths estimated with the model developed by the European consortium EuroMomo between 2012 and 2016. Based on criteria, when an excess of death is observed, decision makers are alerted and an investigation is launched.

Results The system recorded 77.5\% of the national mortality covering the whole territory and varying from 67\% to 96.8\% in metropolitan regions and overseas. Three major excess deaths episodes occurred during winters 2011–12, 2012–13 and 2014–15 and were highly correlated with flu epidemics periods. Five punctual excess periods were identified during the summer months, among them 4 were concomitant with a heat wave or elevated temperature period. No particular event was found correlated to the fifth excess. The system was also able to detect events such as an increase in mortality in Guadeloupe in 2014 concomitant with chikungunya epidemics. National and regional epidemiological mortality reports were published weekly (daily if required) and transmitted to the Ministry of Health and regional health authorities with potential recommendations.

Conclusion The effectiveness of the reactive mortality surveillance system to alert decision makers has been demonstrated. It is useful to adapt along the event recommendation for control measures as well as evaluation of impact of the event on mortality. However, the absence of medical causes of death may limit the ability to target recommendations. Facing the challenge of emergence of epidemics and climate changes, this reactive mortality system will be complementary for other surveillance systems for the future health crisis. The development of mortality surveillance with causes of death will ensure more information for interpretation of all-cause mortality changes.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.060

Session 11–Influenza
Thursday the 5th of July, 2018 – 01:30 pm–02:30 pm

S11.1 Hospital surveillance for respiratory syncytial virus (RSV) in the main metropolitan area of Lyon, France, using birth databases and data on hospitalization for clinical bronchiolitis from 2012 to 2017
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Background RSV is a leading cause of lower respiratory infections, particularly in infants and elderly. Morbidity and mortality are comparable to those of influenza infections in the high-risk population. Several RSV vaccine candidates and antibodies for prevention are currently in development, some of them already at phase III clinical trial stage. However, surveillance data on virus circulation and disease burden in high-risk groups are still incomplete, thus, hindering evidence-based recommendations on RSV vaccine policy and introduction. The main objective of this proof-of-concept (POC) study is to illustrate the feasibility of RSV surveillance in a main metropolitan area using birth databases and data on hospitalization for clinical bronchiolitis. Our concept would allow continuous monitoring and surveillance of RSV in infants and produce comparable data for main metropolitan areas in Europe in a practical and cost-efficient manner.

Methods For this POC study, a case was defined as a hospitalized patient (>1y) born in the Hospices Civils de Lyon (HCL) for which a positive RSV sample was retrieved from a conventional unit. Children below one year of age hospitalized for bronchiolitis are routinely tested for RSV infection in the HCL. All patients included in the study database were described by sex, age, birth weight and, if applicable, prematurity. Data was collected for birth cohorts of 2012 to 2016. Statistical analyses were performed using Stata 12.0.

Results In total, 45,820 children were born in the study period of which 663 met the case definition. Incidence rates for birth cohorts of 2012 to 2016 were 16.3 (95\% CI 13.7–18.9), 10.8 (95\% CI 8.7–12.9), 15 (95\% CI 12.5–17.5), 18.1 (95\% CI 15.4–20.8) and 12.1 (95\% CI 9.9–14.3) per 1000 newborns, respectively. No significant difference was found between hospitalization of male and female infants. The most predictive independent risk factor for RSV hospitalization was month of birth. Odd ratios gradually increased from 0.31 (95\% CI 0.18–0.49) in May to 3.73 (95\% CI 3.11–4.48) in November and were lowest in March with 0.26 (95\% CI 0.14–0.43). Significant differences were found for duration of pregnancy and weight at birth between hospitalized and non-hospitalized children. Children born before week 38 or with a birth weight of 3000 g or less were more likely to be hospitalized due to RSV infection.

Conclusion Seasonal RSV circulation is known to peak in December with younger infants being at higher risk of infection. Besides prematurity, month of birth is shown to be the greatest risk factor for hospitalization due to RSV infection. This results demonstrate that our concept of using already existing routine hospital databases, such as birth database and virological database, can produce reliable results to estimate the burden of RSV in the high-risk group of under one year old children. This surveillance system could be implemented in other metropolitan areas to produce comparable dataset at no extra cost therefore, enabling data collection for evidence-based RSV vaccine recommendations.
S12.2

Trends of incidence of healthcare-associated infections in patients admitted to intensive care units of a French University Hospital between 2011 and 2016

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Introduction

More than 20% patients in intensive care units (ICU) acquired healthcare-associated infections (HAI) in France. Pneumonia and bacteremia are of particular interest as they support significant morbidity and mortality. The objective of present study was to report the time course of patients’ characteristics, incidence of ICU-related HAI and bacteria isolated from these infections in a French university hospital between 2011 and 2016.

Methods

An active standardized surveillance of HAI in ICU was carried out in a university hospital totaling 5362 beds (Lyon, France). The methodology was based on the national surveillance network of HAI in ICU. All ICU patients hospitalized > 48 h between 01/01/2011 and 31/12/2016 were included in the surveillance. Data on patient characteristics, invasive devices, outcome in the ICU and HAI were collected. HAI included bacteremia, pneumonia and ventilator-associated pneumonia (VAP). Only the first occurrence of infection per site was analyzed. Incidence rates (95% CI) were calculated per 1000 patient-days for bacteremia and pneumonia and per 1000 intubation-days for VAP. Adjusted incidence rate ratio (aIRR) were calculated using mixed-effects multivariate Poisson regression.

Results

Overall, 17,299 patients were hospitalized > 48 h in 8 ICU, accounting for 152,367 patients-days and 81,201 intubation-days. In 2011 and 2016, man/woman ratio was 1.82 and 1.49 (P < 0.001), median age 63 (interquartile range [IQR] 51–75) and 66 years (IQR 54–76) (P < 0.001), median length of stay 5 (IQR 3–10) and 4 days (3–9), (P < 0.001), crude mortality rate 19.8% and 14.2% (P < 0.001), median ISS-II (45) IQR 33–59 and 46 (IQR 36–60) (P < 0.001). HAI occurred in 1,748 patients (10.1%) during the study period. The overall incidence of the first HAI was 14.3/1000 patient-days (95% CI: 13.6–15.0). Incidence of pneumonia decreased from 13.0 (95% CI: 11.4–14.7) in 2011 to 11.3 (95% CI: 9.9–12.8)/1,000 patient-days between 2011 and 2016 (P = 0.12); incidence of VAP was stable over time from 21.6 (95% CI: 18.9–24.6) to 22.0 (95% CI: 19.2–25.1)/1000 intubation-days (+1.6%, P = 0.97) for bacteremia. The most frequent microorganisms isolated during the study period in pneumonia were Pseudomonas aeruginosa (13.6–15.0). Incidence of pneumonia decreased from 13.0 (95% CI: 11.4–14.7) in 2011 to 11.3 (95% CI: 9.9–12.8)/1,000 patient-days between 2011 and 2016 (−13.2%, P = 0.012); incidence of VAP was stable over time from 21.6 (95% CI: 18.9–24.6) to 22.0 (95% CI: 19.2–25.1)19/1000 intubation-days (+1.6%, P = 0.87), as well as incidence of bacteremia (changed from 3.4 (95% CI: 2.7–4.3) to 21.6 (95% CI: 18.9–24.6) to 22.0 (95% CI: 19.2–25.1)/1000 intubation-days (+1.6%, P = 0.87), as well as incidence of bacteremia (changed from 3.4 (95% CI: 2.7–4.3) to 3.5 (95% CI: 2.8–4.3)/1000 patient-days in 2016 (+0.8%, P = 0.96)). Between 2011 and 2016, aIRR were 0.881 (95% CI: 0.737–1.053, P = 0.16) for pneumonia, 1.030 (95% CI: 0.854–1.244, P = 0.75) for VAP and 1.005 (95% CI: 0.737–1.371, P = 0.97) for bacteremia. The most frequent microorganisms isolated during the study period in pneumonia were Pseudomonas aeruginosa (n = 410, 26.6%), Staphylococcus aureus (n = 254, 15.2%), Klebsiella pneumoniae (n = 164, 10.6%) and Escherichia coli (n = 159, 10.3%). The most prevalent bacteria in bacteremia were Staphylococcus epidermidis (n = 83, 16.4%), Klebsiella pneumoniae (n = 67, 13.2%), Staphylococcus aureus (n = 54, 10.7%) and Pseudomonas aeruginosa (n = 53, 10.5%). In pneumonia, methicillin-resistant Staphylococcus aureus (MRSA) was less frequently isolated in 2016 (n = 4, 13.8%) compared to 2011 (n = 20, 31.3%, P < 0.001; 3rd-generation cephalosporin-resistant Enterobacteriaceae (3GCR-E) were slightly less frequently isolated in 2016 (n = 25, 25.8%) compared to 2011 (n = 28, 31.1%, P = 0.74).

Conclusion

Patients admitted in ICU were older and more severe in 2011 compared to 2016. Decreases of incidence rates, even non-significant, were observed for nosocomial pneumonia. VAP and bacteremia rates were stable over time while severity of patients at admission increased. The observed decrease of MRSA-related proportion of nosocomial pneumonia is encouraging, although 3GCR-E-related remains relatively stable. Assessment and improvement of health care practices (ventilator bundle, appropriate use of antibiotics) might help to prevent HAI and to limit antibiotic resistance in the high-risk population of ICU patients.

Disclosure of interest

The authors declare that they have no competing interest.

https://doi.org/10.1016/j.jrespe.2018.05.063
surveillance did not detect any Schistosoma-infested snails in the river from 2015 to 2017. Twenty-one rodents were captured for testing along the river and 3,479 cows and goats in Southern Corsica. All seroprevalence tests were negative.

**Discussion**

Corsica possesses all the necessary conditions for permanent transmission of urogenital schistosomiasis. Further research on the survival of infested snails over the winter period, and on the presence of a rodent reservoir in the river area are fundamental to evaluate the risk of ongoing transmission of urogenital schistosomiasis in the Cavu River. The persistence of a human reservoir in vicinity of the Cavu River would increase this risk. Therefore, tourists and locals exposed to the river must be advised of the risk of recreational water use in the Cavu. Public health authorities must reinforce physicians’ awareness of screening recommendations, to promptly detect and treat new cases and to prevent further transmission in Corsica. The maintenance of schistosomes in Corsica serves as a warning to other regions in Europe with environmental conditions favorable to urogenital schistosomiasis transmission.

**Disclosure of interest**

The authors declare that they have no competing interest.

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**S12.4**

**Influenza infection and Pandemrix® vaccination and risk of relapse among multiple sclerosis patients: a nationwide population-based registry study in Norway**

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**Introduction**

Influenza infection has been associated with various neurological complications. The cause of Multiple Sclerosis (MS) is not fully understood, but is thought to be immune-mediated. In MS patients, influenza infection may trigger the immune-response and possibly cause a relapse. The role of influenza infection is understudied, and safety of vaccination among MS patients is debated. We conducted a population-based study to determine the risk of a relapse among MS patients after an influenza infection and after pandemic vaccination.

**Methods**

The entire Norwegian population during 2008–2014 was defined as our study population (n = 5219.904). Data on exposures and outcomes from the Norwegian Patient Registry (NPR), the Norwegian Directorate of Health, the Norwegian Surveillance System for Communicable Diseases, the Norwegian Immunisation Registry and the Norwegian Prescription Database (NorPD) were linked using the unique 11-digit personal identification number. MS patients were defined, as either having at least one registry of MS in NPR and at least one MS medication dispensed or in cases with lack of information on medication from NorPD, at least two registries of MS from NPR was required. Relapse was defined as new contact with the health services and a new registration of International Classification of Diseases, Version 10 (ICD-10) code G35. Risk of relapse among MS patients was studied after an influenza infection (seasonal and pandemic influenza combined), pandemic influenza infection (influenza A [H1N1]), and vaccination with Pandemrix®. Incidence rate ratios (IRRs) with 95% confidence interval (95% CI) in pre-defined risk periods compared with the background period were estimated in self-controlled case series.

**Results**

The IRR for relapse among MS patients within one week after an influenza infection (seasonal and pandemic influenza combined) was 8.14 (95% CI: 3.02–10.71). Influenza infection alone, similarly, risk of relapse among MS patients increased significantly within one week after an infection (IRR: 5.69 [95% CI: 3.02–10.71]). The IRR for other risk periods was not significant. Relapse among MS patients was not associated with the Pandemrix® vaccination for any risk periods.

**Conclusions**

A significantly increased risk for relapse among MS patients was observed within the first week after an influenza infection (seasonal and pandemic influenza combined). The results indicated a similar trend also after pandemic influenza infection. Pandemrix® vaccination was not associated with increased risk of relapse.

https://doi.org/10.1016/j.prepi.2018.05.065

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**S12.5**

**A review of management of latent tuberculosis infection (LTBI) in a TB contact tracing service in Cork, Ireland**

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**Introduction**

Latent Tuberculosis Infection (LTBI) is defined as a persistent immune response to previously acquired Mycobacterium Tuberculosis without evidence of active TB. LTBI, whilst being non-contagous, may become active in 10% of those who acquire it over the remainder of their life. Contact tracing amongst those exposed to a person with active TB is a core public health function to identify people with LTBI. Ideally, all patients identified with LTBI should be offered chemoprophylaxis to prevent disease progression. Monitoring of those taking chemoprophylaxis is important to monitor compliance, treatment completion rates and to observe for adverse events. Good communication between primary care and public health services is vital to achieve optimal contact tracing processes and subsequent management of patients identified with LTBI. The aims of this study were:

- to determine the rate of detection of LTBI in contact screening in the Cork region during 2014 and 2015;
- to assess initiation and completion rates of chemoprophylaxis.

**Methods**

This study was a retrospective study conducted in the Department of Public Health, HSE-South, Cork, Ireland. Data was collected from a prospectively managed departmental contact tracing database which was initiated in 2013.

**Results**

There were 52 and 66 cases of TB notified in Cork in 2014 and 2015 respectively. 793 contacts were screened in 2015 compared to 289 in 2013. Twenty-one rodents were captured for testing along the river and 3,479 cows and goats in Southern Corsica. All seroprevalence tests were negative.

**Limitations**

This study only includes one area of Ireland. LTBI detection rates identified by contact tracing and outcomes of LTBI management should be estimated nationally and in other HSE areas to compare practices and outcomes with other countries and across different HSE areas.
Suggestions for future research: A future challenge for public health is how to further convince patients of the benefits of LTBI treatment. Future research should focus on how to provide an integrated health service to maximize uptake and completion of chemoprophylaxis for maximum societal benefit.

Disclosure of interest: The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.066

S12.6 Risk of HIV infection in a cohort of men who have sex with men attending CheckpointLX in Lisbon, Portugal

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Introduction: To accurately measure incidence it is essential to define precisely the timing of infection. However, in presence of interval-censored survival data, in which the event date is not exactly known, but is known to lie within an interval, timing of infection often needs to be estimated. One common approach is to use the mid-point between last negative and first positive test assuming that event of interest has a uniform distribution. However, when testing intervals are not fixed the mid-point method may not be a good estimate of infection date. Alternative approaches taking into account this uncertainty regarding the date of infection must be used. These include non-parametric estimators such as the Turnbull’s algorithm that we used to estimate the risk of HIV infection among MSM.

Methods: We used data from the Lisbon Cohort of MSM—a dynamic prospective cohort assembled since April 2011. The cohort is set up and conducted at CheckpointLX, a community-based HIV testing and counseling (CBVCT) center tailored for MSM run by trained peer counselors. The cohort recruits males reporting sex with other men, aged 18 or more, and HIV-negative at recruitment. For the survival analysis the nonparametric estimator of Turnbull was applied and the values of the estimator were obtained using the expectation-maximization algorithm. The analysis were conducted using the R package.

Results: From April 2011 to June 2017, 5631 HIV-negative adult MSM were eligible for follow-up of whom 2387 had at least one follow-up visit. During follow-up 99 incident HIV infections occurred. From the survival analysis, the probability that the HIV infection occurred at 430 days of follow-up was equal to 0.03 and after 1827 days, approximately 5 years of follow-up, was 0.08. The risk of infection at the first two years decreased 0.05 while at the end of three years of follow-up the risk decreased 0.06 and standing at 0.92 of probability of survival at the end of the follow-up considered in this study.

Conclusions: We observed that the survival of HIV infection in the Portuguese cohort based in a CBVCT in Lisbon decreased slower as the person-time of follow-up increased. The major decrease on the survival function appeared at the first two years of follow-up (1 to 0.96). Three major causes can operate: the effect of risk reduction counseling and participation in a cohort study; the effect at community level of treatment as prevention and access to pre- and post-exposure prophylaxis; and differential losses-to-follow-up.

Disclosure of interest: The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.067

Session 13–Risk factors, treatment and prevention of chronic diseases

Thursday the 5th of July, 2018 – 03:30 pm–05:00 pm

S13.1 Metabolic mediators of the relationship between adiposity and cardiac structure and function in UK adolescents


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Introduction: Strong evidence shows that adiposity increases cardiovascular disease (CVD) risk, explained in part by blood pressure (BP), glucose, triglycerides and cholesterol. Metabolomics offers the potential to identify novel intermediate pathways.

Methods: Body mass index (BMI) was measured at age 11 in the Avon Longitudinal Study of Parents and Children. Measures of cardiac structure (precursors of CVD; age 17) were left atrial size indexed to height (LAI), left ventricular mass indexed to height2.7 (LVMI), relative wall thickness (RWT) and left ventricular internal diameter (LVIDD). Metabolic traits (mostly lipid and lipoprotein related) were quantified via high-throughput 1H-nuclear magnetic resonance spectroscopy (NMR) at age 15. Complete data was available for all exposures, mediators and outcomes (n = 772). Multiple imputation was used to deal with missing data in covariates. Multivariable linear regression was used to estimate associations of BMI with measures of cardiac structure. Mediation was assessed via controlled direct and natural indirect effects, firstly, considering 156 metabolic measures individually, and secondly considering all metabolites jointly (as principle components, nprc = 17). Bootstrapping was used to calculate robust standard errors.

Results: A one-unit higher BMI was associated with 0.74 (0.54, 0.94) higher LVMI in males; 0.68 (0.52, 0.84) in females. Individually, each metabolite explained little of this association. Jointly, the PCs of the metabolites explained 8% of the association in males and 0.8% in females. Similar results were seen for LAI and LVIDD. There was weak evidence of an association of BMI on RWT.

Conclusion: In this adolescent population, individual metabolites measured by NMR contribute a small amount to the pathway from adiposity to cardiac structure. Considering them jointly indicates they may play a role in the pathway, particularly in males; further work is warranted to assess causality.

Disclosure of interest: The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.068

S13.2 Association between lifestyle risk factors and incident hypertension among middle-aged and older Australians

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Background: Few studies have examined the combined influence of modifiable lifestyle risk factors and the incidence of hypertension (1) in middle-aged and older Australians, and (2) to compare findings in men and women.
The association between different measures of depression and subsequent major cardiovascular events

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Introduction

Associations between depression and cardiovascular disease (CVD) have been reported in a number of studies. However, in many of these, the results have not been adjusted for potentially important confounding factors. As a result, some researchers argue that the observed association is primarily due to residual confounding. With the large amount of data collected, the UK Biobank offers a unique opportunity to assess to what extent the association between depression and CVD may be due to residual confounding. We investigated whether different measures of depression remain independent risk factors for major cardiovascular events (MCVE) after controlling for a number of potential confounding factors.

Methods

We used data from 275,759 UK Biobank participants without a history of cardiovascular disease and major mental disorders other than depression who had complete data available. In primary analyses, depression was defined as one or more of self-reported depression, antidepressant use, or hospital admission for depression. In secondary analyses, the effects of each of the subcategories of depression were analyzed separately. MCVE were defined as first-ever fatal or non-fatal stroke or myocardial infarction ascertained from hospital admission and cause of death records. We performed Cox Proportional Hazards models to estimate the risk of MCVE among participants with depression compared to those without depression. We obtained hazard ratios and 95% confidence intervals for unadjusted models, fully adjusted models, and fully adjusted models additionally included measures of body mass index, alcohol intake, physical activity, smoking, homeownership, fruit and vegetable consumption, oil fish intake, and family history of stroke, heart disease, hypertension and/or depression.

Results

We identified a total of 21,842 (7.9%) participants with depression at baseline of whom 64.1% had a self-reported depression diagnosis, 7.4% had a history of hospital admission for depression, and 76.6% reported using antidepressants. The proportion of people who were previous or current smokers, obese, physically inactive, or reported having diabetes or high cholesterol levels was higher among participants with depression than participants without depression. During a median of 6.7 years of follow-up, an incident MCVE occurred among 326 participants with depression and 3,718 participants without depression. In fully adjusted models, hazard ratios (95% confidence intervals) for MCVE were 1.13 (1.01–1.27) for participants with any indication of depression, 1.14 (1.00–1.31) for participants with self-reported depression, 1.60 (1.18–2.17) for participants with a history of a hospital admission with depression, and 1.12 (0.99–1.27) for participants reporting antidepressant use. In all analyses, hazard ratios increased after adjustment for age, sex, ethnicity, and socioeconomic factors but were attenuated after full adjustment. Similar patterns were observed when stroke and myocardial infarction were used separately as outcomes.

Conclusions

All measures of depression remained independent risk factors for MCVE after adjustment for a variety of potential confounding factors and effect estimates were similar for all sub-categories of depression. The adjusted hazard ratios should only be interpreted causally if one assumes that the covariates are common sources of depression and MCVE. This assumption remains controversial. Some argue that lifestyle factors such as body mass index, smoking, and physical activity are mediators in the relationship between depression and cardiovascular events. Future studies should apply more advanced statistical methods in order to determine the effect of lifestyle factors as potential mediators and explore potential for interactions.

Disclosure of interest

The authors declare that they have no competing interests.

https://doi.org/10.1016/j.respe.2018.05.070
risk of thromboembolic event since the marketing of DOACs and (2) describe factors associated with this underuse.

Methods We conducted a retrospective cross-sectional study including geriatric patients admitted during the pre-DOAC (2008–2011) and post-DOAC (2013–2015) periods in an academic hospital in Belgium. Five inclusion criteria were met: age ≥ 75 years, diagnosis of AF, indication for anticoagulation (CHADS2 score ≥ 2), risk of functional decline (Identification of Seniors at Risk [ISAR] score ≥ 2) and comprehensive geriatric assessment. The use of anticoagulants and antiplatelets at home before admission was recorded. Risks of stroke and bleeding were calculated using CHADS2 and HEMORR2HAGES scores, respectively. Factors associated with the underuse of anticoagulants were assessed through a multivariable logistic regression. To assess if the pre-DOAC vs post-DOAC marketing period was associated with anticoagulation underuse, three different models were used. First, the multivariable logistic regression described above was used (model 1). The two other models included propensity score (PS) techniques to reduce bias due to confounding variables that could be associated with the time period and/or the underuse of anticoagulants. The second model (model 2) was a mixed-effect logistic regression with PS matching to take into account the matched nature of the data. Variables that were associated with the underuse of anticoagulation in the univariate logistic regression (first model), and those that are clinically relevant (e.g. bleeding risk, antiplatelet use) were introduced in a logistic regression model, with the time period being the outcome, to assess the PS for each patient. The last model (model 3) consisted of a multivariable logistic regression using the inverse probability of treatment weighting.

Results Anticoagulant underuse, present in 34% of geriatric patients with AF, was lower in patients with a history of stroke (OR [95%CI]: 0.55 [0.35; 0.85], P = 0.008) or congestive heart failure (OR [95%CI]: 0.67 [0.37; 0.86], P = 0.008) but higher in those receiving antiplatelets (OR [95%CI]: 8.45 [5.67; 12.85], P < 0.001) and in older individuals (P = 0.003). Anticoagulant underuse decreased significantly from the pre-DOAC (37.3%) to the post-DOAC (29.7%) era, as shown by the two analyses using PS. Indeed, time period 1 was significantly associated with OAC underuse in model 2 (OR [95%CI] = 1.58 [1.03; 2.41], P = 0.035) and model 3 (OR [95%CI] = 1.34 [1.05; 1.70], P = 0.017).

Conclusions In older patients with AF, anticoagulant underuse was mainly associated with anti-platelet use. Anticoagulant underuse and antiplatelet use have both decreased since DOAC marketing. We cannot ascertain whether this was solely a DOAC effect or the effect of other factors, e.g. the increased awareness of clinicians of the importance of anticoagulation in these patients coming along with information campaigns and published updated guidelines that accompanied DOAC marketing. Underuse of anticoagulants was still a concern for three in ten geriatric patients with AF at high risk of thromboembolic event.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.071

Session 14–Occupational epidemiology

Thursday the 5th of July, 2018 – 03:30 pm–05:00 pm

S14.1

Big-data and occupational health surveillance: Screening of occupational determinants of health among French agricultural workers, through data mining of medico-administrative databases

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Introduction Surveillance of diseases and associated exposures is a major issue in occupational health especially for identifying new work-related diseases. In addition to classical epidemiology (hypothesis-driven studies), complementary methods relying on data mining of health insurance data must be developed for early detection of work-related diseases, without any prior hypothesis. For this reason, the social security system of French agricultural workers “Mutualité sociale agricole” (MSA) emphasized the potential interest of a surveillance system through the exploitation of their up-to-date databases created for reimbursement of medical expenses. In partnership with the French Agency for Food, Environmental and Occupational Health and Safety (Anses), a pilot study has been set up in order to develop an innovative approach of data mining to look for associations between long-term diseases (LTD) and occupational activities.

Methods The MSA was covering 3.2 million individuals in 2016, with about 1.2 million of active workers. Among them, the study population included all self-employed and steady employees, potentially including individuals who may have retired from 2007, that were registered at least once in MSA databases between 2006 and 2015. MSA holds administrative and medico-administrative databases which include occupational activities, socio-demographic variables (age, sex, incomes), as well as LTD, identified through ICD-10 codes. Following due authorizations especially of the French independent data protection authority (CNIL), MSA databases were cross-linked for the first time and restructured in order to apply logistic models and latent factor models. Obtained p-values...
and odds ratio (OR) were represented on graphics to highlight the key statistical signals of over-represented statistical associations between occupational activity and LTD.

Results The population covered by this study accounted for about 2 million individuals (active workers or retirees), with about 900,000 self-employed and 1.2 million steady employees. In both databases, there was a majority of men (65.7%) and the average age was significantly different (P < 2.2E-16) between self-employed (about 53 years) and steady employees (about 40 years). Concerning LTD, about 9.1% of steady employee and 13.4% of self-employed had at least one LTD declaration during the study period. Significant associations were highlighted especially between specific agricultural sectors and particular dermatitis or specific cancer, which will then be undergone to in-depth expertise. For example, among steady employees, a significant association was found between Parkinson's disease and viticulture (P < 0.01). In addition, OR showed that certain occupational activities were concerned by more or fewer LTD reports during the study period. For example, among self-employed, rural artisans seemed to have less reports of malignant tumors (OR = 0.3 [0.1–0.5]) and diabetes (OR = 0.2 [0.1–0.4]).

Conclusions This pilot study permitted to prove the feasibility and the relevance of using MSA data for health surveillance of occupational risks among agricultural workers. This approach has the following advantages: 1) enabling systematic evaluations of all disease–occupational activity associations, 2) high statistical power and 3) costless data acquisition. The main drawback is its lack of direct information regarding exposure. For this reason, in partnership with the French national public health agency "Santé publique France", further work is currently performed to estimate retrospectively pesticides use relying on previous activities and crop-exposure matrices. This data mining approach will later be enriched by identifying diseases using the drugs consumption as a proxy via specific algorithms.

Disclosure of interest The authors declare that they have no competing interest.

Acknowledgments Ansés (Funds provided through tax on pesticides sales), Central Agricultural Social Insurance Agency (CCMSA).

https://doi.org/10.1016/j.resspe.2018.05.074

S14.2

Changes in work conditions and impact on workers’ health: The case of collective syndrome in workers of a French administration office in March 2017

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Introduction In early 2017, the Regional Unit of Public Health France was solicited for recurring symptoms, mostly irritations and headaches, affecting employees of a 400 people administration office. These symptoms had emerged with the relocation in a new building completely renovated that was characterized by low consumption mode and cumulative new working conditions (open space, reorganization of services). These events led to the evacuation of the building because of non-compliant indoor air analyzes. In order to identify the origin of this episode, surveys were conducted by a multidisciplinary group (epidemiology, occupational health, environment, socio-anthropology) following the recommendations of the National Public Health Agency for the management of unexplained collective syndromes.

Methods In this study, three health components were investigated: the environment, the epidemiological context and the psychosocial context. Environmental expertise was conducted on indoor air quality, ventilation, acoustics and lighting. A retrospective cohort epidemiological survey was set up among the employees to characterize the health events in terms of people’s time and working conditions (noise, lighting, open space...). Finally, an assessment of the psychosocial context was carried out on the basis of interviews with volunteer employees and through the development of a chronogram of events that occurred in recent months.

Results Environmental expertise has revealed a poor ventilation system that may have degraded the quality of indoor air, insufficient thermal comfort, acoustic discomfort and lighting problems. As a result, 78% of employees were symptomatic within 6 months (from October 2016 to April 2017), with a higher attack rate among women (85% vs. 68%, P = 0.009) and 89% of people with multiple episodes of symptoms. Individuals presented a variety of symptoms with a higher incidence of headache (58%), asthenia (56%) and eye stinging (42%). For more than 70% of them, the symptoms disappeared when they left the building and for more than 30% when they opened the windows. The occupational doctor registered 28 recognitions of occupational accidents. Problems related to the building (light, noise, ventilation, odors) were more often felt by the symptomatic people. In total, 71% of people were dissatisfied with the work in open-space, the main inconveniences mentioned being: difficulty of concentration, noise and lack of confidentiality. The interviews of the psychosocial component put forward various elements that could have favored the epidemic phenomenon, such as the disruption of the organization of work, a damaged and impersonal work environment or communication problems with management.

Conclusions The various investigations led to the identification of many symptomatic people, although we cannot exclude some biases of information and selection, and allowed us characterizing these events as sick building syndrome. The occurrence of various and non-specific symptoms having the particularity of disappearing at the exit of the building, the large number of recurrent cases and the higher attack rate in women are characteristic of these episodes. There are also triggers at the environmental level such as insufficient ventilation and noise- or lighting-related annoyances. The new organization of work in open-space was also a particularly contributory factor. Recommendations on the technical points but also on the working conditions were developed in consultation with the management and will require a mid-term evaluation.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.resspe.2018.05.075

S14.3

Population-based assessment of health, healthcare utilization, and specific needs of Syrian migrants living in Germany: what is the best sampling method?

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Introduction The war in Syria belongs to the most dramatic emergencies in the last decades forcing a large number of people to seek refuge in other countries. Information on health-related aspects and special needs of Syrian migrants is urgently required, especially in countries hosting a considerable number of Syrians like Germany. However, data is scarce and as survey response using traditional sampling methods is usually low, one of the biggest challenges is finding appropriate sampling strategies to obtain representative results. In order to increase survey response in hard-to-reach populations, new methods were developed. One of them is respondent-driven sampling (RDS), a network sampling technique that starts with a small convenience sample of the target population ("seeds") which is asked to complete the survey. All participants should then invite a limited number of their contacts ("peer-recruited participants") who are also members of the target population to participate in the survey. In Germany, however, RDS has hardly been used for sampling migrant populations.
Therefore, we aimed to assess if respondent-driven sampling (RDS) is a better approach to recruit Syrian migrants for health research than random sampling via the population registry.

**Methods** A cross-sectional study was conducted in Munich, Germany between April and June 2017 inviting adults (18+ years) born in Syria to answer an online questionnaire asking for sociodemographic and health-related information. The participants were recruited using two sampling strategies: random sampling via the population registry (PR) and respondent-driven sampling (RDS). The two study populations were compared to the total sample drawn from the population registry with respect to gender and citizenship. In addition, the two study populations were compared to each other regarding self-reported health status, healthcare utilization, lifestyle factors, social network size, and acculturation.

**Results** Of 374 persons randomly drawn from the population registry, 49 individuals answered the questionnaire completely (response: 13.1%) while via RDS 195 participants were recruited by 16 seeds. More persons possessed German citizenship in the total PR sample (20.5%, 95% CI: 16.5–24.5%) and in the PR study population (28.6%, 95% CI: 15.5–41.7%) than in the RDS study population (0.5%, 95% CI: 0.1–1.1%). Participants recruited via the population registry were older, smoked less, reported more often to hold a university degree, and indicated a higher prevalence of chronic diseases, more frequent healthcare utilization, higher scores of acculturation as well as a larger social network compared to the study population obtained via RDS.

**Conclusions** As expected, response was very low among the random sample drawn from the population registry while a larger number of participants were recruited via RDS using only 16 seeds. In addition, the two recruitment strategies led to study populations with substantially different characteristics indicating selection bias in either method. These findings provide valuable information for upcoming population-based studies investigating health-related aspects in migrants indicating that mixed sampling approaches combining various recruitment strategies may enhance representativeness.

**Disclosure of interest** The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.076

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**S14.5**

**Nationwide study of Parkinson’s disease incidence between 2010 and 2015 among the French agricultural population**

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**Introduction** The role of farming and professional pesticide exposure is well established in Parkinson’s disease (PD). PD is multifactorial disease, and there are other risk/protective factors that may have an influence on the incidence of the disease in the agricultural population. The impact of professional pesticide exposure on the spatial distribution of the disease is not well known. Our objectives were to estimate PD incidence among the French agricultural population and to compare it to PD incidence in the general population, and to examine its spatial distribution.

**Methods** We used French national drug claims databases to identify PD cases each year between 2010 and 2015 using a validated algorithm. We defined the agricultural population based on affiliation to the “Mutualité sociale agricole” (MSA), the only health insurance for farmers and agricultural workers. We compared PD incidence in MSA farmers, MSA workers, and affiliates to the General scheme (GS, that represents about 91% of the French population) of the social security using Poisson regression adjusted for overdispersion, 5-year groups of age, sex, sex x age, and, and estimated relative risks (RRs) and 95% confidence intervals (CIs). We also examined multiplicative interactions of agricultural status with age, sex, and year. We estimated PD incidence ratios standardized for age, sex, and year in each French “département” among MSA farmers and MSA workers and estimated the intraclass correlation coefficient (ICC), a measure of the proportion of the variance in PD incidence that is due to between-département variation.

**Results** During the study period, between 2253 and 2628 MSA affiliates were annually identified as newly treated for PD; the total number of incident PD cases was of 14,464 (72% farmers, 28% workers). The crude annual incidence ranged from 0.715 to 0.791 per 1,000 person-years. PD incidence was 7% higher in 2010 (P = 0.001) than in the rest of the period but no linear trend was observed between...
2011 and 2015 (P for trend = 0.560). The mean age was 75 years (SD = 12) and 7990 (55%) were males. PD incidence was 12% higher among MSA affiliates compared to GS affiliates (RR = 1.12; 95% CI: 1.09–1.15). Among MSA affiliates, farmers had a higher risk of PD than other workers (RR = 1.10; 95% CI: 1.05–1.15). The increased PD risk in farmers depended on age (P for interaction = 0.004), with a stronger association at older ages, but not on sex (P for interaction = 0.085) or calendar year (P for interaction = 0.443). Regarding the spatial distribution of PD incidence, we observed a more pronounced between-department variation among MSA farmers (ICC = 87%) than among other MSA workers (ICC = 79%).

Conclusion Higher PD incidence among French farmers compared to the general population and agricultural workers, as well as the marked spatial variation of PD incidence in this population are consistent with the role of occupational pesticide exposure in PD. These findings warrant the epidemiological surveillance of PD among French farmers.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.078

S14.6

Obesity and labor market participation: a prospective cohort study of transitions between work, unemployment and sickness absence

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Introduction Obesity is an important risk factor for several health complications and is an immense cost to society. Individuals who are obese, are often targets of stigmatization and discrimination, e.g. in the labor market, where obese employees are ascribed multiple negative characteristics including being lazy, sloppy, less competent, and lacking in self-discipline. Furthermore, when a resume is accompanied by a picture of an obese person, the applicant is rated more negatively and is less likely to be hired. Another mechanism by which obesity could affect labor market status is health; excessive weight is a risk factor for a range of morbidities, which could lead to decreased productivity. Employment and economic security contribute to good health maintenance and being outside of the labor market is, on the other hand, associated with poor life style and health problems. Exclusion from the labor market could add to the negative consequences of obesity, increasing the burden for the individual as well as for society. It is well established, that obese individuals earn less and have a higher risk of exiting employment through disability pension compared to normal weight individuals. However, it is controversial whether obese individuals have a higher risk of exiting employment through other pathways and if they have a lower chance of getting hired than their non-obese peers. We aim to test the hypothesis that being obese is associated with higher risk of unemployment and sickness absence as well as a lower chance of employment compared to being normal weight.

Method A sample of 84,671 men and women (age range: 18–60 years) from the Danish National Health Survey 2010 (DNHS-2010) participated in the study. The exposure was divided into five categories according to body mass index (BMI): underweight (BMI < 18.5), normal weight (18.5 ≤ BMI < 25), overweight (25 ≤ BMI < 30), obese (30 ≤ BMI < 35) and severely obese (BMI ≥ 35). BMI was calculated from self-reported height and weight obtained from the DNHS-2010. Administrative registers were used to obtain information on the outcome: labor market participation during a 5-year follow-up period. Information on other variables including age, gender, education, living area, cohabitation and comorbidity was obtained from registers and information on smoking status, alcohol consumption, depression and physical shape was obtained from the DNHS-2010 questionnaire. Data were analyzed by Cox proportional hazards models adjusted for confounding variables.

Results Being obese or severely obese were both associated with a higher risk of unemployment and sickness absence as well as a lower chance of employment compared to being normal weight. For example, the hazard ratios (HR) for severely obese individuals were 1.42 (95% CI: 1.31–1.55) for unemployment and 1.53 (95% CI: 1.44–1.64) for sickness absence when comparing to participants of normal weight. Among unemployed individuals, the HR for being employed was 0.80 (95% CI: 0.72–0.90) for severely obese compared to normal weight participants. When stratifying by gender, similar trends were seen for both men and women. However, a lower chance of employment among obese and severely obese individuals was only significant among women.

Conclusion Obesity was associated with an increased risk of unemployment and sickness absence compared with individuals of normal weight. Additionally, overweight and obesity was associated with a decreased chance of employment among unemployed women.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.079

S15.1

Assessing the role of a patient transfer network in the spread of carbapenemase-producing Enterobacteriaceae: The case of France between 2012 and 2015

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Introduction The spread of carbapenemase-producing Enterobacteriaceae (CPE) is a major public health threat that has been associated with cross-border and local transfer of patients between healthcare facilities. However, the impact of healthcare transfer networks on CPE spread dynamics may vary in time and between countries. In this context, our study aimed to assess the contribution of the patient transfer network on CPE spread in France from 2012 to 2015.

Methods Using the French healthcare network of 2.3 million patients, we extended a previously proposed statistical method and tested the ability of this network to support observed CPE incidence episodes. First, using 2237 CPE episodes that occurred from 2012 to 2015, we identified the most likely infector for the 1251 non-imported episodes using network-supported paths (NSPs). We then compared the observed NSP distances to those expected by chance, using random permutations of the CPE data. The impact of the assumed time window between infector episode and CPE episode was investigated in a sensitivity analysis.

Results More than half of all CPE episodes were linked, either as infectors or incident episodes. The percentage of episodes with identified potential infectors over the network increased with time, from 57% in 2012 to 66% in 2015. NSP distances from 2013 to 2015 were significantly shorter in the observed data than expected by chance, indicating a role of the transfer network in CPE spread dynamics in France. In 2012 however, this result was not found. Over the entire study period, linked episodes tended to occur in the same administrative depart-
S15.2 Comparison of mediation methods for causal inference of socioeconomic status, diet, and mortality
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Introduction Associations between indicators of health inequalities of socioeconomic position (SEP) and mortality have been identified globally. Despite these inequalities, SEP, as a modifiable risk factor, and mechanisms that lie on the causal path between SEP and mortality are not readily targeted for interventions. Dietary habits are one of the mechanisms by which SEP has been linked to chronic disease outcomes and mortality. In the present study, we investigate the relationship between indicators of SEP as potentially having a direct effect on all-cause mortality and an indirect effect via diet and other mediators such as BMI in LIFEPATH, a pan European project comprised of multiple cohorts.
Methods To determine factors that may lie on the causal path between SEP exposure and mortality we use both structural equation models (SEM) and counterfactual models. Unique to this work are the detailed exposure data, where the primary exposure is comprised of multiple indicators of SEP, including occupation, income, and education and the main mediator of diet is constructed as dietary patterns via factor analysis. SEM is used to determine important mediators of SEP and mortality and counterfactual mediation methods is used to determine the influence of intervening on dietary patterns to reduce the rate of early mortality. In addition, we compare the two approaches of mediation to infer causality. We compare these results in both a pooled analysis of the seven cohorts nested in LIFEPATH and in the individual cohorts.
Results Interestingly, there are two major dietary patterns in the cohorts, western and prudent. We find that there is a direct effect of SEP on all-cause mortality, and that a higher BMI and adherence to a western dietary pattern leads to an increase in the rate of mortality across several populations. For example, in EPIC-Italy the rate of mortality of those who were of lower SEP and obese is 1.4 (95% CI of 1.1, 1.8) compared to those who were higher SEP and non-obese. Additionally, when considering the interaction of BMI and an adherence to a western diet, the rate is 2.2 (95% CI of 1.03, 4.5) in comparison to those with a higher SEP, lower BMI, and non-adherence to a western dietary pattern.
Conclusions We conclude that the potential to intervene on SEP and/or mediating factors such as dietary patterns can reduce the rates of premature death. Additionally, methods of structural equation modelling and counterfactual modelling can be used simultaneously to improve our inferences of causality.
Disclosure of interest The authors declare that they have no competing interest.
https://doi.org/10.1016/j.respe.2018.05.081

S15.3 What are the determinants associated with the patients’ willingness to participate into clinical research? Results from a randomized vignette-based study
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Introduction Clinical research depends on the patients’ willingness to participate. Globally, general public and outpatients express positive attitudes regarding their intent to participate in medical research studies. In reality, a quarter of clinical trials fail to recruit the anticipated number of patients thus exposing the trial to the risk of negative findings and publication bias. Moreover, nonparticipation may cause selection bias, thus reducing the generalizability of the results. Unwillingness to participate to clinical research may be explained by various determinants at different levels of the research process. The objectives of this survey were to identify characteristics of clinical research projects associated with patients’ willingness to participate to research.
Methods We conducted a cross-sectional study among all patients discharged during one month from a Swiss public teaching hospital. We presented two clinical vignettes: one randomized trial for new treatment for a respiratory disease and one diagnostic study assessing the performance of a new laboratory test in two different medical contexts. We asked patients whether they would agree to participate using a 5-point Likert scale. We randomly manipulated three study attributes in each vignette, using factorial design. We performed ordered logistic regression models for each vignette to estimate the association between the likelihood of participation and the three dichotomous experimental factors. We also tested some patient characteristics and behaviors.
Results A total of 1125 respondents (43%) agreed to participate in the studies. Respondents were mostly women (56%), 60.0 years old on average (standard deviation, SD 19.4), Swiss (52%) or other European natives (32.6%), and most of them had children (79%). One third experienced one previous hospital stay within last 6 months (31%), and they rated their current health status as good (47%) or fair (23%). One third were blood donors (33%) and one quarter already participated to clinical research during previous hospitalization stays (25%). 85% of respondents judged that research is a very important mission of a university hospital and 79% expressed that it is definitively justified to ask patients to contribute to producing knowledge that will be useful to other persons. Globally, 84% of respondents had a very and rather positive opinion about clinical research. There were no differences between the 8 groups of patients randomly allocated to the different versions of the vignettes. The proportion of respondents that would “certainly” or “probably accept to participate” in first vignette was 44.8% (95% CI, 41.9–47.8%). Expressing a preference for new treatment was associated with a higher willingness to participate (odds ratio, OR 1.32; 95% CI, 1.06–1.61, P=0.012) as public funding of the research (OR 1.38; 95%CI, 1.12–1.70, P=0.003). Willingness to participate was not associated with the type of allocation of the study drug. The proportion of respondents with positive willingness to participate in second vignette was 76.2% (73.6–78.9%), but none of the experimental factors influenced participation. In both vignettes, participation was also higher among Europeans, patients who had a positive opinion on research, and blood/organ donors. Participation to first vignette was higher in women compared to men while younger patients were more interested to participate to second vignette.
Conclusions Patients are generally very positive toward the importance of research. However, we observed some disparities in their propensity to participate depending on the type of research. Drug studies were less valued than diagnostic studies. It is possible that these disparities are explained by some misunderstanding on some methodological aspects or logistical of the study. Educating the public and providing detailed information to the subjects of research are keys to improve patient participation into clinical research.
Disclosure of interest The authors declare that they have no competing interest.
https://doi.org/10.1016/j.respe.2018.05.082
S15.4 Multi-omic signature of birthweight: metabolites and methylation driven approaches

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Introduction

Birthweight is a known risk factor for diseases in adult life however; the biomolecular mechanisms leading to disease processes remain poorly understood. DNA modifications, transcripts, proteins and metabolites have the potential to imprint biological responses during early life and drive adult risk profiles to chronic conditions. The aim of this study is to enhance the understanding of the complex pathways related to birthweight through integration of multiple OMIC techniques.

Methods

This study combines methylation \((n=468,408\, \text{CpGs})\), transcriptomics \((n=29,164\, \text{transcripts})\), inflammatory proteins \((n=16)\) and metabolomics \((n=4,712\, \text{metabolic features})\) profiles from cord blood of participants in the EXPOSOMICS birth cohort consortium including ENVIRONAGE \((n=200)\), INMA \((n=85)\), Rhea \((n=99)\) and Piccolipù \((n=99)\). We computed Pearson correlation coefficients between pairs of OMICs. Specifically, using a metabolites and methylation driven approaches, we respectively correlated metabolic \((n=68)\) and epigenetic \((n=8696)\) signatures of birthweight identified in previous EXPOSOMICS birth cohort study with the other omics platforms. The OMIC platforms have been denoised using technical variables, pairs were considered significant after Bonferroni correction for multiple testing. Significant correlations were visualized in a globe plot with the Circos visualization toolkit version 0.69–6. Transcripts that were significantly correlated to metabolites and to CpGs sites were studied in an overrepresentation analysis (ORA) using DAVID software (https://www.david.ncifcrf.gov).

Results

In the metabolites driven approach, of 33,835,984 correlations between metabolomics and the other levels, 20,097 \((0.06\%)\) were significant, mainly inverse \((94\%)\) and with a mean absolute correlation coefficient of 0.30 \((\text{range} = 0.19–0.57)\). Over the 68 metabolites under study, 13 were significantly correlated with inflammatory proteins, 9 with the transcriptome and 20 with the methylene for a total of 28 unique metabolites. A globe plot of significant correlations showed that all the 9 metabolites were positively correlated with the transcriptome and had an inverse correlation with methylene. Few overlaps \((n=5)\) were detected in metabolites correlated with both methylene and proteins; the correlations in both pairs went in the same direction (mainly positive). ORA of the 38 genes associated to the significant 41 transcripts resulted in 8 significant pathways, including immune response (such as NK mediated cell cytotoxicity), signaling (MAPK signaling pathway) and also diseases-related (diabetes mellitus and thyroid autoimmunity) pathways. In the methylation driven approach, 0.02% \((n=66,719)\) of a total 293,606,396 correlations were identified as significant with correlation coefficients having absolute mean of 0.42 (range 0.23–0.69), and mostly negative \((67\%)\). Over the 8,663 CpG sites under study, 57 were significantly correlated with proteins, 1,467 with the transcriptome and 2174with the methylene. The globe plot of the significant correlations showed that 13 CpGs appeared in both transcripts and proteins correlation sets, 27 CpGs were common to metabolites and proteins correlation sets, and 791 CpGs were common to metabolites and transcripts correlation sets. Significant correlations in the metabolites and methylation driven approaches shared 34 transcripts, 14 metabolites, 529 CpG sites and 3 proteins. ORA among the 333 genes associated to the 391 unique transcripts significantly correlated to the methylene identified 61 pathways including 4 over the 9 pathways detected in the metabolites driven analysis (including NK mediated cell cytotoxicity and antigen processing and presentation), and also hormone (progesterone-mediated oocyte maturation) and nitrogen metabolism pathways.

Conclusion

This study provides initial insights into the molecular mechanisms related to birthweight and the biological pathways potentially leading to adverse health effects.

Disclosure of interest

The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.083

S15.5 Statistically significant survival benefits in randomized clinical trials in oncology: are they potentially clinically relevant?

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Introduction

We aimed at studying how often “statistically significant” improvements in survival in oncological randomized clinical trials (RCTs) are compatible with trivial (clinically non-significant) differences.

Methods

We selected meta-analyses on the impact of oncology treatments that included phase 3 RCTs with overall survival as primary or secondary outcome. Our source was the Cochrane Review database. We only selected meta-analyses that included studies with point estimate and confidence interval that indicated a statistically significant benefit for overall survival. For each of the selected meta-analysis, we then recorded the individual studies point estimate and confidence interval when they were statistically significant. The point estimate and the upper confidence limit were categorized to determine what proportion of significant point estimates were compatible with trivial differences according to the upper confidence limit (close to 1). Categories were < 0.5, 0.5–0.59, 0.6–0.69, 0.7–0.79, 0.8–0.89, and 0.9–0.99.

Results

A total of 109 point estimates corresponding to hazard ratios were extracted. The 109 point estimates were distributed as follows: 0 above 0.9, 11 (10%) between 0.8 and 0.89, 26 between 0.7 and 0.79 (24%), 37 between 0.6 and 0.69 (34%), 14 between 0.5 and 0.59 (13%) and 21 below 0.5 (19%). More than 2 out of 3 studies \((72/109, 66\%)\) had a point estimate below 0.7 indicating a gain in overall survival and clinically significant efficacy of the treatment. In contrast, the upper limits of the confidence intervals were frequently compatible with clinically trivial benefits. For 41 studies \((38\%)\), this upper limit was ≥ 0.95, for 25 \((23\%)\) studies it was between 0.90 and 0.94, for 28 \((26\%)\) it was between 0.80 and 0.89 and for only 15 \((14\%)\) it was below 0.80. Such contrast was most compelling for studies with a main point estimate between 0.6 and 0.69 for which 22 out of 37 \((59\%)\) had an upper confidence limit of 0.9 or above.

Conclusion

The survival benefits described in “statistically significant” phase 3 oncology trials were often clinically impressive, as relative reductions in mortality exceeded 30% in two thirds of the studies. However upper confidence limits of these estimates were frequently in the vicinity of 1, and were compatible with a clinically negligible benefit: for 61% of the trials the upper limit suggested a relative reduction in mortality below 10%. Clinicians should consider not only if a treatment benefit is statistically significant and if the point estimate is sufficiently clinically convincing, but should also consider the uncertainty of the benefit, reflected by the width of the confidence interval, and in particular the confidence bound nearest the null hypothesis of no benefit. Trialists should design trials with a sufficient power not only to detect a given survival benefit, but also to exclude small survival benefits of little clinical relevance.

Disclosure of interest

The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.084
S15.6
Comorbidities and mortality in persons with type 1 diabetes: the vantage point of multiple time scales via Bayesian intensity model
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Introduction Type 1 diabetes is an incurable autoimmune condition occurring typically before the age of 30 years in which the ability of pancreas to produce insulin in compromised resulting in too high levels of blood sugar. Diabetes often causes other health problems over time. Calendar year and age of diagnosis of type 1 diabetes as well as diabetes duration are considered as important predictor factors for mortality and morbidity in persons with type 1 diabetes. One of the common comorbidities in type 1 diabetes is the chronic kidney disease, which increases the risk for both cardiovascular death and end-stage renal disease (ESRD). ESRD is a life-threatening complication resulting in a poor prognosis for patients. Cardiovascular death and renal failure are therefore competing risks in patients with type 1 diabetes. So far, researchers have focused on the competing risks approach to account for mortality when evaluating the ESRD risk. Our aim is to provide an overall picture on the changes in the progression of type 1 diabetes to ESRD and/or death without ESRD, when studying the risk on multiple time scales simultaneously, and accounting for the interplay of the relevant time scales.

Methods This study is based on the cohort formed in the register-based FinDM (Diabetes in Finland) study, in which incident type 1 diabetes patients were identified from the Finnish drug reimbursement register (Social Insurance Institution) and from the Finnish Hospital Discharge Register (National Institute for Health and Welfare). This study focused on those diagnosed with type 1 diabetes between 1972 and 1991 before age of 30 years (n = 11,810). Follow-up data from the date of entitlement until end of 2014 on ESRD (Finnish Registry for Kidney Diseases) and death (Statistics Finland) were obtained through a computerized register linkage. We tracked the individual’s risk for ESRD or death without ESRD on the relevant time scales, age, calendar time and diabetes duration, by applying nonparametric Bayesian intensity model. The model allows incorporation of multiple time scales and multiplicative effects of different time scales. We used the informative graphical displays of the hazard, such as 3-dimensional plots and heatmaps, to present and interpret the results.

Results After a mean follow-up of 26.7 years, a total of 338,492.8 person-years accumulated and 844 persons (7.1%) developed ESRD, yielding a crude incidence rate of 2.5 per 1000 person-years. Deaths of persons with ESRD (n = 440) comprised almost 19% of all of the 2345 deaths. The crude mortality rate was 5.7 and 86.2 per 1000 person-years among type 1 diabetic patients without and with ESRD, respectively. Estimation of multiplicative effect of the diabetes duration and attended age by means of Bayesian model depicted both time scales as determinants of the risk for ESRD as well as the risk of death without ESRD. After attended age of 20 years, the risk of ESRD increased steeply, reached a plateau around 30 years, and showed a slight decrease after age of 40 years. The risk of ESRD associated with diabetes duration incorporated two levels, the lower one followed by the higher one, with the change point at 15 years. The risk of death without ESRD increased gradually with increasing age, whereas a decrease in risk was seen for increasing diabetes duration in those diagnosed with type 1 after age of 8 years. Calendar time was associated with improved survival of type 1 diabetic patients without ESRD and decreased risk for ESRD.

Conclusions Overall prognosis of type 1 diabetes has improved over time. Attended age and duration of diabetes, both important determinants of the morbidity and mortality in patients with type 1 diabetes, have a multiplicative effect. The strongest joint effect of two time scales on the risk of ESRD was seen for those attending 30-40 years after diabetes duration over 15 years.

Disclosure of interest The authors declare that they have no competing interest.
https://doi.org/10.1016/j.respe.2018.05.085

Session 16–Non-communicable diseases
Friday the 6th of July, 2018 – 11:00 am–12:30 am

S16.1
Monitoring the health effects of disasters and environmental hazards: The primary care database as a tool to inform public decision-making
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Introduction Public leaders are responsible for minimizing the potential negative effects of disasters and environmental hazards on the health and well-being of exposed citizens. In order to decide upon appropriate measures, decision makers depend heavily on the availability of reliable information on the human health consequences of exposure to specific events, substances or agents. Disaster researchers and epidemiologists can play a crucial role in monitoring activities. The objective of this contribution is to describe how the research possibilities of a particular data infrastructure, the Nivel Primary Care Database (PCD), were used in the context of three disasters and four environmental hazards cases in the Netherlands.

Methods The PCD continuously collects and processes electronic health record data (e.g. healthcare utilization, symptoms, diagnoses and prescriptions; coded according to the International Classification of Primary Care) of (i) more than 500 general practices with 1.6 million registered patients (10% of the Dutch population); and (ii) electronic health records of primary care out-of-hours services with a total catchment area of 11.5 million. The PCD can overcome shortcomings from other data sources like body materials, interviews and questionnaires, and allows longitudinal and cross-classified multilevel analyses with patients nested in GPs and postal codes. The three disaster cases involve exposure to the fireworks disaster in Enschede (2000; 23 people killed, 950 wounded: data range 1999–2005); the Volendam New Year’s fire (2001; 14 children killed, 350 wounded: data range 2000–2006); and a shooting incident in a shopping mall in Alphen aan den Rijn (2011; 7 people killed, 17 wounded; data range 2010–2011). Environmental hazards cases include: living nearby livestock (especially goat farms) (data range 2007–2017), living in a fruit production area where pesticides are used (data range 2013–2016), living in the vicinity of an industrial area with chemical companies (data range 2006–2008 and 2013–2015).

Results The disasters and major crises were accompanied by a significant increase in health care utilization and psychological problems among affected groups and illustrate a pattern of normalization over time. Particular risk groups could be followed through time e.g. non-western immigrants, people with existing psychological problems, and children with or without burns. Industrial and agricultural activity was associated repeatedly with health problems related to airways and lungs (the association between goat farms and pneumonia received special attention). In the pesticides case, PCD data could be combined with a complementary survey providing information on self-perceived symptoms and perceptions, which confirmed that participants mostly did not attribute their health problems to pesticides in fruit production. Almost all of the studies provided information on the prevalence of medically unexplained symptoms and chronic health problems. In one industrial case, municipalities close to the industrial zone could be compared with other communities in the same region as well as a comparison group of patients in a living environment with a similar level of urbanization and industrial activity.

Conclusions A major challenge for disaster health researchers and epidemiologists is to understand the association between population health on the one
Mortality and longevity after traumatic spinal cord injury in Switzerland from 1990 to 2011: a 21-year longitudinal study
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Introduction Traumatic spinal cord injuries (TSCIs) have life-long implications on the health and mobility of the individual’s affected. In Switzerland, TSCIs are due most often to sports- and leisure-related activities, transportation-related accidents, and falls; with the highest incidence rates among the young (16–30 years) and the old (76 years and older). Although limited, extant literature suggests a reduced life expectancy up to 50% in comparison to the general population, following TSCI. However, these estimates vary across settings and according to SCI-characteristics. To adequately inform targeted intervention strategies aimed at reducing premature mortality, appropriately stratified, country-specific estimates of risk factors for mortality and reduced survival are imperative. Presently, Switzerland has no estimates on mortality and life expectancy after TSCI. Methods We used data from the Swiss Spinal Cord Injury (SwiSCI) cohort study to model mortality in relation to age, sex and lesion characteristics. Poisson regression using an offset of follow-up time was used to estimate mortality rate ratios and adjusted mortality rates for each pre-determined follow-up period. Hazard ratios (HRs) were estimated using flexible parametric survival models of time since discharge from first rehabilitation to death or September 30, 2011, whichever came first. Skew-normal regression was used to estimate marginally adjusted life expectancy (LE) at age 30 years. Results Two thousand two hundred and fifteen persons were included that incurred a new TSCI between 1990-2011, contributing a total time at risk of 18'846 person-years (median 7.8 years) and 380 deaths. A total of 73.4% were male, 59.1% were paraplegic, and the average age at injury was 43.4 years (SD = 18.8; IQR = 31). The mortality rate within the first six months post-injury was 36.8 per 1'000 person-years (95% CI = 26.6–47.1), after which the mortality rate reduced dramatically to 9.0 per 1'000 person-years (95% CI = 6.1–11.9) between six months and two years, and remained stable thereafter. Controlling for age and sex, there was a 58% increased risk of mortality for high compared to low lesions (HR = 1.58; 95% CI = 1.23–2.02) and a 48% higher risk for complete versus incomplete lesions (HR = 1.48; 95% CI = 1.16–1.88). At an attained age of 30 years, comparing the highest, more severe lesions (C1–C4: AIS A, B, or C) to less severe lesions at any level (AIS D/E), estimated LE reduced by 17 years.

Conclusion This study provides the first estimates of mortality and life expectancy following TSCI in Switzerland. Main risk factors identified were: Age at injury, severity and lesion level. The observed discrepancies in mortality estimates point towards disparities in mortality and survival outcomes according to SCI-specific characteristics. Future research is thus needed that identifies risk of cause-specific mortality for targeted interventions to improve LE and reduce avoidable mortality contributing to large SCI-specific disparities.

Disclosure of interest The authors declare that they have no competing interest.

Prediction of intimate partner violence using administrative data on pregnancy
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Background Intimate partner violence (IPV) is one of huge problem worldwide, especially IPV during pregnancy need to be prevented because it leads negative health outcome for both the mother and offspring. However, it is hard to find women who suffer from IPV by health practitioner or public health staff due to stigma or hesitation. Thus, it would be useful if we can detect the possibility of IPV using administrative data on pregnancy. The aim of this study is to develop an algorithm to predict IPV during pregnancy using administrative data on pregnancy.

Methods We used data of pregnancy record registered at Adachi city, Tokyo, in 2016 fiscal year (n=6008). The administrative pregnancy record include date of registration, location of health center, type of center where pregnancy record submitted, parity, maternal age, BMI, psychiatric disease, lack of insurance or public aid, week of gestation when pregnancy record submitted, marital status, feeling when recognized pregnancy, multiple pregnancy, twin, teenage pregnancy for first baby, existence of social support, having trouble within family, history of abnormal pregnancy or delivery, having smoker within family, drinking, economic situation. IPV was assessed for the first time interview or other opportunity for further assessment by public health nurse. Multiple logistic regression model was used to predict IPV.

Results IPV cases were found for 38 (0.65%) cases. Multiple logistic regression analyses showed that weekend registration, location of health center, parity, young maternal age, psychiatric disease, lack of insurance or public aid, late week of gestation when pregnancy record submitted (20 week or later), single marital status, multiple pregnancy (4 or more), lack of social support, having smoker within family, drinking, severe economic situation showed significant association with IPV. These variables predicted IPV with good predictive power (area under receiver operating characteristic curve = 0.95, 95% confidence interval: 0.92 to 0.98).

Conclusion We showed strong predictability of IPV during pregnancy using administrative data on pregnancy record. Current study is useful to prevent deterioration of IPV per se, and further adverse health outcome due to IPV during pregnancy, such as postpartum depression, low birth weight or child maltreatment.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.086

https://doi.org/10.1016/j.respe.2018.05.087
**S16.4**

**Patient and injury characteristics associated with in-hospital mortality among adult acute burns patients. The case of a burns center in the Western Cape, South Africa**

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**Background**

Specialized burns centers should manage the most severe burn cases. They often cater for large geographical areas and in low-income settings must deal with patient volumes far larger than their capacity. In such context, understanding the most significant determinants of in-unit mortality and knowing how to best predict it is instrumental to priority settings. The objective of this study is two-fold: firstly to identify patient and wound characteristics that best predict in-hospital outcome, and secondly, to assess whether prediction mortality scores, such as the Burn Abbreviated Severity Index (ABSI), established in high-income settings, are suitable in other settings where resources are limited.

**Methods**

The study is set in the burns center at Tygerberg Hospital in the Western Cape Province of South Africa, the only burns center catering for adult patients. All patients there during two consecutive years 2015–2016 (n = 452) were identified of which palliative care patients (n = 7) were excluded. A case report form was then used to systematically collect data on the characteristics of the patient (sex, age, comorbidity and referral status), injury (mechanism, intent, body part, inhalation, burn depth and size), the treatment received and, if applicable, on in-hospital mortality (prior to discharge from the center). Associations between in-hospital mortality and individual patient and injury characteristics were measured using simple logistic regression, and expressed as odds ratios (OR). A stepwise multivariate logistic regression model was then used and odds ratios adjusted for all other variables were obtained. For all variables, the reference category was defined as the one with the smallest mortality rate. The sensitivity and specificity of the determined all cases aggregated using a cut-off point of 8 (equivalent to a mortality rate of 50%).

**Results**

Almost half (47.6%) of the patients had a TBSA > 20%, and almost as many (42.0%), full thickness burns. The overall mortality rate was 19.8%. In-hospital mortality was associated with age (OR = 1.03 per year increase), being a female (OR = 2.25 (1.58–3.97 compared to male) and having an inhalation burn (OR = 5.27 (3.14–8.84) compared to those with no inhalation burn). Patients with flame burns had 16.9 higher odds of dying compared to those with scaldings and deep/full thickness burns patients, 8.9 higher odds than those with superficial/partial burns. There was a graded association between burn surface and the odds of dying. Five variables remained associated with in-hospital mortality after adjusting for all others in a multivariate regression model: age, sex, inhalation, burn size and depth. The mean of the ABSI-scores was 6 but there is a steep increase in mortality rates between the two consecutive scores of 7 and 8 (12.1% and 39.5% respectively). The score’s sensitivity was 68%, and its specificity 92%. It is of note that all 14 patients with scores higher than 11 died, whereas the published scores predict a chance of survival smaller than 10%.

**Conclusion**

At the center, the mortality rate was high, with age, sex, inhalation, mechanism of injury, depth and size all being individually associated with in-hospital mortality. Our adjusted model retained age, sex, inhalation, burn size and depth as predictors of in-hospital mortality. These 5 variables are the same as the ones used in ABSI, confirming both the potential to use that score and their importance in mortality predictions. The mixed results regarding the ABSI score suggest it would perform better to foresee in-unit mortality of severe burns rather than less severe ones at the center. Whether lowering down the cut-off value from 8 to 6 as an option remains to be determined.

**Disclosure of interest**

The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.089

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**S16.5**

**Persistence with brand versus generic oral bisphosphonates among newly treated osteoporosis patients: a retrospective cohort study in the French claims database**

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**Introduction**

The first line of osteoporosis (OP) treatment is oral bisphosphonate (BP) and aims to reduce the risk of osteoporotic fracture. Although BP demonstrated its efficacy in preventing fractures, persistence with BP was estimated very low in previous studies in France and other countries. It has been proposed that persistence with generic BP formulations may be lower compared to brand formulations, due to changes of excipients reported to result in differences in disintegration time increasing the risk of upper gastrointestinal irritation. We aimed to compare the persistence with brand versus generic oral BPs.

**Methods**

We conducted a retrospective, comparative cohort study in the EGB (“Échantillon Généraliste des Bénéficiaires”), a representative sample of the French Health Insurance claims database. We included all patients aged 50 and older, newly treated with oral BP (alendronic acid, ibandronic acid, risendronic acid or etidronic acid, without association with vitamin D) for primary osteoporosis between 01/01/2009 and 31/12/2015. Patients were followed from the initiation date until: switch (change from generic to brand drug and conversely, or change of BP molecule); discontinuation of BP (no new dispensation during a period greater than twice the expected duration of supply if taken as prescribed); or 12 months. Persistence was evaluated as time to discontinuation and as proportion of patients still on treatment at 6 and 12 months. Time to discontinuation and 6- and 12-month persistence were compared between patients who initiated treatment with generic and patients who initiated with brand BP, excluding patients who switched.

**Results**

In total, 3903 patients initiated an oral BP treatment for primary OP during the 7-year inclusion period, 1710 (44.0%) with generic BP and 2193 (56.0%) with brand BP. Mean age was comparable between the 2 groups: 70.8 (± 10.6) in “generic BP” group and 70.0 (± 10.4) in “brand BP” group. There were fewer women in the “generic BP” group than in “brand BP” group (respectively 87.8% and 90.3%; P = 0.01). 236 (13.8%) patients in “generic BP” group and 306 (14.0%) patients in “brand BP” group switched to the other BP group during the 12 months after initiation; 56 (3.3%) patients in the “generic BP” group and 175 (8.0%) patients in “brand BP” group have changed to another BP molecule, respectively. After exclusion of patients who switched, 6- and 12-month persistence were not statistically different between the 2 groups: respectively 43.9% and 33.8% in “generic BP” group and 41.7% and 31.3% in “brand BP” group (P = 0.22 and 0.14 respectively for 6- and 12-month persistence). Mean time to discontinuation was 185.6 days (± 138.3) in “generic BP” group and 183.1 days (± 138.1) in “brand BP” group.

**Conclusions**

There were no differences in persistence with brand or generic BP in this population. Low persistence rates in our analysis are consistent with results of other studies, and confirm that discontinuation of BP treatment is currently a public health concern. The reasons for discontinuation require further investigation, to inform shared decision-making in treatment choice and strategies to support long-term BP use.

**Disclosure of interest**

The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.090
Session 17–Nutrition
Friday the 6th of July, 2018 – 11:00 am–12:30 am

S17.1 Dairy intake during high school and risk of colorectal adenomas in women
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Introduction
There is substantial evidence including from meta-analyses that higher dairy intake during adulthood is associated with lower risk of colorectal cancer. In contrast, little is known about the association between adolescent dairy intake and risk of colorectal neoplasia. Only two studies have previously investigated the association between dairy intake in early life and later risk of colorectal neoplasia, with conflicting results, but none used a validated dietary assessment tool to define exposure. Therefore, with our study we aimed to investigate the association between dairy intake during adolescence and the risk of colorectal adenomas later in life using data from the large, prospective female cohort Nurses’ Health Study II (NHSII) in which adolescent diet was inquired retrospectively by a validated food frequency questionnaire, and participants were followed prospectively for incidence of colorectal adenomas.

Methods
The study population consisted of 42,975 women aged between 34 and 51 years who had reported their adolescent diet in a validated food frequency questionnaire about diet during high school (HS-FFQ) in 1998 and had undergone at least one lower bowel endoscopy during the study period, i.e. between the return of the HS-FFQ and May 31st 2011. To investigate the association between adolescent dairy intake and risk of later colorectal adenoma, we used a period-based analysis approach taking into account that NHSII participants may have undergone multiple lower bowel endoscopies during the follow-up period. We used multivariable-adjusted logistic regressions for clustered data (each participant posesses a cluster) to calculate odds ratios (ORs) and corresponding 95% confidence intervals (CI). Models were adjusted for potentially confounding factors and dairy intake during adulthood.

Results
Between 1998 and 2011, 2456 women were diagnosed with at least one adenoma. High dairy consumption during high school was not significantly associated with risk of colorectal adenomas (OR highest versus lowest quintile 0.89, 95% CI 0.76, 1.04). Adolescent dairy consumption was not associated with risk of proximal (OR 1.01, 95% CI 0.81,1.27) adenomas, but a statistically significant inverse association was observed for distal (including rectal) adenomas (OR 0.81, 95% CI 0.66,1.00; P-trend 0.04). Furthermore, the risk of advanced adenomas (large or villous adenomas) was lower for women with high versus low adolescent dairy intake (OR 0.70, 95% CI 0.50, 0.96; P-trend 0.03). No association between adolescent dairy consumption and risk of non-advanced adenomas was observed (OR 0.97, 95% CI 0.79, 1.20). ORs for distal and advanced adenomas were no longer statistically significant after additional adjustment for dairy calcium intake during high school. When analyzed separately by individual dairy foods, milk, yoghurt or cheese intakes during high school were not significantly associated with risk of colorectal adenoma.

Conclusions
The findings suggest that dairy intake during adolescence may play a role for later risk of colorectal adenoma, independent of adult dairy intake.

Disclosure of interest
The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.091

S17.2 Vitamin D deficiency, overall and cause-specific mortality: the impact of age
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Introduction
Vitamin D deficiency, as reflected by low 25-hydroxyvitamin D blood levels (25D), is a prevalent correctable risk factor for death in most populations around the globe. The evidence ranges from numerous association studies and meta-analyses thereof, over Mendelian randomization studies, to randomized controlled trials (RCTs). However, most studies reported to date were performed in rather older populations and some of the largest association studies may have been confounded by increased vitamin D supplementation at old age, especially in women, and by the use of vitamin D2, which is fully measured by 25D immunoassays but biologically considerably less active. In addition, cause-specific mortalities and the impact of age on the 25D association with the risk of death have not been reported in detail, yet.

Methods
Data of all patients who had a 25D measurement at the Department of Laboratory Medicine, General Hospital of Vienna between 1991 and 2011 were retrieved and matched with the Austrian national register of deaths. First 3 years of mortality since 25D measurement were excluded in the analyses. Fine-Gray regression models adjusting for competing risks were used to estimate the survival time in dependence on 25D, adjusting for sex, age, year and month of blood draw. 25D was represented using a spline with 5 knots placed on the corresponding 1/6th quantiles. Age group (0– < 45, 45– < 60, 60 – < 75, 75+ years) specific analyses were conducted owing to a strong interaction between 25D and age, where age was kept as a continuous variable to avoid remaining residual confounding. Using 50 nmol/L as the reference value, we estimated hazard-ratios of chosen serum vitamin D concentration levels (10 and 90 nmol/L). All analyses were conducted in SAS 9.4 (SAS Institute Inc., Cary, NC, US). The significance level was set to 1% in order to adjust for multiple testing.

Results
Data from 78,581 patients (mean age = 51.0 years, men 31.5%) were used for analyses. During 20 years (median = 10.5) of follow-up, 11877 deaths were observed. Among these patients, 25D < 10 nmol/L had 2.3-fold increased risk of death (<45 years old: HR = 2.7, 95% CI (2.1, 3.4); 45– < 60 years old: HR = 2.9, 95% CI (2.6, 3.4); 60–75 years old: HR = 2.0, 95% CI (1.8, 2.3), whereas 25D ≥ 90 nmol/L has shown to be associated with up to 40% reduced all-cause mortality (< 45 years old: HR = 0.7, 95% CI (0.6, 0.9); 45– < 60 years old: HR = 0.6, 95% CI (0.5, 0.7); 60– < 75 years old: HR = 0.7, 95% CI (0.7, 0.8). No associations were observed in the age group 75 years and older (10 nmol/L: HR = 1.1, 95% CI (1.0, 1.2); 90 nmol/L: HR = 1.0, 95% CI (0.9, 1.1)). In terms of cause-specific mortality, we found only a relatively modest relationship for cancer and cardiovascular disease. The strongest association was found for other causes of death with the largest effect size for diabetes HR = 4.4, 95% CI (3.1,6.3).

Conclusions
Our survival data from a large cohort, covering all age groups, from a population with minimal vitamin D supplementation at old age and negligible intake of vitamin D2 confirm a strong association of vitamin D deficiency (25D < 50 nmol/L) with increased mortality. This association is most pronounced in the younger and middle-aged groups and for causes of deaths other than cancer and cardiovascular disease. Some J-shaped curves were found only for the 25D association with cancer and cardiovascular mortality in certain age groups. Our findings strengthen the rationale for widespread vitamin D supplementation to prevent premature mortality, emphasize the need for it early in life and mitigate concerns about a possible negative effect at higher 25D levels up to 150 nmol/L. RCTs in younger age groups are needed to confirm these findings.

Disclosure of interest
The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.092
S17.3 Mediterranean dietary pattern and skin cancer risk: a prospective cohort study in French women


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Background and aims Skin cancers are the most common cancers in Caucasian populations worldwide and their incidence is rising. Ultraviolet radiation (UV) exposure is currently the sole environmental factor on which skin cancer prevention can be based. Given the oxidant effects of UV leading to skin carcinogenesis, dietary consumption of antioxidants has been proposed to reduce skin cancer risk. However, previous findings were inconsistent. The Mediterranean diet (MD) has long been reported to reduce the risk of several diseases including cancers. While previous studies explored the relationships between major food groups or individual dietary components of the MD and skin cancer risk, no previous study has investigated adherence to a MD pattern in relation to skin cancer risk to date.

Methods E3 N is an ongoing prospective cohort of 98,995 French women aged 40–65 years at inclusion in 1990. Participants completed self-administered questionnaires biennially. Skin cancer cases were confirmed through pathology reports. Dietary data were collected via a validated food frequency questionnaire in 1993. Adherence to a MD pattern was assessed using the 9-unit dietary score proposed by Trichopoulou et al. in 2005, which takes values from 0 to 9 points (minimum to maximum adherence) according to the combined intake of fruits, vegetables, legumes, cereals, lipids, fish, dairy products, meat products, and alcohol. In this revised version of the MD score, lipid intake was assessed by calculating the ratio of unsaturated (i.e., mono- and polyunsaturated) to saturated fatty acids. We used Cox proportional hazards regression models to compute hazard ratios (HR) and 95% confidence intervals (CI) adjusted for age, birth cohort, pigmentation traits, residential UV exposure at birth and at inclusion, family history of skin cancer, total energy intake, body mass index, physical activity, smoking status, education, and coffee intake.

Results Between 1993 and 2008, 404 melanoma, 232 squamous-cell carcinoma (SCC), and 1367 basal-cell carcinoma (BCC) cases were ascertained among the 67,332 included women. The MD score distribution was as follows: Tertile 1: 0–3 (29.4%), Tertile 2: 4–5 (45.2%) and Tertile 3: 6–9 (25.4%). Adherence to the MD was associated with an overall reduction in skin cancer risk (HR = 0.87, 95% CI: 0.77–0.97 for T3 vs. T1; trend = 0.01); HR = 0.96, 95% CI: 0.94–0.99 per unit increase in the MD score). When considering skin cancer type, there was a linear inverse association between MD score and risk of non-melanoma skin cancers (HR = 0.87, 95% CI: 0.76–0.99; trend = 0.04). In particular, BCC (HR = 0.84, 95% CI: 0.72–0.97; P-trend = 0.01). However, while we found no evidence of a linear association with melanoma (P-trend = 0.08), we observed that high MD scores were associated with a borderline reduced risk of melanoma (HR = 0.76, 95% CI: 0.57–1.00) compared with the lowest scores. Moreover, there was no heterogeneity detected across skin cancer types (P heterogeneity = 0.23).

Conclusion In this large prospective cohort study, adherence to the MD was linearly associated with a reduction in overall skin cancer risk, mostly driven by an inverse association with BCC; in addition, a high MD score was associated with a decreased melanoma risk. These results suggest that a high level of adherence to the MD pattern may confer protection against skin cancer in women. If confirmed in future research, these findings may ultimately provide additional knowledge for skin cancer prevention.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.093

S17.5 Antioxidant supplement use and risk of non-melanoma skin cancer in women: a prospective cohort study

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Background and aims Experimental studies suggest that antioxidants could protect against skin carcinomas. However, epidemiological studies on dietary antioxidant supplement use in relation to risk of basal-cell carcinoma (BCC) and squamous-cell carcinoma (SCC) yielded inconsistent findings, and very few prospective studies with available sun exposure data have been conducted to date. Our objective was to investigate the relationships between the use of dietary supplements in beta-carotene, and vitamins A, C, and E, and risk of non-melanoma skin cancers (NMSC).

Methods E3 N is an ongoing prospective cohort involving 98,995 French women aged 40–65 years at inclusion in 1990. Data on the occurrence of BCC and SCC were collected every 2–3 years through self-administered questionnaires, with skin cancer cases confirmed through pathology reports. Intake of specific antioxidant supplements was collected in 1995. Dietary antioxidant intakes from foods were calculated using data collected via a validated food frequency questionnaire in 1993. We used Cox proportional hazards regression models with age as the time scale to compute hazard ratios (HRs) and 95% confidence intervals (CIs) for the risks of BCC and SCC associated with antioxidant supplement use. Models were adjusted for age, birth cohort, pigmentation traits, residential UV exposure at birth and at inclusion, family history of skin cancer, body mass index, physical activity, smoking status, and education.

Results Over a mean follow-up of 11.6 years, 1245 BCC and 219 SCC cases were diagnosed among the 63,077 included women. We observed a positive association between vitamin A supplement use and risk of NMSCs (HR = 1.30, 95% CI: 1.02–1.67), particularly BCC (HR = 1.32, 95% CI: 1.01–1.72). There was also a positive association between vitamin E supplement use and NMSC risk (HR = 1.28; 95% CI: 1.05–1.56). Moreover, we found an interaction between vitamin A supplement use and dietary intake of retinol (P interaction = 0.04) on the risk of NMSCs: vitamin A supplement use was associated with an increased risk of NMSCs only in women in the highest tertile of dietary retinol intake (HR = 1.89; 95% CI: 1.29–2.75), but not in those in the middle (HR = 1.05; 95% CI: 0.64–1.74) or lowest tertiles of intake (HR = 1.10; 95% CI: 0.70–1.73). However, use of beta-carotene or vitamin C supplements was not associated with NMSC risk.

Conclusion Our study suggests an increased risk of NMSCs associated with vitamin A (particularly for BCC) and vitamin E supplement use. The increased risk associated with vitamin A supplement use was restricted to women with high intakes of retinol from foods. These findings suggest that high dietary intakes of some antioxidants could confer a higher risk of NMSCs in women, particularly in the context of high antioxidant intakes in the diet in the case of retinol. More research is warranted in order to replicate these findings and investigate their underlying mechanisms.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.095
Effect of selenium supplementation on changes in glycated haemoglobin (HbA1C): results from a multiple-dose, randomized controlled trial

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Background Information from observational studies and a limited number of clinical trials has raised concerns over the potential adverse effects of long-term selenium supplementation on glucose metabolism and risk of type-2 diabetes in populations with high background selenium status, such as the US. There is limited trial evidence on the effect of selenium supplementation on glucose metabolism in European populations whose selenium status is much lower than that in the US.

Objective We aimed to determine the effect of selenium supplementation at different dose levels on changes in HbA1c after 6 months and 2 years in a population of relatively low selenium status.

Design The Denmark PRECISE study was a single-centre, randomized, double-blinded, placebo-controlled, multi-arm, parallel clinical trial with four groups. Four hundred and ninety-one male and female volunteers aged 60–74 years, recruited at Odense University Hospital, Denmark, were randomly assigned to treatment with 100, 200, or 300 μg selenium/day as selenium-enriched yeast or placebo-yeast. HbA1c measurements were available for 489 participants at baseline (1998–99), 435 at 6 months, and 369 after 2 years of selenium supplementation. Analyses were performed by intention to treat.

Results The mean (SD) age, plasma selenium concentration, and HbA1c at baseline were 66.1 (4.1) years, 86.5 (16.3) ng/g and 36.6 (7.0) mmol/mol, respectively. During the initial 6-month intervention period, mean HbA1c levels (95% CIs) decreased by 1.5 (0.2 to 2.8) mmol/mol for 100 μg of selenium supplementation and by 0.7 (−0.6 to 2.0) mmol/mol for the 200 and 300 μg/d groups compared with placebo (P = 0.16 for homogeneity of changes across the four groups). After 2 years of selenium supplementation, HbA1c decreased significantly in all four treatment groups, with no difference between active treatment groups and placebo. Compared with placebo, mean HbA1c levels (95% CIs) changed by −0.9 (−2.7 to 0.9) mmol/mol, 0.1 (−1.7 to 2.0) mmol/mol and −1.0 (−2.8 to 0.8) mmol/mol for 100, 200, and 300 μg/d of selenium supplementation, respectively (P = 0.52 for homogeneity of changes across the four groups).

Conclusions Selenium supplementation in a European population of elderly individuals of relatively low selenium status did not significantly affect HbA1c levels after two years of supplementation. Our results do not support a beneficial or a harmful effect of selenium supplements on glucose metabolism.

Disclosure of interest The author declares that he has no competing interest.

https://doi.org/10.1016/j.respe.2018.05.096

Session 18–Lifestyle and maternal and child health
Friday the 6th of July, 2018 – 11:00 am–12:30 am

Investigating maternal risk factors for stillbirth in a population-based cohort in the South of England

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Introduction In the UK there has been little improvement on the rates of stillbirth; the stillbirth rate was 2.9 per 1000 in 2015 (≥28 weeks gestation) and the annual rate reduction (ARR) of stillbirths was 1.4% from 2000–2015, which is roughly in the bottom one-third of high-income countries. Until now, most studies have only identified individual maternal risk factors associated with stillbirth and, to our knowledge, only one study has produced a stillbirth prediction model in the UK. Our study aimed to investigate risk factors for stillbirth (defined as a baby delivered with no signs of life after 24 weeks of pregnancy) using routinely-collected healthcare data at a regional level in the South of England.

Methods Analysis of a population-based cohort using routine antenatal care and delivery data collected between 2003–2017 in Southampton, UK. Stillbirth was defined as born with no signs of life after 24 weeks gestation. Univariable comparisons between livebirth and stillbirth pregnancies were made using chi-squared test for categorical variables and independent t-test for continuous variables. Logistic regression modelling produced unadjusted and adjusted odd ratios (aOR) for stillbirth risk, adjusting for within-participant clustering of multiple pregnancies. A stillbirth prediction model was developed using backward stepwise regression. The model’s derivation area under receiver operator curve (AUROC) was calculated. For the purpose of generating and testing a stillbirth risk score, the cohort was divided chronologically into derivation (n = 44,108) and internal validation cohorts (n = 24,684). An unweighted risk score variable consisting of the number of risk factors was generated for each pregnancy. A weighted risk score variable was generated taking into account the magnitude of the association of each risk factor with stillbirth (OR).

Results The total sample size was 81,798 (81,366 livebirth pregnancies and 432 stillbirths), giving a stillbirth incidence rate (≥24 weeks gestation) of 5.28/1000 (95% CI 4.80–5.80). A total of 15,813 births were excluded in the multivariable model due to missing data, hence giving a total number of 65,985 births (65,663 livebirths and 322 stillbirths). Significant risk factors for stillbirth in the multivariable model of the whole cohort (n = 65,985) included: maternal age ≥35 years (aOR 1.39, 95% CI 1.03–1.87), Asian ethnicity (aOR 1.80, 95% CI 1.22–2.66), mothers with unemployed partners (aOR 1.53 95% CI 1.07–2.18), no previous livebirths (aOR 1.49, 95% CI 1.13–1.97), maternal educational qualification of secondary school or below (aOR 1.46, 95% CI 1.07–2.00) and college (aOR 1.49, 95% CI 1.05–2.12) (compared to university qualification or above), maternal obesity (aOR 1.58, 95% CI 1.18, 2.12), diastolic hypertension (aOR 4.3, 95% CI 2.04–9.06) and pre-existing diabetes (aOR 2.35, 95% CI 1.35, 4.11). Upon investigating the proportion of women in the study population (n = 65,985) with significant risk factors identified in the multivariable analysis; 5126 (7.42%) had none, 25,430 (36.80%) had one, 35,887 (54.18%) had two, 9518 (13.77%) had three and 1586 (2.30%) had ≥4 significant risk factors. When conducting the multivariable model in the derivation cohort (n = 44 108) and testing the risk score in the validation cohort (n = 24 684), for each additional significant risk factor, there was a 16% increased risk of stillbirth (95% CI 6–27%, P = 0.001). The stillbirth prediction model’s AUROC was 0.64 (95% CI 0.61–0.67).

Conclusion This study identifies the characteristics associated with stillbirth in this English cohort and that the risk of stillbirth is amplified in women with co-existing risk factors. Derived using routinely-collected healthcare data, this prediction model, if externally validated, can help early identification of pregnant mothers at risk of stillbirth from their first antenatal appointment. Interventions attempting to prevent stillbirth could then be targeted at the high-risk mothers.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.097
Body mass index transitions during childhood: a multiple-state model approach

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Introduction
Childhood obesity is of major public health concern with significant health, social and economic impacts, having even potential to reverse the increase in longevity that has been observed. We aimed to estimate the instantaneous rate of transition among various states of body mass index (BMI) categories, in children and to evaluate the effect of a vector of explanatory variables—maternal age and education at delivery, type of delivery, sex and birth weight—on the transitions intensities, taking into account that the transitions times are interval censored.

Methods
The participants of this study were part of Generation XXI birth cohort, recruited between April 2005 and August 2006, after delivery, during the hospital stay in Porto, Portugal. Follow-up evaluations of the cohort were carried out at 4 (between April 2009 and July 2011), 7 (between April 2012 and March 2014), and at 10 years of age (between July 2015 and July 2017) and a total of 4128 participants were included. A multi-state model was implemented describing how a child moved between underweight, normal weight, overweight, and obesity, between the ages 4 and 10 years. Since it was not possible to observe participants continuously throughout the lifespan, as they were assessed only at follow up established visits, the exact times of state-to-state transitions are interval-censored, that is the transition is only known to have occurred within a bounded time interval. Under this constraint, standard multi-state methods cannot be applied and we used a time-homogeneous Markov multi-state model to describe the movement of a child between four states based on BMI.

Results
The maximum likelihood estimate (MLE) and corresponding 95% confidence interval (CI) for each possible instantaneous transitions were calculated. For children in the overweight state, the progression transition to the normal weight state, and for the obese state similar (0.0009 versus 0.0095). The progression from normal weight state to overweight state was 15 times more likely (0.0061) than the progression from normal weight state to the underweight (0.0004). In underweight children, the progression to normal weight state was the most likely progression rate observed (0.0302). The hazard ratios (HR) from the discrete-time event history models were calculated and statistically significant results were found for sex and maternal education, although only for progressive transitions, i.e. transition to normal weight in those underweight, to overweight in normal weight and to obesity in children who were overweight. Females were more likely to experience transitions to normal weight among those underweight (HR = 1/0.15 [95% CI: 0.02–0.80] = 6.67) as in males the most frequent transitions were to overweight and to obesity (HR = 1.16 [95% CI: 1.00–1.35]) and HR = 1.34 (95% CI: 1.08–1.65), respectively. A similar pattern was observed when analyzing the effect of maternal education as an HR = 1.23 (95% CI: 1.01–1.51) for the transition to normal weight status among children who underweight revealed an increase of 23% in the hazard per year of maternal education, opposite effects were observed for the remaining progressive transitions with hazard ratios of 0.98 (95% CI: 0.97–1.01) and 0.96 (95% CI: 0.93–0.98) per year of education, respectively.

Conclusions
We observed that the more likely transition from normal weight status is to overweight state (MLE 0.0061) and once a child was in underweight state, the higher transition probability was to normal weight state (MLE 0.0061) than the progression from normal weight state to the underweight (MLE 0.0004). The progression from normal weight state to overweight state was 15 times more likely (0.0061) than the progression from normal weight state to the underweight (0.0004). In underweight children, the progression to normal weight state was the most likely progression rate observed (0.0302). The hazard ratios (HR) from the discrete-time event history models were calculated and statistically significant results were found for sex and maternal education, although only for progressive transitions, i.e. transition to normal weight in those underweight, to overweight in normal weight and to obesity in children who were overweight. Females were more likely to experience transitions to normal weight among those underweight (HR = 1/0.15 [95% CI: 0.02–0.80] = 6.67) as in males the most frequent transitions were to overweight and to obesity (HR = 1.16 [95% CI: 1.00–1.35]) and HR = 1.34 (95% CI: 1.08–1.65), respectively. A similar pattern was observed when analyzing the effect of maternal education as an HR = 1.23 (95% CI: 1.01–1.51) for the transition to normal weight status among children who underweight revealed an increase of 23% in the hazard per year of maternal education, opposite effects were observed for the remaining progressive transitions with hazard ratios of 0.98 (95% CI: 0.97–1.01) and 0.96 (95% CI: 0.93–0.98) per year of education, respectively.

Disclosure of interest
The authors declare that they have no competing interest.

A longitudinal study of urban moveability and physical activity in the transition phase from childhood to adolescence

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Introduction
Physical activity (PA) is one of the most important lifestyle behaviors to reduce the risk for non-communicable diseases. Positive effects of the urban environment on PA in terms of walkability measures such as street connectivity, land use mix, and availability of public open spaces in the urban neighborhood are well investigated. However, evidence of this association is mostly based on cross-sectional studies. Usually, discrete measures of urban point characteristics such as the simple intensity are calculated based on arbitrary municipal districts inducing scaling bias. The present study aims to longitudinally investigate the effect of built environment characteristics on PA of children in their transition phase to adolescence. We considered a kernel intensity approach to assess built environment characteristics and linked urban measures with objectively measured PA data that were collected in the IDEFICS/I.Family cohort.

Methods
Spatial data were collected in six study regions of three countries, Germany, Italy, and Sweden, participating in the IDEFICS/I.Family cohort. We considered walkability measures such as population density, land use mix (LUM), street connectivity, and availability of public transit. We additionally assessed the availability of public open spaces (POS). Point characteristics, e.g. intersections or POS, were assessed via adaptive anisotropic kernel functions. Urban measures were calculated in network-dependent home neighborhoods using a network distance of 1 km. We used standardized z-scores of urban measures to construct a moveability index that quantifies urban opportunities for PA of children and adolescents. Based on the place of residence, we linked urban measures with individual-level data of 699 children aged 2 to 14, who provided at least two (n = 610) or three (n = 89) accelerometer measurements, from either baseline, first follow-up (IDECFICS study), or second follow-up (I.Family study) with in total 1487 observations. Trajectories of moderate-to-vigorous physical activity (MVPA) as well as light physical activity (LPA) were modelled using linear mixed models accounting for repeated measurements nested within individuals by means of a random intercept and random linear slope for age (centred at 8 years). Environmental variables (z-scores) were included as fixed effects and as interaction effect with age. All models were stratified by sex and adjusted for age, BMI z-score, parental education, valid wear time, season, and region.

Results
Mean age was 6.6 in boys and 6.8 in girls. Compared to boys, girls spent on average less minutes in MVPA (boys: 58.8, girls: 51.6) and LPA (boys: 305, girls: 294) per day. Linear trajectories showed a significant decline of MVPA over age (boys: = −2.9, 95% CI: [−3.5; −2.3], girls: = −3.6, [−4.1; −3.1]) and LPA (boys: = −7.6, [−9.1; −6.1], girls: = −7.6, [−9.1; −6.1]). The moveability index interacting with age showed only small effects on PA trajectories that were more pronounced for MVPA in boys (= 0.08, [−0.08; 0.24]) and for LPA in girls (= 0.15, [−0.23;0.50]). Considering POS a stronger interaction with age was found for MVPA in boys (= 0.24, [0.10; 0.38]) than in girls (= −0.08, [−0.58; 0.42]). The interaction of population density with age showed a positive effect on MVPA in boys, but not in girls, while the effect on LPA was stronger in girls compared to boys. Only in Girls, negative effects were found for LUM on MVPA (−0.22, [−0.76; 0.33]) and LPA (−1.14, [−2.52; 0.23]).
Conclusion The kernel approach allowed for a flexible modelling of urban measures and improved the assessment compared to simple density methods. Although PA strongly declined with age, urban measures showed a supportive effect that attenuated this decline in the transition phase from childhood to adolescence. However, urban measures differently affected PA in boys and girls.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.099

S18.4 Effect of breastfeeding on non-verbal cognitive development at 2-years of age in very preterm infants and the role of clinical and social risk: results from the EPICE cohort

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Introduction There is a considerable controversy over the nature and the pathways involved in the relation between breastfeeding and cognitive development in very preterm infants. In a European cohort of very preterm infants we investigated the effect of breastfeeding on non-verbal cognitive development at 2 years of corrected age and variation by clinical and social risk.

Methods Data were obtained from the EPICE (Effective Perinatal Intensive Care in Europe) population-based prospective cohort of infants born between 22 and 31 completed weeks of gestation, in 19 regions from 11 European countries, in 2011–2012. Of the 6792 infants discharged alive, 4425 children had a follow-up at 2 years of corrected age. For analysis, we included all infants with valid information on breastfeeding initiation, non-verbal cognitive development, and on clinical and social risk (n=4032). Data on infant, obstetric and maternal characteristics and on neonatal morbidity were retrieved from medical records, using a structured form filled in by clinicians until discharge from the hospital. At 2 years of corrected age, data on child’s health and development, breastfeeding and sociodemographic characteristics were collected using a structured questionnaire completed by parents. Non-verbal cognitive ability was measured applying the Parental Report of Children’s Abilities (PARCA-R) except for France that used Ages and Stages Questionnaire (ASQ). We defined three risk groups based on perinatal factors: High-risk [born before 28 weeks of gestation or with severe neonatal morbidity (severe congenital anomaly, bronchopulmonary dysplasia, intraventricular hemorrhage grade III or IV, cystic periventricular leukomalacia, retinopathy of prematurity, necrotizing enterocolitis)] (n = 1394, 34.6%); Medium-risk (birth–29 weeks of gestation or having growth restriction, but no morbidities) (n = 1485, 36.8%); Low-risk (birth at 30–31 weeks with no morbidities or growth restriction) (n = 1153, 28.6%). Social high-risk was defined as maternal age < 20 years or if the mother was alone and not employed or if both parents were not employed (n = 370, 9.2%). To assess the effect of breastfeeding (never vs. ever) on non-verbal cognition, categorized as an optimal and suboptimal outcome, crude and adjusted risk ratios (RR) with 95% confidence intervals (CI) were estimated fitting Poisson regression models.

Results Overall, 15.8% (n = 638) of the children presented suboptimal non-verbal cognition. Never breastfed children were more likely to have suboptimal non-verbal cognition (Crude RR = 1.40, 95%CI: 1.20–1.64). Never-breastfeeding was associated with a significant increased risk in the clinical high-risk group (Crude RR = 1.52, 95%CI: 1.25–1.85), but not in the medium or low-risk groups (Crude RR = 1.05, 95%CI: 0.76–1.44, Crude RR = 1.22, 95%CI: 0.81–1.85, respectively). The stratified analysis by social risk found a significant effect in both low (Crude RR = 1.29, 95% CI: 1.08–1.54) and high-risk (Crude RR = 1.91, 95% CI: 1.29–2.83) groups. After adjustment for the region of birth, corrected age at completion of the questionnaire (months), migration status, clinical risk, and social risk, never-breastfeeding remained associated with an increased risk for suboptimal non-verbal cognition (RR = 1.27, 95% CI: 1.07–1.50). There was no interaction with clinical and social risk in adjusted models.

Conclusions Breastfeeding promotes non-verbal cognitive development of very preterm children, independently of clinical and social risk. It provides evidence for specifically targeted interventions to promote, and support breastfeeding among these most vulnerable infants.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.100

S18.5 Association of pupertal development with adiposity and cardio-metabolic health in girls and boys—Findings from generation XXI birth cohort study

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Introduction There is increasing evidence that the timing of pubertal development is associated with adult adiposity and cardio-metabolic health. In regard to the effect of early timing of pubertal development on worse cardio-metabolic health, some aspects remain largely unaddressed—the effect is detectable already in childhood or, on the contrary, only occurs after adolescence; if this occurs also in males or only in females; and if this is or not independent of childhood adiposity. Accordingly, we aimed to evaluate the association of pubertal development with adiposity and cardio-metabolic health in girls and boys at 10 years of age and clarify if that association is independent of body mass index (BMI) previous to the onset of puberty.

Methods This study included 4550 children recruited from the birth cohort Generation XXI in 2005/2006, from Porto, Portugal. Pubertal development was evaluated at the 10 years old follow-up evaluation, by trained nurses through the Tanner scale and categorized into 1–pre-pubertal and ≥ 2–pubertal and post-pubertal. Girls were also categorized according to menarche stage and boys by testicular volume (< 4 mL vs. ≥ 4 mL). Data on anthropometrics, body composition, blood pressure, lipid profile, fasting plasma glucose, insulin, HOMA-IR and high-sensitivity C-reactive protein were also collected. Regression coefficients and 95% confidence intervals (β [95% CI]) were computed using linear regression models.

Results After taking previous BMI into account, Tanner stage ≥ 2 remained associated with weight [girls β = 3.03 kg (2.57;3.50); boys β = 1.29 kg (0.88;1.71)], height [girls β = 3.81 cm (2.21;4.42); boys β = 2.45 cm (1.93;2.97)], waist circumference [girls β = 2.64 cm (2.11;3.18); boys β = 0.81 cm (0.34;1.29)], fat-free mass index [girls β = 0.33 kg/m2 (0.18;0.47); boys β = 0.18 kg/m2 (0.04;0.31)], HDL-cholesterol [girls β = –1.64 mg/dL (–2.87;–0.41); boys β = –1.51 mg/dL (–2.62;–0.41)], and only in girls, BMI [β = 0.67 (0.51;0.83)], glucose [β = 1.59 mg/dL (0.85; 2.33)], insulin [β = 1.73 μU/mL (1.02; 2.44)] and HOMA-IR [β = 0.40 (0.24; 0.57)].
Considering only testicular volume to define pubertal development the results were similar to the previous ones for boys, while having had menarche was only significantly associated with higher weight [$\beta = 0.60 \text{kg} \ (0.29; 0.91)$] and BMI [$\beta = 0.17 \text{kg/m}^2 \ (0.07; 0.28)$].

**Conclusions** Independently of previous BMI, girls and boys with a more advanced pubertal development at 10 years of age had worse cardio-metabolic health. These pre-adolescents should be a target for prevention of impaired levels of cardio-metabolic indicators.

**Disclosure of interest** The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.101

**S18.6 Effects of maternal (pre)pregnancy lifestyle interventions in obese women on child neurobehavioral development: Follow-up of two RCT studies**

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**Background** Obesity is a major public health problem. The prevalence of obesity in women of reproductive age ranges from 7 to 25% in European countries. Children of women who were obese before or during pregnancy are at increased risk for neurodevelopmental delay and behavioral problems. Improving the lifestyle of obese women before and during pregnancy may have a great potential to optimize child neurobehavioral development, but no previous study has assessed this however. We examined the effects of two maternal lifestyle interventions before and during pregnancy in obese women on child neurobehavioral development.

**Methods** This study concerns the follow-up of two randomized controlled trials that were successful in reducing maternal weight or gestational weight gain: the Finnish RADIEL and the Dutch LIFEstyle trial. Women with a pre-pregnancy BMI $\geq 29 \text{kg/m}^2$ wishing to conceive or who were already pregnant (< 20 weeks) were allocated to a lifestyle intervention or care as usual. The lifestyle intervention consisted of individualized counseling on diet, physical activity and weight control. All parents of singletons conceived within the study were approached for follow-up ($n = 401$ RADIEL and $n = 300$ LIFEstyle) when their child was between 3 and 5 years of age. Child neurodevelopment was measured with the Ages and Stages Questionnaire. Child behavioral problems were measured with the Childhood Behavior Checklist (RADIEL follow-up) or the Strengths and Difficulties Questionnaire (LIFEstyle follow-up). We used linear regression and binary logistic regression analyses to assess the effects of the lifestyle interventions on the children’s neurodevelopmental scores and behavioral problem scores.

**Results** We had data of 161 (40%) RADIEL and 96 (32%) LIFEstyle children. In both studies, child total neurodevelopmental score ($B = -0.17, 95\%$ confidence interval $(-0.51$ to $0.16)$ and $B = 0.06 (-0.38$ to $0.51)$ respectively) and total behavioral problem score ($B = -0.06 (-0.38$ to $0.27)$ and $B = 0.01 (-0.47$ to $0.48)$ respectively) did not differ between children of the intervention and the control group. Children of the intervention and the control group also did not differ in neurodevelopmental domain scores and specific behavioral problem scores. Also, when comparing children of the mothers of the intervention group who attained the lifestyle intervention goal with children of mothers of the control group, no differences in neurobehavioral development were found.

**Conclusion** Although previous findings of neurobehavioral problems in children of obese mothers give reason to suggest maternal (pre-) pregnancy lifestyle intervention to be preventive, this follow-up of two randomized controlled trials is the first to show that lifestyle interventions before and during pregnancy in obese women do not affect child neurobehavioral development at age 3–5 years.

**Disclosure of interest** The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.102
Session 1 – Epidemiology and aging and other target groups

P1-1
Community social capital and the improvement of functional ability among older people in Japan

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Background The aim of this study was to investigate the contextual effects of community social capital on the improvement of functional ability among older people in Japan.

Methods We performed a multilevel survival analysis on 1936 men and 2207 women nested within 320 communities included in Japan Gerontological Evaluation Study in 2010. We used the objective data of the functional ability trajectories based on national long-term care insurance systems. We used multilevel Weibull survival models including a community-level random intercept. We stratified the analyses by gender. We used a validated measure of community social capital that captured three components: the levels of civic participation, social cohesion, and reciprocity.

Results In a community with high social cohesion, older men with the low perception of community social cohesion were less likely to improve their functional ability than older men with the high perception of community social cohesion (P for interaction = 0.007). Among women, community social cohesion was inversely associated with the improvement of functional ability regardless of the individual perception of community social cohesion. In a community with high civic participation, women who did not participate in any group in the community were less likely to improve their functional ability than women who participate in some groups (P for interaction = 0.008), whereas such cross-level interaction was not found among older men. Community reciprocity was not associated with the improvement in functional ability in men and women.

Conclusion The effect of community social capital on the improvement of functional ability might differ between individuals depending on their psychosocial components in the same community. There might be older people who do not benefit from and excluded from community social capital.

Disclosure of interest The authors declare that they have no competing interest.
https://doi.org/10.1016/j.respe.2018.05.104

P1-2
Having children is associated with a longer survival after ischemic stroke. A population-based cohort study of Swedish men and women aged 65 years and older

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Introduction Elderly parents have lower mortality than childless individuals. Suggested explanations for this finding include selection into parenthood, influence on health behaviors, and social support from adult children to their ageing parents. Previous studies have mostly focused on the association between number of children and mortality rates in the population. However, mortality rates are determined by both incidence of-and survival from disease and little is known about whether the presence of children affects survival once a disease has occurred. Since stroke often results in functional limitations, support from adult children may be of particular importance. Here, we examine whether the presence of children matters for survival after stroke among older Swedish men and women.

Methods This prospective cohort study linked data from several Swedish population registers. Individuals aged 65 years and older with their first ischemic stroke between 1998 and 2002 (30379 men and 32201 women) were followed up for 12 years for survival. The study population was restricted to individuals who survived the subacute phase of the stroke, corresponding to the first 28 days. Hazard ratios (HR) and 95% confidence intervals for all-cause mortality were calculated by number of children using Cox proportional hazard regression stratified by sex and marital status and adjusted for education and income. In further analyses, we adjusted for length of hospital stay as a proxy for stroke severity as well as number of previous hospitalizations. Predicted median survival was estimated based on the final regression models.

Results Childlessness and having only one child was associated with higher mortality after stroke compared to having two children both among men and women. The relative survival disadvantage of childless individuals was largest among married women (HR: 1.28 [1.19–1.37]) and smallest among married
men (HR: 1.07 [1.01–1.12]). For unmarried individuals, the estimated HR were 1.18 [1.14–1.23] among women 1.14 [1.08–1.20] among men. There were no differences between parents of two and parents of three or more children. The differences in predicted median survival between childless individuals and those with two children were 4 and 7 months among married and unmarried men, and 16 and 8 months among married and unmarried women, respectively.

**Conclusions** Having children is associated with a longer survival after stroke among men and women regardless of marital status and despite adjusting for several potential confounding factors. The absolute differences in predicted median survival time between parents of two children compared to childless individuals were substantial considering the relatively short survival of individuals over the age of 65 with stroke (the median survival was approximately 5 years in the study population). Our findings further suggest that the presence of children is especially connected to married women's survival. These results may have implications for how to improve informal care for childless old individuals.

**Disclosure of interest** The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.105

### P1-3

**The prevalence and associated factors influencing depression in the geriatric population: A cross-sectional study in Ban Nayao, Chachoengsao Province, Thailand**

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**Background** Depression is a major burden disease. Geriatric depression is not well recognized and cannot be treated adequately. In rural community, various socio-demographic factors are responsible for the depression among older adults.

**Methods** This cross-sectional study aims to evaluate the prevalence and associated factors of depression in the geriatric populations (age > 60 years) in Ban Nayao, Chachoengsao Province, Thailand. A total of 433 elderly populations were interviewed using Thai geriatric depression scale (TGDS), 16-item family relationship questionnaire and Barthel Index of ADL. We excluded those who were interviewed using Thai geriatric depression scale (TGDS), 16-item family relationship questionnaire. The prevalence of depression in the geriatric populations (age > 60 years) in Ban Nayao, Chachoengsao Province, Thailand. A total of 433 elderly populations were interviewed using Thai geriatric depression scale (TGDS), 16-item family relationship questionnaire and Barthel Index of ADL. We excluded those who were interviewed using Thai geriatric depression scale (TGDS), 16-item family relationship questionnaire.

**Results** Of 416 participants were enrolled; 225 (50.1%) were female. Mean age was 69.3 ± 7.0 years; 412 (99.1%) were independence ADL status by using Barthel Index (mean score 19.6 ± 1.6), and 206 (54.1%) were imbalance family by using 16-item family relationship questionnaire. The prevalence of depression was 21.7%. The associated factors of moderate to severe depression were female gender (adjusted OR = 3, 95% CI = 1.2–7.5, P-value = 0.017), illiterate (adjusted OR = 2.4, 95% CI = 1.0–5.5, P-value = 0.041), current smoker (adjusted OR = 4, 95% CI = 1.0–9.9, P-value = 0.002) and imbalance family type with low attachment, low co-operation and poor alignment between each members (adjusted OR = 4.3, 95% CI = 1.8–7.5, P-value = 0.001).

**Conclusion** The prevalence of depression was high in our population. Additionally, female gender, illiterate, current smoker and imbalance family type were the associated factors of depression in geriatric population in the rural community.

**Keywords** Geriatric depression; Rural community; Prevalence; Family relationship

**Disclosure of interest** The author declares that he has no competing interest.

https://doi.org/10.1016/j.respe.2018.05.106

### P1-4

**Association between childhood suicidal ideation and geriatric depression: A life course approach**

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**Background** Previous studies have shown that adverse childhood experience induces adult disease, including depression, even among older people. However, there are few studies examining whether the adverse effect of childhood suicidal ideation, which may occur as a consequence of exposure to adverse childhood experience, increases the risk of depression among older people. The purpose of this study is to investigate the association between childhood suicidal ideation and geriatric depression.

**Method** A total of 1234 community-dwelling adults aged 65 and above living in a town, located in North-East region of Japan, participated in a mailed questionnaire. Geriatric Depression Scale-15 was used to assess depression symptoms (0 = normal, 1 = mild depression, 2 = severe depression), and a dichotomous question was used to identify suicidal ideation before 18-years-old. Ordered logistic regression was employed for statistical analyses, adjusted for current household income, marital status, living alone status, number of diseases currently receiving treatment, and adverse childhood experience.

**Results** In total, 6.8% reported suicidal ideation before 18-years-old. Percentages of severe depression and mild depression were 31.0% and 12.7%. Childhood suicidal ideation showed a significant association with geriatric depression [odds ratio (OR) = 1.85, 95% confidence interval (CI): 1.21, 2.82]. The OR increased to 1.95 (95% CI: 1.21, 2.86) when adjusted for sex, age, current household income, marital status, living alone status, and number of diseases currently receiving treatment. Further adjustment of adverse childhood experience decreased the ORs to 1.63 (95% CI: 0.99, 2.67).

**Conclusions** Adverse effects of childhood suicidal ideation may continue to late-life, indicating the need for early identification and continued intervention.

**Disclosure of interest** The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.107

### P1-7

**A measles outbreak in Plovdiv: Ethnic and age differences**

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**Introduction** Measles is a highly contagious infectious disease and one of the leading causes of death among young children, although a safe and effective vaccine is available. According to World Health Organization (WHO) in 2017, the incidence of measles in Europe is 11,882, with over 35 deaths in the last 12 months. One of the most affected groups at risk for the development and spread of infectious diseases in Bulgaria is the Roma community. According to the National Statistical Institute (2004), 10.33% of the population is defined as Roma. The purpose of the study was to describe the epidemic of measles in the Plovdiv region (the second largest area in Bulgaria).

**Methods** Epidemiological review of cases that have been admitted to the Infectious Diseases Clinic–Plovdiv during the outbreak from March to July 2017 and studied by the Department of Anti-Epidemic control at the Regional Health Inspection - Plovdiv.

**Results** In the spring/summer of 2017, a measles epidemic was observed in Plovdiv region, Central Bulgaria, which affected mainly the Roma ethnic group. A total of 146 cases (44% female, 56% male) were registered, of which 48 cases of measles among young Roma were confirmed. Children under the age of 4 represent the highest number of cases (n = 73) and 16 cases under 6 months. One children at 10 months of age died as a result of a vaccine-preventable illness. All
of them have been vaccinated with MRS, according to the age and immunization calendar of the country.

Conclusions In children and adolescents below the age of 18 years, a high incidence of morbidity was observed regardless of childhood vaccination. This indicates that other social determinants (such as housing, lifestyle, poverty, education, access to services) affect the health of this ethnic group. More than 90% of cases require hospitalization because of the severity of the disease. Improved access to healthcare and treatment options for patients may have reduced further medical complications and deaths. There is a need of surveys of morbidity among people in the Roma community, identification of risk factors and development of strategies for combating vaccine-preventable diseases.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.110

P1-8

The influence of psychosocial working conditions on late-life physical functioning

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Background In older adults, increasing age correlates with declining physical functioning. The growing demographic challenge posed by an aging population makes finding predictors of functional decline in old age increasingly important. Work dominates much of our adult lives, which makes it likely that the workplace is important to health and aging. Stressful working conditions have been associated with limitations in physical functioning in old age. Active jobs (high psychological demands, high control) are considered to increase learning, which may reduce the perception of situations as stressful and instead be viewed as challenges and opportunities for personal growth. This will, in turn, lead to feelings of self-efficacy that may encourage an active leisure-time, such as physical activity. We investigated the long-term association between active jobs and mobility in old age.

Method Two individually linked Swedish surveys were used (n = 775). A psychosocial job-exposure matrix was used to measure active jobs four times in midlife (age 40–65). Mobility was measured in 2014 as the self-reported ability to stand without support, walk up and down stairs, walk 100 meters fairly briskly, rise from a chair with arms crossed across the chest, and ability to balance indoors, summarized in a 5-item index (0–5). Data were analyzed with ordered logistic regressions.

Results Having an active job was associated with significantly better mobility in old age compared to people in non-active jobs. However, the accumulated score of active jobs over working life were not more strongly associated with mobility in old age than the score of active job in 1991, which may indicate that the conditions of a person’s most recent job mattered the most.

Conclusions Active job conditions in midlife are important predictors of mobility in old age. Promoting active job conditions may be used to improve midlife interventions aimed at preventing physical deterioration later in life.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.111

P1-9

Baseline BMI as determinant of frailty trajectories in elderly general population


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Introduction Frailty is a state of vulnerability in elderly that increases the risk of disability and death. However, frailty is a dynamic process that progresses over time and some individuals may follow a more rapid frailty progression. Obesity is associated to a higher risk of frailty and could also be a determinant of frailty trajectories. The aim of this study was to examine whether individuals with different levels of baseline BMI might experience different trajectory of frailty progression.

Methods We studied participants of the English Longitudinal Study of Ageing (ELSA) who attended wave 2 in 2004–2005. The determinant was baseline levels of BMI and the outcome was the longitudinal trajectory of a 36-item frailty index, assessed every 2 years (waves 2 to 7) over a 10-year period. In order to deal with missing data, we applied multiple imputation on the underlying variables and then calculated the frailty index. We fitted a mixed model with age as time scale, age/quadric time as fixed-effects and frailty index trajectory as dependent variable allowing for intercept/slope random effects. We fitted two separate models for baseline BMI, one adjusting for sex and the other adjusted additionally for baseline values of income, smoking status, physical activity, HbA1c, and haemoglobin. Quadratic terms and interactions with time/squared time were included in the models. We calculated yearly frailty index values at different BMI values (17, 22, 25, 30 and 35 kg/m²).

Results We analysed 5333 participants (mean age 71.2 years (SD 8.0) 44.4% men, 50% followed-up until 2014–2015). In the sex adjusted model, BMI was associated with frailty trajectories. Frailty trajectories varied with different values of baseline BMI, and the differences of frailty trajectories with different levels of BMI tended to be greater at 80 years and over. With the age-adjusted model, baseline BMI estimates were negative and significant [−0.017 (95% confidence interval = −0.022; −0.012)] with a positive significant interaction between BMI and time [4.177e-06 (95% confidence interval = 3.074e-06; 5.279e-06)]. With the fully adjusted model, all BMI estimates were still significant. Compared with participants with a BMI less than or equal to 25, participants with an initial BMI greater than 25 had frailty trajectories that increased over time. This trend was accentuated during follow-up.

Conclusions Obese participants may experience a steeper deterioration of frailty with ageing. These effects were still significant when adjusting for potential confounders. Differently, participants with low values of BMI (17 kg/m²) show slightly higher levels of frailty at 60 years, but with 70 years and over their frailty trajectories follow those of normal values of baseline BMI (22 and 25 kg/m²).

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.112
P1-10
Association of dyslipidemia and lipid-lowering treatment with risk of postoperative cognitive dysfunction (POCD):
A systematic review and meta-analysis
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Introduction
Postoperative cognitive dysfunction (POCD) is a common complication after surgery and involves a spectrum of symptoms spanning from mild to severe cognitive deficits that affect the daily lives of patients. Despite occurring in up to one third of older patients during the first few months after surgery, POCD is poorly characterized in terms of its epidemiology. Lipid imbalance in older age has frequently been linked to age-related cognitive impairment, but its role in determining patients’ risk of POCD is presently unknown. We therefore conducted a systematic review and meta-analysis of published research on the associations of dyslipidemia before surgery, use of lipid-lowering treatment before surgery and risk of POCD.

Methods
PubMed, Ovid SP and the Cochrane Database were searched for longitudinal studies that reported on associations of any measure of dyslipidemia (high total cholesterol, high low-density lipoprotein cholesterol, high triglycerides, low high-density lipoprotein; hypercholesterolemia) or on lipid-lowering treatment with POCD as relative risks (RR) or odds ratios. Any definition of POCD was permitted. Fixed-effects inverse variance models combined effects. Observational and intervention studies were considered separately. Meta-analysis Of Observational Studies in Epidemiology (MOOSE) and Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) guidelines were followed and the search was registered on the PROSPERO database (CRD42017069013).

Results
Of 205 articles, 17 studies totaling 2725 patients (mean age 67 years) were included. All had observational design. Median follow-up period was 7 days (range 1 day to 4 years) and surgical procedures were most commonly of the heart or carotid artery. Studies focused almost exclusively on hypercholesterolemia (either not further defined, or defined through self-report or laboratory analysis) as a measure of dyslipidemia (n = 12 studies) and on statins as lipid-lowering treatment (n = 8 studies). Few other parameters of dyslipidemia were investigated. Of all included studies, only 2 had set out to address the present research question. All of the remaining investigations reported on pre-surgery exposure to dyslipidemia or lipid-lowering treatment and POCD risk in descriptive tables showing characteristics of patients with POCD compared with cognitively stable patients. Statistical adjustment for potential confounders was rare. In meta-analysis, we found no association of hypercholesterolemia with POCD risk (RR: 0.93; 95% CI: 0.80, 1.08; P = 0.34), whereas statin use before surgery was associated with a reduced POCD risk (RR: 0.81; 95% CI: 0.67, 0.98; P = 0.03). Information on duration of statin treatment was lacking throughout. Additional evidence from 2 trial studies that failed to meet inclusion criteria was conflicting. One reported better post-surgery cognitive function patients receiving rosuvastatin for 7 to 10 days before cardiac surgery compared with patients not receiving that treatment at 10 to 14-day follow-up but lacked a placebo-controlled group; the other of critically ill patients found no effect of statin treatment initiated immediately after surgery versus placebo on POCD risk at 6-month follow-up.

Conclusion
In this meta-analysis we found no association of hypercholesterolemia with risk of POCD, but we found that use of statins was associated with a reduced risk. Future epidemiological studies should consider collecting data on patients’ treatment history, including indication, drug type, dosage and treatment duration, and should strategically adjust for potential confounders in view to disentangle parameters of dyslipidemia and lipid-lowering treatment in POCD risk prediction. If those types of studies were to support the preliminary evidence presented here, trial studies could determine the causality in the reduced risk of POCD seen in statin users, as trials are inadequate at present in terms of study number and design.

Disclosure of interest
The authors declare that they have no competing interest.
https://doi.org/10.1016/j.respe.2018.05.113

P1-13
Prevalence and factors associated with syphilis, HIV and hepatitis B virus infections among men who have sex with men in Togo in 2017
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Introduction
Hepatitis B and other sexually transmitted infections (STIs) have been linked to an increased risk of HIV transmission and disease progression among men who have sex with men (MSM), but their frequency and distribution in this community have not been extensively studied in Togo. In addition, a holistic understanding of transmission patterns of these STIs is required in order to develop sustainable prevention strategies and reduce transmission among MSM. The objective of the study was to estimate the prevalence and factors associated with syphilis, HIV and hepatitis B virus (HBV) infections among men who have sex with men (MSM) in Togo in 2017.

Method
A cross-sectional study was conducted in eight main cities in Togo from August 1 to September 30, 2017. MSM aged 18 years and above were recruited using the respondent driven sampling method. Data including sociodemographic characteristics, human immunodeficiency virus (HIV) testing history, condom use patterns, sexual partners characteristics and behaviors were collected using a questionnaire during face-to-face interviews. Blood samples were drawn after the interview for STIs screening using rapid tests. Multivariate logistic regression analyses were performed to identify factors associated with syphilis, HBV and HIV infections among MSM.

Results
Out of a total of 711 MSM recruited, 69.7% were living in Lomé, which is the capital city of Togo. Median age of study participants was 23 years, interquartile range (21–27 years) and 91.4% had at least secondary education level. At least three MSM over ten reported having condomless anal sex during the last month. The prevalence of syphilis, HIV, and HBV infection among 678 (95.3%) MSM who accepted the screening test was 0.0% [upper limit of 95% confidence interval (95% CI) 0.0%], 21.9% (95% CI [18.9–25.3%]), and 7.1% (95% CI [5.3–9.3%]), respectively. Among them, 7 (1.0%) (95% CI [0.4–2.2]) had HIV and HBV co-infection. The prevalence of HBV infection was not associated with HIV infection status (4.7% among MSM infected with HIV and 7.8% among MSM not infected with HIV, P = 0.199). Age, place of residency, nationality, MSM membership, previous HIV screening, and living with a male partner were significantly associated with HIV infection (P < 0.05). Hepatitis B was more frequent among MSM aged 23–25 (aOR = 3.15; 95% CI [1.07–10.53]; P = 0.044) or older than 26 (aOR = 4.62; 95% CI [1.79–14.33]; P = 0.003), and those living outside of Lomé (aOR = 5.09; 95% CI [2.71–9.91]; P < 0.001).

Conclusion
Our findings emphasize the importance of targeting HIV and viral hepatitis testing and prevention efforts to populations at risk for STIs. Despite all the awareness campaigns, the prevalence of STIs among MSM remains high. This urges the implementation of routine screening, vaccine-based prevention, and education programs for this most-at-risk population.
Body size, non-occupational physical activity and the chance of reaching longevity in men and women: Findings from the Netherlands cohort study

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Introduction
In developed countries, the rising number of obese and/or physically inactive individuals might negatively impact human lifespan. The aim of this study was to quantify the association between body size and non-occupational physical activity, and the chance of reaching longevity (defined as ≥ 90 years of age), in men and women separately.

Methods
For this study, data from the oldest birth cohort (1916–17) of the Netherlands cohort Study (NLCS) was used. Participants (n = 7807) completed a baseline questionnaire in 1986 (at age 68–70). Follow-up for vital status information until the age of 90 years (2006–07) was > 99.9% complete. Multivariable-adjusted Cox regression analyses were based on 5479 participants with complete exposure and co-variable data to calculate risk ratios (RR) of reaching longevity.

Results
In women, increasing height was positively associated with reaching longevity [RR: 1.05; 95% confidence interval (CI): 1.00–1.09 per 5 cm increment]. Significantly inverse associations were observed between reaching longevity and BMI at baseline (≥ 30 vs. 18.5–< 25 kg/m²; RR: 0.68; 95% CI: 0.54–0.86) and BMI change since the age of 20 years (BMI ≥ 8 vs. 0–< 4 kg/m²; RR: 0.81; 95% CI: 0.66–0.98). In men, no significant associations were found between body size and longevity. A positive linear relationship was found between non-occupational physical activity and reaching longevity in men (RR: 1.05; 95% CI, 1.02–1.09 per 30 min/day increment), while in women the association between physical activity and longevity showed an inverse U-shaped association, with an optimal level of physical activity between ≥ 30 and 60 min/day (RR: 1.21; 95% CI: 1.07–1.37) compared to 0–< 30 min/day.

Conclusion
Body size at the age of 68–70 years showed significant associations with the chance of reaching longevity in women, but not in men. Increasing levels of non-occupational physical activity were significantly associated with an increased chance of reaching longevity in both sexes, but evidence for a non-linear relationship was found in women.

Disclosure of interest
The authors declare that they have no competing interest.

Current characteristics of family caregivers of elderly dependents in Northern Spain


Introduction
To know the current characteristics and trends in the profile of family caregivers of elderly dependents is essential in order to promote multi-component interventions individualized to each situation and context that enhance the positive aspects of caregiving and minimize their negative aspects. The objective of this study was to determine the current characteristics of family caregivers of elderly dependents in northern Spain.

Methods
Cross-sectional study: 184 family caregivers of elderly dependents in the province of Cantabria were selected by simple random sample stratified according to Healthcare Centres. Different types of variables associated with the caregiver were collected by a structured interview. Comparisons between groups were performed by using the Chi² or Student t-tests for categorical and continuous variables.
quantitative variables respectively. Alpha error was set at 5%, and all test were two tailed.  
Results  One hundred and fifty-three out of the 184 family caregivers (83.2%) were women and 31 (16.8%) men. The mean age of family caregivers was 60.98 years [SD = 10.69]. No differences were observed in terms of age according to sex. Regarding the sex and family relationship of caregivers, three predominant profiles were identified: daughters (n = 104, 56.5%); wives (n = 24, 13%); and sons (n = 22, 12%). Overall, daughters and sons accounted for 68.5% of the sample (n = 126), and partners (husbands and wives) accounted for 15.8% (n = 29). Statistically significant differences were found between female and male caregivers in terms of marital and employment status. Female caregivers were in a greater percentage “married” (70.6%) and male caregivers were in a greater percentage “single” or “divorced or separated” (54.8%), P = 0.005; 32.1% of family caregivers (n = 59) were retired. “Household tasks” were more prevalent among non-retired women than men. The men were unemployed to a greater extent. Restricting to daughters and sons, the statistically significant differences were maintained. Daughters were in a greater percentage “Married” (62.9%) and “housework” continued to be more prevalent than in sons (31.7% vs. 0%). Sons were “Single” or “Divorced or separated” and “unemployed” to a greater extent. The educational level was similar in men and women; 61.4% of the sample of family caregivers studied only primary studies. Regarding the sex of elderly dependents, statistical differences were also obtained (P < 0.001). Men were cared mainly by their wives (47.7%) followed by their daughters and sons (38.6%), while women were mostly cared for by their daughters and sons (77.9%) and scarcely by their husbands (5.7%).  
Conclusions  Three predominating profiles for family carers of elderly dependents have been identified in relation to sex and family relationship. In order of frequency, daughters, wives, and sons. It is observed in comparison with previous studies, a decrease in the gender gap, due to a progressive incorporation of unemployed men in the role of family caregiver. The progressive increase of employed women in the last decades and the impact of the economic crisis occurred in recent years increasing the number of unemployed sons, can explain our results. The progressive aging of the population that affects both caregivers and elderly dependents, support the maintained trend towards a gradual increase in the percentage of retired family caregivers.  
Disclosure of interest  The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.120

P1-19 Metabolic aging and its association with depression in a UK cohort
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Introduction  Depression is associated with both reduced lifespan and cardiovascular disease risk. Accelerated biological aging may underlie this association. Modern ‘omics’ platforms provide new opportunities for the systematic assessment of biological aging. Genome-wide DNA methylation data has been used to predict chronological age with high accuracy, and ‘age acceleration’ - the difference between DNA methylation age and chronological age - is predictive of mortality. Few studies have employed metabolomics (small molecule profiling) to model the aging process. We have employed untargeted metabolomics across multiple nuclear magnetic resonance spectroscopy (NMR) and mass spectrometry (MS) based platforms, to develop a highly predictive model of age, within a large sample from the Airwave Health Monitoring Study (AIRWAVE). We investigate the correlation between metabolomic age and DNA methylation age and show that metabolic age acceleration is associated with depression and other disease risk factors.

Methods  Full metabolomic data was acquired for 2238 participants (age range: 19.2–65.2 years, 61% male) in the AIRWAVE cohort of employees of police forces from across Great Britain. Nine metabolomic analyses were applied: NMR, hydrophilic interaction chromatography-MS and reversed-phase chromatography-MS (both positive and negative modes) in both serum and urine, and NMR-based Bruker VDR Lipoprotein Subclass Analysis in serum only. NMR profiles were aligned and interpolated onto a common 20,000-point grid while MS data was processed into retention time-m/z pairs. All platforms were combined into one dataset providing 98,824 metabolite features. A metabolomic age prediction model was constructed using elastic net modelling, with penalization parameters found following 10-fold cross validation, in a training portion of the data (80% of participants) and then validated in a test set (remaining 20%). Metabolic age acceleration (AA) was defined as the difference between predicted metabolomic and chronological age. We computed the ‘intrinsic’ AA, defined as the residuals from the linear regression of AA with chronological age, hereafter referred to as ‘metAA’. DNA methylation was measured in leukocytes in 1102 participants using the Illumina 850 K methylationEPIC array and Hannum’s DNA methylation age calculated. Intrinsic DNA methylation AA was calculated as for metAA, additionally accounting for blood cell proportion, and referred to as ‘DNAmethAA’. Depression was assessed through the Patient Health Questionnaire (PHQ-9) and associations with metAA and DNA methAA were assessed through linear regression.

Results  Metabolic age, based on 472 features, was highly correlated both with chronological age in the independent validation set (Pearson’s correlation r = 0.85) and with DNA methylation age (r = 0.85). There was no relationship between DNAmethAA and metAA (r = 0.02). In analyses adjusted for sex, disease risk factors and diet, metAA was associated with both having some depressive symptoms [β, interpretable as years of increase in metabolic age, = 0.70, 95% confidence interval (CI): 0.38, 1.10] and being a depression
case (0.54, 95% CI: 0.08, 0.99) compared to those with no symptoms of depression. Obesity (1.35, 95% CI: 0.95, 1.69); low income (0.33, 95% CI: 0.00, 0.65); and heavy drinking (0.72, 95% CI: 0.08, 1.36) were also associated with metAA. Only being male was significantly associated with DNAmethAA (0.89, 95% CI: 0.47, 1.30). Participants with low income had higher DNAmethAA than those with high income, although this was not statistically significant [0.41 (−0.12, 0.94) after adjustment for sex].

**Conclusion** Metabolomic dysfunction can be used to predict age with high accuracy. Accelerated metabolic aging appears to capture a different dimension of the aging process to DNA methylation age acceleration, and may contribute to associations between depression and mortality.

**Disclosure of interest** The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.122

**P1-22**

**Physical activity promotion in a university hospital. A prospective cohort study in France, 2017**

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**Background** The objective was to evaluate the impact of promotion of physical activity in hospital professionals.

**Methods** A prospective cohort study was conducted in Rouen University Hospital in France in 2017. A set of online questionnaires were collected at different points of follow-up, from inclusion to sixth month (a total of 7 points). Physical activity was measured by electronic pedometers distributed at the beginning of the study to voluntary hospital professionals, who participated individually or as a team in order to measure and improve their physical activity. Sociodemographic variables were collected as well as the number of steps and the behavior regarding the routine physical activity. Metabolic equivalents (MET) were calculated using the short version of International Physical Activity Questionnaire (IPAQ). Analyses were fitted by mixed model.

**Results** A total of 1010 hospital professionals were initially included and 905 of them picked up the electronic pedometers; 75.3% persons filled in the inclusion questionnaire. The mean age was 41.6 years old (SD = 10.7), the sex ratio M:W was 0.16; 41.3% were nurses, 24.1% were in the administrative section, and 9% were physicians; 86.3% of them worked only during the daytime, 4.9% only during the nighttime and 8.8% both during the daytime and nighttime. Thirty-six percent of healthcare personnel have sitting and standing work, 31% have mostly sitting work and 20.7% have mostly standing work; 53.6% of individuals declared doing sport regularly. The mean number of steps increased during 6 months, with a significant progression from the first measure compared to the next ones (P < 0.0001). The progression of MET for intense activity was significant from the first measure to the second month (P = 0.03) and to the third month (P = 0.04). The progression of MET for moderate activity was significant from the first measure to the first month (P = 0.03) and to the second month (P = 0.01). In the subgroup of administrative section workers, the mean of steps daily at the first measure was 7864 with a significant increase in comparison to the third month (9178, P = 0.0002), the fourth month (10,099, P < 0.0001) and the sixth month (9249, P = 0.001). Comparing the persons that work in the administrative section to the rest of participants, there was a difference in the mean number of steps per day (8552 versus 9483, P < 0.0001), in the MET for intense activity (1361 versus 1820, P = 0.0008), in MET for moderate activity (1108 versus 1304, P = 0.02) and in the IPAQ score (P = 0.035). The mixed model confirmed the difference between the two groups, the group that did not work in the administrative section had an increase in what concerns the baseline number of steps (947, P = 0.0002), but also progressively in time at each measurement, with an augmentation between the first measurement and the last of 742 steps (P < 0.0001). The difference of level of IPAQ score was also confirmed as greater for the group that did not work in the administrative section (P < 0.0001).

**Conclusions** This initiative was an accomplishment in promoting physical activity in a hospital population. Physical activity can offer its benefits and if it is encouraged at the working place contributes to the well-being of workers additionally as well as to better cope with the stress at work. Activity trackers appear a promising tool to engage people in self-monitoring a physical activity.
Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.125

PI-23
Mortality following trajectories of physical function: The impact of socio-demographic factors and social relations
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Introduction It is important to help older adults maintain a good physical function in old age in order to ensure quality of life, independent living and longevity. To tailor future preventive interventions and rehabilitation, it is necessary to identify how different trajectories of physical function are associated with mortality and whether certain groups of older adults are more vulnerable to negative consequences of adverse trajectories of physical function in old age. The aims of this study are to investigate how trajectories of physical function among older adults are associated with mortality and whether socio-demographic factors and social relations modify the associations.

Methods Questionnaire data linked with register data on 2906 older Danish adults aged 75 and 80 years at baseline were included. Physical function was measured by the validated Mobility-help scale (0–6) four times over a 4.5-year period. Trajectories of physical function were based on the baseline measure of physical function and slopes of linear regression lines between the four measures of physical function over time. Four trajectories of physical function were identified by: (1) stable full physical function, (2) full physical function followed by a decrease, (3) stable low physical function and (4) low physical function followed by a decrease. Multivariable additive hazard regression models were used to estimate the association between the four trajectories of physical function and the following 5-year mortality.

Results Compared to older adults with a stable full physical function, older adults with a low physical function followed by a decrease were associated with the highest number of additional deaths per 1000-person-years (py) (118.02, 95% CI: 67.40; 168.64). Hereafter older adults who had full physical function followed by a decrease (82.49, 95% CI: 65.22; 99.76) and finally older adults who had a stable low physical function (70.20, 95% CI: 35.33; 105.06). Wald test for global interaction showed significant interactions (P-value < 0.01) between trajectories of physical function and age and gender, respectively. Due to interaction, men experienced 74.17 (95% CI: 32.44; 115.89) additional deaths per 1000 py for the trajectory full physical function followed by a decrease. The two other trajectories were not associated with significantly additional deaths among men than women. For age, those aged 80 years compared to 75 years were due to interaction associated with 48.48 (95% CI: 6.72; 90.23) additional deaths per 1000 py for the trajectory full physical function followed by a decrease, 85.50 (95% CI: 3.92; 167.07) additional deaths per 1000 py for the trajectory stable low physical function and 169.07 (95% CI: 55.90; 282.24) additional deaths per 1000 py for the trajectory low physical function followed by a decrease. Test of global interactions showed that socioeconomic factors and social relations did not modify the associations.

Conclusion Trajectories of physical function that included decline were associated with the greatest mortality. The magnitudes of the associations between adverse trajectories of physical function and mortality were greater for men than women and those aged 80 years than those aged 75 years at baseline.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.126

PI-24
Epidemiological and clinical characteristics of children with morbilli in Serbian enclaves in Central Kosovo
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Introduction Morbilli is a highly contagious disease manifested by catarhal changes of the conjunctiva, mucous membrane of the upper respiratory tract, and maculopapular rash that spreads from the face and neck towards the trunk and extremities. Even nowadays, morbilli poses a significant social and health problem in the regions that have not reached adequate levels of vaccination. The aim of the study was to investigate epidemiological and clinical characteristics, as well as vaccination status of persons affected by morbilli in Serbian enclaves in Kosovo.

Methods This is a retrospective 3-month study (October–January 2017). Sixty-nine affected children were treated at the Pediatric Department of the Clinical Hospital Center Pristina. The diagnosis was established according to epidemiological and clinical characteristics, blood count, and findings of specific IgM antibodies in serum. The method of descriptive epidemiology was used in the study. Student’s t-test was used to compare the numerical means and the Chi² test and Fisher’s exact test were used for comparing distribution of descriptive characteristics.

Results Mean age of children was 8.25 ± 3.83 years (MIN 7 months, MAX 18 years and a half), male gender: 7.16 ± 6.29, female gender: 9.43 ± 5.87 years. Age-related distribution was: 22.7% between 10–14 years, 18.7% between 2–5 years, 13.0% between 5–9 years, 9.7% between 6 months and 1 year, 6.6% less than 2-year-old, and 9.7% children between 15–19 years of age. There were 76.7% unvaccinated children and 23.3% incompletely vaccinated children. The infection was acquired: in 48.6% in school and pre-school facilities; in 23.1% in healthcare facilities; in 14.1% the infection occurred due to family epidemic, the source of the infection was of unknown etiology in 10.1%. As for ethnicity, there were 37.6% Roma children, 27.4% Albanian, and 22.4% Serbian children. Clinical signs and symptoms were: temperature (higher than 39 °C - 57.8%, up to 38.5 °C - 44.5%; 9.4% had sublebrile conditions); facies morbillosa - present in 83.5%, dry cough present in 33.7%; Koplik’s spots in 6.4%; nausea and vomiting in 36.7%, diarrhea in 21.2%; initial maculopapular rash retroauricular - 79.8%, on face - 95.2%, on the trunk - 78.2%, on the extremities - 49.9%. Tipe of rashes was: dense rashes (60.7% > Roma children, 6.4%; nausea and vomiting in 36.7%, diarrhea in 21.2%; initial maculopapular rash retroauricular - 79.8%, on face - 95.2%, on the trunk - 78.2%, on the extremities - 49.9%. Tipe of rashes was: dense rashes (60.7% > Roma children, 6.4%; nausea and vomiting in 36.7%, diarrhea in 21.2%; initial maculopapular rash retroauricular - 79.8%, on face - 95.2%, on the trunk - 78.2%, on the extremities - 49.9%. Tipe of rashes was: dense rashes (60.7% > Roma children, 6.4%; nausea and vomiting in 36.7%, diarrhea in 21.2%; initial maculopapular rash retroauricular - 79.8%, on face - 95.2%, on the trunk - 78.2%, on the extremities - 49.9%.

Conclusions The majority of affected children were Roma and Albanian unvaccinated children. Due to the course and complications of the disease, morbilli should be eradicated by mandatory vaccination of unvaccinated and incompletely vaccinated individuals. Epidemiological and healthcare control of affected persons in Serbian enclaves in Kosovo should be performed regarding the disease reports, laboratory and serological testing, as well as isolation and treatment of infected individuals.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.127
P2-1
Epidemiological patterns of leukemia in 184 countries: A population-based study
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Introduction Leukaemia is a heterogeneous group of haemopoietic cancers that comprises a number of diverse and biologically distinct subgroups. We examine the leukaemia burden worldwide and highlight the distinct incidence patterns in order to elucidate explanatory factors that may support preventive measures and health resource planning. We aimed to estimate the global burden of leukaemia incidence according to the four major subtypes stratified by age and sex.

Methods In this population-based study, we assessed leukaemia incidence for the major subtypes using the Cancer Incidence in Five Continents Volume X (CIS-X), which includes data from 290 cancer registries in 68 countries covering the diagnostic period 2003–07, for all ages and both sexes. We then extracted counts and incidence rates in 184 countries for the year 2012 from IARC’s GLOBOCAN database of national estimates. We calculated age-specific incidence rates per 100,000 person-years and age-standardised rates (ASRs) using the world standard population by country, sex, age group, and where applicable, by major subtypes. We excluded from all analyses registries for which the total number of leukaemia cases was less than 100 or the proportion of microscopically verified (MV%) cases was less than 80% (2572 cases).

Results A total of 717,863 cases between 2003–07 were included in this analysis. More than 350,000 new leukaemia cases were estimated in 2012. We observed substantial variation in incidence between and within world regions. The highest leukaemia incidence rates for both sexes were estimated in Australia and New Zealand (ASR per 100,000 11.2 in males), Northern America (10.5 in males and 7.2 in females), and western Europe (9.6 in males and 6.0 in females), and the lowest was in western Africa (1.4 in males and 1.2 in females). Rates were generally higher in males than females with an overall male to female ratio of 1.4. In children, acute lymphoblastic leukaemia was the main subtype in all studied countries in both sexes and characterised by a bimodal age-specific pattern. The subtype distribution was more diverse in adults, with a relatively higher proportion of chronic lymphocytic leukaemia in most European and North American countries, whereas rates of acute lymphoblastic leukaemia remained relatively high among adults in selected South American, Caribbean, Asian, and African populations.

Conclusion Geographical disparities in leukaemia might partly be explained by quality of, and access to, health systems linked to resource levels, although there is probably a role for aetiological factors, including gene–environment interactions. The observed bimodal pattern could be due to different risk factors affecting different ages and might include a genetic component.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.128

P2-2
Use of dietary supplements in soy isoflavones and risk of breast cancer among women aged over 50 years: Results from the E3N prospective cohort
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Introduction Soy-based dietary supplements have been proposed as natural alternatives to menopausal hormone therapy, but their effect towards breast cancer risk is controversial and has little been evaluated. We investigated the association between the use of those supplements and breast cancer risk in a large prospective cohort of women aged over 50 years.

Methods A total of 76,442 women from the E3N cohort, born 1925–1950, were followed between 2000 and 2011 (11.2 years on average; 3608 incident breast cancers). Use of soy-based dietary supplements was assessed every 2–3 years. Hazard ratios (HRs) of breast cancer and their 95% confidence intervals (CI) associated with current, past, and never use of soy supplements were estimated using multivariable Cox models.

Results HRs associated with current use of soy supplements were 0.92 (95% CI = 0.76 to 1.11) for breast cancer overall, 0.78 (95% CI = 0.60 to 0.99) for ER+ breast cancer and 2.01 (95% CI = 1.41 to 2.86) for ER- breast cancer, compared to never use. No association was observed for past use. We found effect modification by family history of breast cancer (P = 0.03) and menopausal status (P = 0.04). HRs for current use were 1.36 (95% CI = 0.95 to 1.93) among women with a family history of breast cancer in first-degree relatives, and 0.82 (95% CI = 0.65 to 1.02) among women with no such history; they were 1.06 (95% CI = 0.87 to 1.30) more than 5 years after menopause onset and 0.50 (95% CI = 0.31 to 0.81) in perimenopause or within 5 years after menopause.

Conclusions We report opposite associations of soy-based dietary supplements with ER+ and ER- breast cancer risks. Our results suggest caution in using them in women with a family history of breast cancer. Whether their risk profile may be more favorable among premenopausal or recently postmenopausal women deserves further investigation.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.129

P2-3
Global and regional forecast of epithelial ovarian cancer incidence over a ten-year period (2018–2028)
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Introduction Ovarian cancer is the 7th most frequent cancer in women globally and ranks 18th of all cancers. The aim of this study is to forecast the incidence of epithelial ovarian cancer globally and by geographic and economic regions over a 10-year period (2018 to 2028).

Methods Using publicly available country-specific cancer registries, appropriate ICD 10 codes, and relevant histology proportions, epithelial ovarian cancer incidence was estimated for 45 countries grouped by 6 regions, representing approximately 90% of the world’s population. Our literature review of risk factors and the historic trend of age-specific incidence of ovarian cancer lead us to forecast the incidence of this disease based on demographic changes only. The proportion of BRCA1/2 mutation among ovarian cancer patients was estimated from a selection of the most relevant publications and were pooled by geographic
region. To estimate the number of incident cases globally, we derived a weighted average of the aggregate estimates for each region.

**Results** In 2018, we estimate there will be 270 thousand diagnosed incident cases of ovarian cancer worldwide. The number of diagnosed incident cases of ovarian cancer worldwide will increase by 18% over the period 2018–2028. The number of diagnosed incident cases of ovarian cancer in 2018 is highest in the lower-income countries of the Asia-Pacific region, accounting for 44% of the global total. Growth in the number of diagnosed incident cases from 2018–2028 will be greater across lower-income countries (24%), than across high-income countries (7%). There is a substantial difference in the risk of ovarian cancer between high-income and lower-income countries, at 8 per 100,000 per year across the former and 4 per 100,000 per year across the latter.

**Conclusions** The incidence of epithelial ovarian cancer is expected to increase globally, primarily driven by the aging of the population. Lower income countries contribute the majority (64%) of ovarian cancer cases.

**Disclosure of interest** The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.130

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**P2-4 Ovarian cancer in select EU countries: Incidence, treatable populations and sales by key drug class**

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**Introduction** Ovarian cancer is the 7th most frequent cancer in women. This study seeks to describe epithelial ovarian cancer epidemiology to enable estimation of the number of treatable cases eligible for PD-1/L1 inhibitors, PARP inhibitors, and angiogenesis inhibitors in advanced first-line maintenance setting across 15 European countries (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Italy, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom). PARP inhibitors are effective treatment options for recurrent, platinum-sensitive, high-grade ovarian cancer, regardless of BRCA1/2 status, but it is a costly treatment and therefore healthcare providers must be able to size this patient population in order to develop budget impact models.

**Methods** Using peer-reviewed studies and cancer registry data, we estimated the number of incident epithelial ovarian cancer cases, and report these by stage and BRCA1/2 mutation status. Using stage and grade of disease data, we derived the early stage first-line, and advanced stage first-line eligible cases. Using estimates of recurrence-free survival, we modelled the recurrence of early stage first-line cases and early stage non-drug treated cases, assuming that these cases would be eligible for treatment in the second-line. To estimate rates of progression between the first and second lines of metastatic treatment, we relied on estimates of progression-free survival from the literature, as well as estimates obtained from a survey of practicing oncologists. We used database pricing sources to estimate the cost of key drug class treatment.

**Results** We estimate that there will be 30,000 incident cases in 2018 of ovarian cancer in the 15 European countries, of which 13% have a mutation in the BRCA1/2 gene. Over the next 10 years, the number of cases will increase with the aging population. Over 4600 will be eligible for early stage treatment, and 23,400 will be eligible for advanced stage first-line maintenance treatment. If PARP inhibitors successfully penetrate the first-line maintenance setting, we estimate that given 51% treatment with these agents, sales could exceed US$ 1 billion by 2028.

**Conclusions** Advanced cases account for 83% of the first-line drug-treatable population. By 2028, of the key drug class used to treat ovarian cancer, immune checkpoint inhibitor (PD-1/PD-L1) and PARP inhibitors are expected to make up the majority closely followed by angiogenesis inhibitors.

**Disclosure of interest** The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.131

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**P2-6 Epidemiological profile of digestive cancers at Oran EHU, 2012–2017**


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**Introduction** There is a particular interest of digestive cancers, due both to their frequency and severity (1.85 million deaths worldwide according to the WHO). Epidemiological studies are necessary means to approach this worrying situation. Digestive tract cancers have varying incidence, progressing mainly because of the increase of colorectal cancer cases, which occupies the third position among most prevalent cancers worldwide. The objective of our work is to describe the epidemiological profile of digestive cancers in the hospital and university establishment of Oran (EHUO) during the period from 2012 to 2017.

**Methods** The data were collected from the EHUO clinical register of cancers. Primary malignant tumors are coded according to CIM02 and CIM10.

**Results** There are 395 cases of digestive tract tumor in the period 2012–2017. The mean age of the patients is 56.3 ± 2.7 years. The sex ratio is 1.07. The most common histological type is adenocarcinoma (83.6%). Colorectal cancer remains the most frequent localization (59.3%) of digestive cancers followed by gastric cancer with a frequency of 32%. Surgical treatment is initial in 77.6% of cases.

**Conclusion** Cancer registries are the tools of choice for studying the epidemiological characteristics of digestive cancers, establishing prognoses and evaluating the political and health programs, in order to improve their management and reduce their impact.

**Keywords** Epidemiology; Digestive Cancers; Cancer Registry

**Disclosure of interest** The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.133
Patients and methods All cases of invasive colon cancer diagnosed in the Gironde and Tarn during 2010 in patients over 18 years of age and not presented in MDTm were included from the cancer registries of these two départements. A comparison group was selected on the same criteria corresponding to a random draw of 50% of patients presented in MDTm. After a description step, we compared these two groups according to a case-control design (without MDTm/MDTm) to assess the factors associated with the absence of MDTm presentation in patients with colon cancer. A second analysis compared these groups, without the early deaths following the diagnosis of colon cancer, according to an exposed/unexposed type design (without MDTm/MDTm) to study the link between non-presentation in CPR and management. Five indicators were defined and validated: performing a thoracic CT scan during the extension assessment, performing chemotherapy (stages II and III), delay surgery-chemotherapy, death during chemotherapy. In order to take into account the socio-demographic level of the patients, we used the aggregate index of deprivation “European Deprivation Index” (EDI). This EDI was divided into quintiles: Q5 corresponding to patients living in most disadvantaged geographic areas. The analyzes were performed using logistic regression models.

Results The first factor explaining patients’ non-presentation in MDTm was death in the month following diagnosis (OR = 2.94, 95% CI = [1.52–5.66]), these patients were therefore excluded from the analyses of the second objective. Moreover, regardless of the early death, advanced age and living in more deprived areas were associated with non-presentation in MDTm (ORQ5–Q1 years = 2.10, 95% CI = [1.06–4.18] and ORQ4–Q5 = 1.96, 95% CI = [1.23–3.14]). For the second objective of this study, after adjusting for patient-related variables (age, comorbidities, EDI) and tumor (stage to diagnosis), thoracic CT scan was less often performed in non-MDTm patients (OR = 0.40, 95% CI = [0.24–0.65]). There was no association between the absence of MDTm and the others management indicators, these remain influenced by patient and tumor characteristics such as age at diagnosis, comorbidities and stage of tumor. However, regardless of stage of diagnosis and MDTm status, patients living in a more disadvantaged area died more often during postoperative chemotherapy (ORQ1–Q5 = 2.08, 95% CI = [1.02–4.25]).

Discussion In 2010, in Gironde and in the Tarn départements, the factors associated with the non-presentation of a patient file in MDTm were having died in the month following the diagnosis, as well as two independent factors of death: the advanced age of patients (over 85 years) and residing in more disadvantaged areas. In the end, therapeutic management was not associated with the presentation in MDTm but with patient and tumor characteristics, including age, comorbidities but also level of deprivation. For the continuation, survival analyzes of patients with colon cancer based on their MDTm status are underway.

Keywords Colon cancer; Multidisciplinary team meeting; Therapeutic management; EDI

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.134

P2.8 Case-series analysis of haematological malignancies in gold mining areas in South Africa

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Introduction South Africa has a long history of uranium (U) production from gold mining and milling that has resulted in locally high-levels of environmental contamination from uranium and its decay products (radium 226 and radon 222). Due to short distances from mining tailings to residential areas, populations living around gold mine tailings of the Witwatersrand goldfields may be exposed to uranium and its decay products from the tailings through multiple pathways, including ingestion of contaminated water and food grown in contaminated areas, direct consumption of soil (geophagia) and inhalation of dust, raising concern about potential health risks associated with environmental U-exposure, and in particular regarding haematological malignancies (HM). We designed a case-series study of HM from Chris Hani Baragwanath Academic Hospital (CHBAH), South Africa, to assess the feasibility of an analytical study on the association between U-exposure and HM risk in this setting.

Methods First, patient and cancer characteristics and spatial distribution were retrospectively reviewed from patient files of the HM cases diagnosed between 2004 and 2013 at CHBAH. Spatial relations between residential addresses of patients and location of mine tailings and other U-sources were analysed using a specifically designed GIS-supported virtual geographical environment. Then, we assessed the feasibility of collecting additional information, from patients newly diagnosed with a HM at CHBAH (in 2014–2015), on potential environmental U-exposure pathways and referral patterns from interviewer-administered questionnaires.

Results Among the 1880 cases aged 18–94 years and retrospectively identified from CHBAH’s patient files, 44% were diagnosed with Non-Hodgkin lymphoma (NHL), 26% with leukemia and 17% with myeloma. Referral from distant provinces was not uncommon but more than 90% of patients lived within 50 km of the hospital. Human immunodeficiency virus (HIV) status was known for 94%, of which 44% were HIV-positive. No clear and consistent spatial relations between patient’s residences and mine tailings deposits could be established. A total of 196 haematological cancer cases aged 18–90 were prospectively diagnosed between 2014 and 2015 at CHBAH, with NHL (35%), leukemia (34%) and myeloma (16%). HIV status was available for all patients, 41% being HIV-positive. Working in gold mines was reported by 12 cases (6%), all men. Soil consumption was a habit for 53 cases (27%), mostly men, and came from backyards and road vendors. Soil consumption occurred more frequently during adulthood and pregnancy. Drinking water came from piped water; untreated water from nearby rivers was not drunk. Animal products and vegetables came from stores and backyards. At the time of interview, 95% of cases were living in Gauteng Province, in Soweto (58%). Half of the cases were living at their current residence for 20 years or more. Cases were referred to CHBAH by governmental clinic doctors (44%), referral hospitals (25%) and private doctors (20%). Most cases lived less than one hour from CHBAH (77%).

Conclusions This case-series analysis showed the capacity of CHBAH to recruit HM patients and allowed the description of the HM burden of the area. Caution is required when interpreting the spatial distributions of patients; our results may not reflect population-incidence rates due to referral patterns to the hospital and inaccuracies in residential addresses retrospectively collected from clinical records. This needs to be considered when analyzing spatial relations related to various exposure pathways. The questionnaire administered to the prospective cases allowed collecting information on U-related exposure, although results generally showed low exposure prevalence in our study population. As infections, such as HIV, may be a risk factor for some HM, collecting clinical data on infections and subtypes of HM needs to be considered in the investigation of HM risk.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.135
P1-9  
Epidemiological, clinical and pathological characteristics of gastric neoplasms. The experience of the first population-based specialized gastric cancer registry in Italy

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Background Gastric cancer (GC) is the 5th most common cancer and the 3rd leading cause of cancer-related deaths worldwide. GC incidence and mortality rates vary widely across different geographical areas. In Italy, the province of Cremona is characterized by a high incidence, compared to the national one. For these reason a specialized population-based registry was set up.

Methods The collection encompasses all GCs diagnosed in the province of Cremona since January the 1st, 2010. The main data sources were represented by the pathological records and patient clinical charts.

Results Up to November 2017, 1087 cases were collected. 876, those diagnosed until December 2015 to have a minimum of two years of follow-up, were analyzed. Male/female ratio was 1.4. The GLOBOCAN world age-standardized incidence rate (ASIR) per 100,000 was 20.8 for male and 12.7 for female, compared to the Italian average rates of 10.9 and 5.9, respectively. A decrease in incidence was register both in male (−1.92%) both in female (−3.21%). Overall differences between incidence across districts was noticed (P < 0.001). Median age at diagnosis was lower for male than female (P < 0.001). Helicobacter Pylori (HP) infection was present in less than 20% of evaluated cases, with differences across districts (P < 0.001). The gene HER-2 resulted amplified in about 25% of cases. An association between sex of patient and site of insurgence of the tumour (P < 0.001) was registered, as well as between sex and tumour istotype (P < 0.05). More than half of cases was in advanced stage of disease at diagnosis (P < 0.001). The gene HER-2 resulted amplified in about 25% of cases. More than half of cases was in advanced stage of disease and the low rate of postoperative therapy adherence (about 40%). OS was strongly improved by adjuvant treatment (P < 0.001) regardless the tumour istotype (HR = 0.97, P = 0.957). Overall, data available at diagnosis that impacted on survival, were: sex, age, tumour site and the grade of differentiation of cancer cells. Same analysis was made including also information available after diagnosis, resulting from a deeper tumour characterization and from the clinical pathway followed. In pts who did have surgery, parameters were: age at diagnosis (HR = 1.086, P < 0.001), the status of lymph nodes (HR = 2.027, P < 0.001), and furthermore both neoadjuvant (HR = 3.186, P = 0.003) both palliative (HR = 2.293, P = 0.013) therapies. In pts with advanced stage of disease at diagnosis, who did not have surgery, survival seemed to be impacted only by the grade of differentiation of malignant cells.

Discussion This study confirms the high GC incidence in the province of Cremona, with a geographical spread across districts. Moreover, was confirmed the high percentage of GCs detected in advanced stage of disease and the low rate of 5-year relative survival. Based on these findings, effective preventive interventional health strategies and screening procedures need to be implemented to reduce the impact of this pathology for this geographical area.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.136

P2-10  
Descriptive epidemiology and dietary risk factors of nasopharyngeal carcinoma in Western Algeria, 2016–2017

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Background Nasopharyngeal carcinoma (CNP) is an epithelial malignant tumor dominated by undifferentiated carcinomas of nasopharyngeal type (UCNT), in more than 90% of cases. It is a rare tumor in most countries but is more prevalent in southern Asia, Artic regions and North Africa (Maghrebian countries “Algeria, Morocco and Tunisia”; intermediate risk zone: incidence 8–12/100,000). In Oran city (Wester Algeria) its incidence varies on average 5.6/100,000; (report of the cancer registry of Oran 2010). It is a multifactorial disease including Epstein-Barr virus (EBV) activation, genetic susceptibility and exposure to environmental carcinogens. Dietary risk factors in Maghreb area include preserved foods consumption (khlii, harissa, rancid butter), lack of fresh fruit.

Objective The aim of our study is to describe the epidemiological profile and dietary risk factors of NPC in Oran university hospital (EHUO) 2016–2017.

Methods Data were obtained from two years of registration (2016–2017) as part of the cancer registry of EHUO. The central coding is carried out using the supports of CIM02 and CIM06. Results were obtained with Epida analysis.

Results In total, 61 cases of NPC were recorded during the 2016–2017 period. The average age of these patients is 47.1 ± 4.2 years old. The most common histological type is UCNT (83.6%). The discovery of this cancer is often based on revealing symptoms (90.2%). Consumption of preserved foods have been found to be risk factors in our populations such as khaddad (dried mutton stored in oil) (5%), harissa (very spicy condiment prepared with red pepper, olive oil, garlic, caraway) (75%), rancid butter (21%).

Conclusion In Algeria, this cancer morbidity remains poorly known. A better knowledge of the epidemiology of this cancer will make it possible to put in place preventive measures.

Keywords Cancer; Cavum; Registry; EHUO

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.137

P2-11  
Epidemiological profile of cervical cancer in Oran, Algeria, 2014–2015

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Background Cervical cancer is the fourth most common cancer among females, worldwide (2012). There were an estimated 526,000 new cases of cervical cancer, of which around 85% occurred in less developed regions. Around 266,000 females died of cervical cancer, accounting for 7.5% of all female cancer deaths. About 87% of cervical cancer deaths 1 occurred in the less developed regions. This cancer affects women in their youth. In Algeria, cervical cancer is the second gynecological cancer in Algeria, with an incidence of 8.7 per 100,000 women. It accounts for 12.5% of all female cancers. It is a real public health problem. The frequency of this cancer and its consequences has been declining for 40 years in developed countries thanks to smear Pap. The incidence should continue to decline in the future with the generalization of anti papillomavirus. Squamous cell cancer is the most common histological variety and is a model in pelvic oncology since we know its main etiology (papillomavirus), its physiopathology (integration of the viral genome and cell transformation) and the natural history of the disease. He is preceded by a pre-invasive phase that can be detected and treated.
Aim Describe epidemiological profile of cervical cancer in the Oran University Hospital (EHUO).

Methods The data were obtained from two years of registration as part of the cancer registry of EHUO. The central coding is carried out using the supports of CIMO2 and CIM10. Results were obtained with Epida analysis.

Results In total, 161 cases of cervical cancer were registered during the period 2014–2015. The average age of patients is 56.8 ± 2.0 years old. Histological analysis of cancerous cases showed a predominance of squamous cell carcinomas 66.9%, while adenocarcinoma represents 3.4%. Low grades lesions (I and II) are the most common (91.2%). The discovery of cancer is mainly by revealing symptoms 85.6%.

Conclusion In our country, cervical cancer is considered a poor prognosis at late stage. But it is the easiest gynecologic cancer to prevent, with regular screening tests and follow-up for all women every 3 years for women between 20 and 65 years old.

Keywords Epidemiology; Cervical cancer; Cancer registry

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.138

P2-12 How long does it take until the effects of endoscopic screening on colorectal cancer mortality are fully disclosed? A Markov Model study

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Introduction Colorectal cancer (CRC) is one of the leading causes of cancer morbidity and mortality worldwide. A recent randomized trial has suggested persisting protection from CRC incidence and mortality of a single flexible sigmoidoscopy for up to 17 years and possibly beyond. We performed a simulation study to explore the time course and magnitude of protection provided by screening colonoscopy against CRC death over 25 years.

Methods Using data from the German national screening colonoscopy registry, a multi-state Markov model was set up based on the adenoma-carcinoma pathway to estimate the cumulative CRC mortality when different proportions of the population have a single screening colonoscopy at age 55, or two or three screening colonoscopies at ages 55 and 65. Ratio and difference of the expected cumulative CRC mortalities among screened and unscreened populations were calculated over follow-up to reflect the impact of screening colonoscopy.

Results Cumulative CRC mortality continuously increased with age, and in the absence of screening reached 2.6% and 1.7% at age 80 for men and women, respectively. A single colonoscopy at age 55, even with limited uptake, was predicted to lead to much lower cumulative mortality (0.7% and 0.5% for men and women, respectively at age 80 when uptake was 100%). Relative mortality reduction continued to increase over more than 10 years and reached the maximum around 12–13 years after screening. Although relative risk reduction became attenuated for even longer periods of follow-up, absolute risk reduction steadily increased throughout follow-up and more than 70% of the total risk reduction was observed between 13–25 years. A repeat colonoscopy 10 year later further enhanced the effects and the cumulative mortality remained at 0.1% to 0.2% throughout follow-up when uptake was 100%.

Conclusions Even a single (once only) screening colonoscopy has the potential to prevent most of CRC mortalities. Protective effects are expected to be long lasting and to become fully manifest after more than two decades from screening.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.139

P2-13 The best age for screening colonoscopy: A Markov Model study

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Introduction Colonoscopy has been demonstrated to be effective in reducing colorectal cancer (CRC) incidence and mortality and is commonly used as a screening modality. We performed a simulation study to examine the best age to have screening colonoscopy when capacity is limited, and once-only test is allowed, and compared the estimates with the best ages for two and three screening colonoscopies.

Methods A Markov model was set up with the use of data from the German national screening colonoscopy registry to simulate the natural history of the adenoma-carcinoma process. Years of potential life lost (YPLL) from CRC deaths for people aged 50 in Germany were estimated when they have a single screening colonoscopy, or two or three screening colonoscopies with 10-year intervals at various ages.

Results CRC was estimated to yield a total of 384.529 and 290.190 YPLL till age 85 in the absence of screening for men and women, respectively. One single screening colonoscopy performed between 50–65 years was expected to reduce this estimate by approximately 49–69%. A U-shaped association was found between screening age and the estimated YPLL, and the optimal age for once-only screening colonoscopy (associated with the least YPLL) was 53 to 54 for males and 54 to 56 for females. For two or three screening colonoscopies, the best starting age fell to 50 or even younger for both genders.

Conclusions Our estimates lend support to the suggestion that the current German screening colonoscopy offer starting at age 55 should be extended to cover people aged 50–54. When colonoscopy capacity is limited, different age at initiation of screening for men and women might be considered.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.140

P2-14 Does administration of broad-spectrum antibiotics in febrile neutropenic children trigger the emergence of BMR? A French experience

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Background Blood stream infections (BSI) remain a major cause of morbidity and mortality in immunocompromised children and increase the length of hospitalisation as well as the cost of treatment. The difficulty of documented bacteremia at the onset of fever in neutropenic patients led to an early
administration of broad-spectrum antibiotics, without waiting for further clinical or microbiological evidence of infection. Furthermore, gut decontamination is performed in children with a high-risk of BSI. Does this practice trigger the emergence of multidrug resistant bacteria?

Methods We performed a monocentric, retrospective and descriptive study between January 2014 and December 2017, using a large cohort of pediatric patients with hematological and oncological diseases in a tertiary care pediatric center in France, the Institute of Hematology and Oncology Pediatric (IHOPe) in Lyon. This includes patients with acute leukemia, lymphoma, patients who underwent hematopoietic stem cell transplantation (HSCT) (allogeneic and autogenic), children with severe combined immunodeficiency syndromes as well as children suffering from solid tumors. A bacteremia was defined by a positive blood culture sample, associated with fever. For coagulase-negative staphylococci (CoNS), two distinct positive blood cultures within 48 h were mandatory. The children were divided into 4 infectious risk groups regarding their immunosuppression level. Groups 3 and 4 received non-absorbable antibiotics for gut and oral decontamination. The empirical antibacterial therapy was adjusted to the risk group, as well as a prior identified bacteria colonisation: all patients with a central venous access received vancomycin (stopped after 48 hours in the absence of bacterial identification), amikacin and a broad-spectrum penicillin.

Results During these 4 years, our institution recorded more than 8000 hospitalisations distributed within 3 units: 2 conventional hospitalisation wards and the HSCT unit. Our protected unit is equipped with spacious positive air pressure rooms, for child and parent, with high-efficiency particulate air (HEPA) filters where only a clean non-sterile outfit (gown and mask) are required. We identified 350 cases of BSI, thus an overall incidence of 4.5%. Fifteen to twenty per cent of these children suffered from a second or more re-infection. The incidence of BSI was stable throughout the four years of our study. Gram-positive bacteria represented more than 50% of BSI and CoNS was the most frequent pathogen agent found. Among the others gram-positive isolates, we counted around 5 to 6 cases/year of Streptococcus and Staphylococcus aureus. Among Gram-negative bacteria, enterobacteria accounted for 14 to 20 BSI per year and Pseudomonas aeruginosa for 2 to 4 cases per year. Among the identified bacteria, only 6.5% were multidrug resistant for all our study time. Three highly resistant bacteria were identified in 2 children priorly treated in Romania and Tunisia: 2 Klebsiella pneumoniae producing Carbapenemase (KPC), 1 Enterococcus faecium resistant to glycopeptides. Interestingly, 35% of the BSI occurred in the less immunocompromised group. The other cases were evenly distributed between the 3 more severely immunocompromised groups.

Conclusion Our empirical initial broad-spectrum antimicrobial coverage is well adapted to the epidemiology of our bacterial agents and shortens hospitalisations. Furthermore, it is not associated with the emergence of antibiotic resistance patterns. The microbiological spectrum of incriminated bacteria is relatively stable over time and we do not observe the emergence of multidrug resistant gram-negative bacteria as well as the absence of vancomycin-resistant enterococci (VRE) in our tertiary center.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.141

P2-15
Selenium status and survival from colorectal cancer in the European prospective investigation of cancer and nutrition

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Introduction Suboptimal levels of selenium (Se) or selenoprotein P (SELENOP), which is an antioxidant protein that also distributes Se from the liver to target tissues, may contribute to risk of colorectal cancer (CRC) development, as we previously showed using serum samples taken pre-diagnostically in the European Prospective Investigation into Cancer and Nutrition (EPIC) cohort[1]. However, the relationship between Se and survival outcomes following cancer diagnosis is more uncertain. Here, we examined the association of Se status with mortality from CRC and overall mortality in the same study group.

Methods Se was measured by total reflection X-ray fluorescence and SELENOP by immunoluminometric sandwich assay. Multivariable-adjusted Cox proportional hazard models were used to calculate the hazard ratio (HR) and 95% confidence interval (CI) of the association between Se and SELENOP and CRC death and all-cause mortality.

Results Higher levels of Se showed non-significant inverse associations with reduction in both CRC and overall mortality: respective multivariable-adjusted HRs for the fifth quintile versus the first quintile (HRQ5 vs. Q1) were 0.76 (95% CI: 0.52–1.11, P trend = 0.10), and 0.82 (95% CI: 0.56–1.16, P trend = 0.14). Higher levels of SELENOP were also not associated with a statistically significant reduction in CRC mortality (HRQ5 vs. Q1 = 0.83, 95% CI: 0.57–1.19, P trend = 0.33). However, higher SELENOP concentrations were associated with a significant reduction in overall mortality (HRQ5 vs. Q1 = 0.70, 95% CI: 0.50–0.98, P trend = 0.05). Similar results were also obtained by tumour site and sex. Possible interactions of potential effect modifiers and sensitivity analyses showed no considerable change in these estimates, although CRC stage data sensitivity analyses were significant for the association between Se and overall mortality (HRQ5 vs. Q1 = 0.89, 95% CI: 0.80–0.99, P trend = 0.03).

Conclusions We found no major association of Se status markers with survival after CRC diagnosis, but an association of SELENOP with overall mortality. Detailed investigation of Se metabolism is needed to further explore relevance for CRC prognosis especially for individuals of suboptimal SELENOP status.

Keywords Selenium; Selenium status; Selenoprotein P; Colorectal neoplasm; Prospective cohort

Disclosure of interest L. Schomburg: link with: founder of selenOmed GmbH, a company involved in improving Se diagnostics. The other authors declare that they have no competing interest.

Reference


https://doi.org/10.1016/j.respe.2018.05.142
P2-16
Assessing the validity of self-reported breast cancer screening coverage in the Belgian Health Interview survey
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Introduction Worldwide, breast cancer is the leading cause of cancer-related deaths among females. In Belgium, it is the first female cancer in terms of incidence (more than a third of cancers) and the leading cause of premature death in women. Hence, reducing deaths through early diagnosis is an important objective for the health authorities. Screening for breast cancer is generally recognized as being effective in reducing mortality from this cancer. Studies have demonstrated the effectiveness of mammography screening for breast cancer, especially for women aged 50 to 69 years. According to the international guidelines, it is advisable to measure the proportion of the target population covered by screening. Due to the time and the costs related to medical records abstraction, information on breast cancer screening is often based on self-reports in population-sample surveys. Self-reported data may however be inaccurate due to recall errors and biases, impeding valid inference. The validity of self-report can be verified by comparing this information with a trusted measure or “gold standard” such as health insurance data. This study investigates first the validity of self-report information on breast cancer screening in the Belgian Health interview survey (BHIS), using the Belgian compulsory Health Insurance (HI) data as gold standard and second, the selection bias due to non-participation.

Methods Individual data of the Belgian Health Interview Survey 2008 (BHIS2008) were linked to HI data covering more than 99% of the population. Only women aged 50–69 years who responded to the question related to the breast cancer screening in the BHIS2008 “having had a mammogram in the last two years” were considered (n = 1009). This indicator measures the rate of eligible women undergoing mammography. In the HI data related to the same women, the fact that women had a reimbursement for a mammography within the last two years was used as golden standard. The breast cancer screening coverage rates from both data sources were compared. The sensitivity, specificity and predictive values of the self-reported indicator were estimated for which HI data served as golden standard. We also assessed the selection bias by comparing the screening coverage in the BHIS2008 sample with that of a completely random sample of HI data (representing 1/40 of the Belgian population).

Results Mammographic coverage rate in the BHIS2008 sample was estimated to be 73% through the self-reported information and 63% through the HI information. From the random sample, the coverage rate was 61.9%. The sensitivity of reporting a mammography was high (93.9%) while the specificity was moderate (62%) for whole Belgium. However, within the 37.9% of women reporting to have had a mammography in the past 2 years, but for which no confirmation could be found in the HI dataset, the almost the half (17%) had indeed undergone a mammography in the last 3 years. This is a typical “telescoping bias”, when people perceive events as being more recent than they actually were. The positive and negative predictive values were respectively 81% and 85%. The difference between HI and random sample coverage rates was small (1.5%), and there was not significant evidence of selection bias.

Conclusions The mammographic coverage rate in women aged 50–69 years is overestimated in the BHIS2008. This is in line with expectations since such information can be subject to social desirability and/or telescopic bias. There was almost no selection bias. Although the validity of breast cancer screening in the BHIS2008 is moderate, BHIS remains an added value for the breast cancer screening in the general population since it offers the opportunity to link with plenty of other parameters, like the health and the socioeconomic status as well as other health (preventive) behaviours.

Disclosure of interest The authors declare that they have no competing interest.
https://doi.org/10.1016/j.respe.2018.05.143

P2-17
Metabolomics and risk of kidney cancer
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Introduction Renal cell carcinoma (RCC) contributes significantly to the global cancer burden, annually accounting for over 140,000 deaths worldwide. Several lifestyle risk factors have been strongly implicated in RCC aetiology, notably obesity and hypertension, as well as other factors associated with the metabolic syndrome (MetS). While these factors appear to be implicated in RCC aetiology from an epidemiological point of view, the underlying causal pathways remain to be elucidated. Our aim was to identify metabolites associated with RCC risk in pre-diagnostic blood samples.

Methods A targeted metabolomic platform based on liquid chromatography tandem mass spectrometry (LC-MS; AbsoluteIDQ™ p180 kit from BIOCRATES), was used to quantify 145 metabolites in pre-diagnostic blood samples from 634 RCC case-control pairs from the European Prospective Investigation into Cancer and Nutrition (EPIC), and 140 case-control pairs from the Melbourne Collaborative Cohort study (MCCS). After excluding metabolites with more than 20% samples below the limit of detection or quantification, 127 metabolites were analysed in relation to RCC risk using conditional logistic regression. Metabolites associated with the risk of RCC in EPIC, after correction for multiple testing, were evaluated in MCCS. Further adjustment for body mass index (BMI), waist-to-hip ratio, alcohol and smoking was performed.

Results After multiple testing correction (P-value < 9.62 × 10⁻⁵), five metabolites were inversely associated with RCC risk in EPIC: 2 lysophosphatidylcholines (lysoPC), 2 phosphatidylcholines (PC), and the ratio of total lysoPC over total PC (an indicator of phospholipase activity). One amino-acid was positively associated with the risk of RCC. In MCCS, one of the PC replicated. Upon adjustment for BMI, waist-to-hip ratio, alcohol and smoking, the association of metabolites with risk of RCC in EPIC were attenuated for three of the six metabolites.

Conclusions Our study is the first to evaluate the association between metabolites measured in pre-diagnostic blood samples and risk of RCC. The results highlight glycerophospholipids as a group of metabolites that may be important in RCC aetiology, but their causal relevance remains to be confirmed.

Disclosure of interest The authors declare that they have no competing interest.
https://doi.org/10.1016/j.respe.2018.05.144

P2-18
Selective COX2 inhibitors, other NSAIDS, and influence of COX2 polymorphisms on breast cancer risk: Results from the CECILE study
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Background In the context of a possible role of chronic inflammation in cancer risk, our objective was to investigate breast cancer risk in relation to the use...
of selective COX2 inhibitors and other non-steroidal anti-inflammatory drugs (NSAIDs) including aspirin, and to explore interactions of NSAIDs with COX2 genetic polymorphisms.

Methods
We conducted a population-based case-control study in France on breast cancer risk factors. Data on NSAID use were obtained in 871 cases and 915 controls using a standardized questionnaire, and 7 single nucleotide polymorphisms in the COX2 gene were genotyped in 811 cases and 829 controls. Odds ratios (OR) and their 95% confidence intervals (CI) were calculated using unconditional logistic regression models.

Results
We found an inverse association between breast cancer and NSAID use (OR = 0.80, 95% CI: 0.66–0.97), which was stronger for COX2 selective inhibitors (OR = 0.55, 95% CI: 0.35–0.86). Associations were more pronounced in salicylate non-users and overweight women. The SNP rs5275 in COX2 genes was associated with breast cancer (P = 0.01) and a significant interaction between rs5275 and NSAID use was observed (P for interaction 0.02).

Conclusion
Our results confirm an inverse association between NSAID use and breast cancer and highlight the role of selective COX2 inhibitors. Polymorphisms of the COX2 gene may modify the risk of breast cancer associated with NSAID use.

Disclosure of interest
The authors declare that they have no competing interest.

Reference

P2-19
Impact of physical activity on fatigue and quality of life during and after adjuvant treatment for breast cancer
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Introduction
Although physical activity (PA) can alleviate fatigue and improve quality of life (QoL) in patients with breast cancer (BC), not all components of PA may have equal impact. The aim of this study was to examine the longitudinal impact of PA components on the evolution of fatigue and QoL during and after adjuvant treatment for BC.

Methods
We included women from the 2-year longitudinal FATSEIN study with 10 follow-up: 0, 1, 2, 4, 6, 7 and 8 months (adjuvant treatment period) and 12, 18 and 24 months (adjuvant post treatment period). Fatigue and QoL were measured by the Multidimensional Fatigue Inventory and EORTC QLQ-C30 questionnaire respectively. Fatigue and QoL scores have been normalized from 0 (low-level) to 100 (high-level). PA practice has been assessed by frequency (number/week), duration (minutes/session) and intensity (low, moderate or vigorous) of PA. Group-based trajectory analysis was used to determine patterns of PA components evolutions. The selection of the optimal models was based on the Bayesian information criterion maximization, the proportion of patients in each trajectory group (> 5%), the statistical significance of the equation modeled and the clinical relevance of trajectories identified. Cross-sectional and longitudinal association between PA patterns and fatigue and QoL were analyzed by multivariable linear regression and a mixed model for repeated measures, respectively.

Results
Among 424 women included (mean age 57.1 ± 10.4 years), two trajectories were identified for each of the three PA components: “low and insufficient frequency” (51.2%, ≤ 1 day/week) and “regular and moderate frequency” (48.8%, 3 days/week), “low and insufficient duration” (47.6%, 8.4 minutes/session) and “regular and moderate duration” (52.4%, 56.2 minutes/session), and “low intensity” (47.2%, 0.33 metabolic equivalent of task (MET)) and “low to moderate intensity” (52.8%, 3.14 MET). Overall, during adjuvant treatment (chemotherapy and/or radiotherapy and/or hormone-therapy), fatigue increased and QoL decreased, and the reverse was observed after adjuvant treatment. The impact of PA on evolution of fatigue and QoL varied depending on PA component. During treatment, increased fatigue and decreased QoL was limited by regular PA frequency (β = − 8.71; 95% confidence interval (CI) [− 17.34; − 0.18] for total fatigue, β = 1.28; 95% CI [1.26; 24.30] for role function), but results were less significant after treatment.

Conclusions
PA, especially its frequency, is an important determinant of fatigue and QoL during adjuvant treatment for BC. Promoting regular PA among women undergoing treatment for BC may be an effective way to reduce fatigue and improve QoL. This work had led to an article published in the Journal of the Cancer journal [1].

Disclosure of interest
The authors declare that they have no competing interest.

P2-20
Circadian genes and prostate cancer risk: Results from the EPICAP study
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Background
Night work has been associated with cancer risk, including prostate cancer, in several studies. It has been suggested that disruption of circadian rhythm, induced by night work, may play a role in carcinogenesis. Indeed, circadian rhythms regulate several physiological functions and genes controlling the circadian rhythm were found to regulate cell proliferation, cell cycle and apoptosis. Very few studies have investigated the role of those circadian genes in prostate cancer occurrence. This study aims to analyze the association between circadian genes polymorphisms and prostate cancer risk based on data from the EPICAP study.

Methods
EPICAP is a French population-based case-control study including 819 incident prostate cancer cases and 879 controls frequency matched for age, among which 777 cases and 823 controls provided blood or saliva sample, allowing the constitution of a DNA bank. Blood and saliva samples were used for DNA extractions and genotyping using the Infinium® Oncosarray-500 K BeadChip (Illumina). This chip contains 276,000 single nucleotide polymorphisms (SNPs) assuring a genome-wide coverage and was completed by 234,000 SNPs selected for their potential relevance to the most common cancers including prostate cancer. Overall, the EPICAP genetic database included 1515 subjects (732 cases/783 controls) and 447,896 SNPs that passed stringent quality controls. For the purpose of this study, 31 circadian clock genes including 872 SNPs with a minor allele frequency (MAF) greater than 0.01 were selected. Genes from the circadian pathway was additionally divided into 2 sub-pathways: the well-established core-circadian genes that include 9 genes (CLOCK, NPAS2, ARNTL, Csnk1E, Cry1, Cry2, Per1, Per2, and Per3) and the other 22 genes. Odds ratios (ORs) for association between prostate cancer and each SNP were estimated using unconditional logistic regression assuming a log-additive model. We also used a gene-based and pathway-based approach such as the Adaptive Rank-Truncated Product (ARTP) method which combines association signals from the SNPs in a given gene (or from the genes in a pathway) to provide a P-value at the gene (or pathway level). Separate analyses were conducted by prostate cancer aggressiveness according to the Gleason score (low or intermediate score ≤ 7 [including 3 + 4], high score > 7 [including 4 + 3]).

Results
No SNP was significantly associated to prostate cancer after correction for multiple testing using the false discovery rate (FDR) method. At the gene level, we reported 2 genes significantly associated to prostate cancer: NPAS2 (P = 0.046) and PER1 (P = 0.046). The whole circadian pathway was significantly associated to prostate cancer (P = 0.023) and this association was mainly supported by the circadian core-genes sub-pathway (P = 0.0002).
Predictive factors of failure of BCG therapy in high-level superficial bladder tumors

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Introduction High-grade bladder tumors are superficial, poorly differentiated, they are characterized by their architectural disorganization and marked cytologic abnormalities. The treatment of superficial tumors of the bladder has a twofold objective: the first one is to reduce the frequency of local recurrences and, on the second one is to prevent progression towards muscular infiltration. Hence, the indication of the adjuvant treatment to the transurethral resection of the bladder. The purpose of our work is to study the predictive factors for the failure of intravesical BCG instillations in the management of these tumors. Failure was defined by the progression or recurrence of superficial high-grade bladder tumors.

Material and method We undertook in this work a retrospective descriptive study, including 80 patients who were treated in the urology department “A” at the RABAT CHU for high-grade urothelial carcinoma PTa and PT1 between January 2010 and June 2013. Rates of recurrence, progression after BCG therapy were studied. The prognostic factors associated with this type of tumor were then sought after by Cox regression. The overall average decline in the study was 50 months or about 4.5 years.

Results The patients were 71 men and 9 women. The average age of our patients was 58 years old with extremes ranging from 25 to 71 years old. Of the 100 patients in the study, 66 (66%) were classified T1G3 from the outset, while 34 were classified T1G3 during a recurrence (T1G3 secondary). Initial treatment consisted of deep and complete transurethral resection (RTU) in all patients. Follow-up of a BCG protocol therapy in 56 patients, among 56 (56%) patients who received BCG therapy 15 (26%) recidivated including 5 in progression, for another 44 (44%) patient group 30 (68%) recidivated, 12 of which were under progression. In univariate analysis, the significantly identified risk factors for recurrence were: tumor size > 5 cm (P=0.01), multifocality of lesions and the lack of the adjutant treatment to the transurethral resection of the bladder (P=0.001) including BCG therapy. In multi-varied analysis, the significantly identified risk factors for progression and recurrence were: the presence of carcinoma in situ and the failure of BCG therapy (P=0.001). The primary or secondary character of the tumor was not significant (P=0.4). Thus, the difference in overall survival as a function of the initial or secondary status of T1G3 tumors was not significant when the other prognostic factors were taken into consideration.

Conclusion The results of this retrospective study suggest that T1G3 tumors can be safely controlled by the RTU + BCG combination. These results justify a good deep resection followed by a second resection at 6-week intervals and intravesical BCG instillations. This study also identifies T1G3 patients at high-risk of recurrence and progression and requires close monitoring.

Disclosure of interest The authors declare that they have no competing interest.

Determinants of precancerous cervical lesions: A case-control study

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Introduction Development of cervical cancer is almost preceded by cervical precancerous lesion. Lesions evolutions may happen by regression or aggravation. These evolutions are closely related to human papillomavirus (HPV) infection and other determinants. Our objective was to describe the determinants.
distribution of the cervical cancer according to presence or absence of cervical precancerous lesion in Morocco.

Methods The population of our study was nested in a control population of a national case-control study on cervical cancer [1]. 108 women were selected (27 cervical precancerous lesion cases and 81 controls). The controls were selected using an individual age-matching (± 2 years). The population was included between November 2009 April 2012 in different centers of Morocco: in primary healthcare centers (in Rabat, Casa and Fes) and in gynecological public hospital (in Rabat). The target population was represented by all women’s outpatient consultants for pathologies others than gynecological pathologies (gynecological infection, menstruation disorders, etc.) as well as women consultants in the context of pregnancy monitoring. The women benefited from a gynecological examination with sampling for the cervical vaginal smear and for genotype of HPV. Data were collected by a questionnaire that included socio-demographic characteristics, sexual behaviours, reproductive and contraceptive history and history of sexually transmitted diseases.

Results The mean age of cases was 54.5 ± 11.2 years while the age of controls was 55.0 ± 10.6 (P = 0.8). The lesions type in the study was distributed as follows: 51.9% were low cervical precancerous lesion, 25.9% were atypical squamous cells of Undetermined Significance (ASC-US), 14.8% were malpiginian cell atypia of undermined significance and 4.7% were atypical Squamous Cell evocating High-grade lesion (ASC-H). The HPV infection was positive for 11.1% cases against 13.5% for controls (the oncogenic HPV infection was identified for 11.1% of the cases against 4.9% for the controls). The multiple HPV infection was detected for the three cases while the controls had one multiple infection and eleven single infection (63.6% with HPV 33 and 27.3% with HPV 16). Most cases and controls were married (76.0%, 61.7%, respectively); 66.7% of cases were illiterate against 61.5% of controls. Concerning the reproductive characteristics 52.4% of cases had an age of menarche ≤ 12 against 40.5% of controls and 47.2% of cases had an age of menarche > 12 against 59.4% of controls. Sixty-three percent of cases used the oral contraceptives against 52.5% of controls. The duration of uses of oral contraceptives was < 6 years for 66.7% of cases against 41% of controls and 33% of cases had duration of uses of oral contraceptives ≥ 6 against 59% of controls. Most cases and controls had one sexual partner (88.5%, 89.3%, respectively) and only 11.5% of cases had number of lifetime sexual partner’s ≥ 2 against 10.7% of controls. The husband number of sexual partners was equal to one partner for 73.1% cases against 77% of controls and more than one partner for 26.9% of cases against 23% of controls. Only 14.8% of cases had sexual intercourses during menstruation against 7.6% of controls. They were no sexual transmitted infection for cases population against two controls who claimed that they had a sexual transmitted infection in their life.

Conclusion Only 11.1% of women with cervical precancerous lesion HPV had a positive HPV infection, while some controls had an infection with oncogenic HPV type. These results raise the importance of looking for other factors associated to appearance and/or development of cervical precancerous lesion which will be the subject of our future research work.

Keywords Pre cancerous lesions; HPV; Morocco

Disclosure of interest The authors declare that they have no competing interest.

Reference

https://doi.org/10.1016/j.respe.2018.05.152

P2-26 Oral contraceptive use and cutaneous melanoma risk: A French prospective cohort study

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Introduction Evidence suggests that cutaneous melanoma, the most lethal form of skin cancer, may be influenced by sex hormones. Oral hormones are the leading contraception method in industrialized countries and represent a significant source of exogenous hormone use. Several studies reported a positive association between oral contraceptive (OC) use and melanoma risk. However, findings were conflicting and data from large prospective studies are lacking. Our aim was to explore the associations between OC use and melanoma risk in women.

Methods E3 N is a prospective cohort of 98,995 French women aged 40–65 years at inclusion in 1990. Use of oral hormones for contraception was collected through a self-administered questionnaire at baseline, and detailed information on lifetime use of OCs was then recorded every 2–3 years from 1992. We computed hazard ratios (HRs) and 95% Confidence Intervals (CIs) using Cox regression models adjusted for age, birth cohort, pigmentation traits, residential UV exposure in county of birth and at inclusion, and family history of skin cancer. We stratified the results according to melanoma site and histological type using competing-risk models. To examine potential confounding by sun exposure, we used data from E3N-SunExp, a nested case-control study in which a specific questionnaire on lifetime residential and recreational UV exposures was sent to all incident skin cancer cases and 3 controls per case (matched on age, county of birth, education, and length of follow-up in the cohort) in 2008. Analyses in the sub-cohort were performed through logistic regression modelling.

Results Between 1992 and 2008, 539 melanoma cases were ascertained among 79,365 women. In age-adjusted models, there was a modest association between ever use of OCs and melanoma risk (HR = 1.18, 95% CI = 0.98–1.42), which was reduced after full adjustment (HR = 1.14, 95% CI = 0.95–1.38). The association was stronger in long-term users (HR = 1.33, 95% CI = 1.00–1.75 for a number of lifetime sexual partner’s ≥ 6 against 59% of controls. Most cases and controls had one partner (88.5%, 89.3%, respectively) and only 11.5% of cases had number of lifetime sexual partner’s ≥ 2 against 10.7% of controls. The husband of controls. The husband number of sexual partners was equal to one partner for 73.1% cases against 77% of controls and more than one partner for 26.9% of cases against 23% of controls. Only 14.8% of cases had sexual intercourses during menstruation against 7.6% of controls. They were no sexual transmitted infection for cases population against two controls who claimed that they had a sexual transmitted infection in their life.

Conclusion Only 11.1% of women with cervical precancerous lesion HPV had a positive HPV infection, while some controls had an infection with oncogenic HPV type. These results raise the importance of looking for other factors associated to appearance and/or development of cervical precancerous lesion which will be the subject of our future research work.

Keywords Precancerous lesions; HPV; Morocco

Disclosure of interest The authors declare that they have no competing interest.

Reference

https://doi.org/10.1016/j.respe.2018.05.152
P2-27
Proportion of cancers attributable to major lifestyle and environmental risk factors in the Eastern Mediterranean region
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Introduction Many countries in the Eastern Mediterranean region (EMR) are undergoing marked demographic and socioeconomic transitions. Cancer increasingly becomes a major contributing cause of morbidity and mortality. Primary prevention through lifestyle and environmental changes offers a large potential for reducing this burden. The aim of the study was to estimate the cancer burden attributable to major lifestyle and environmental risk factors.
Methods We used age-, sex-, and cancer-specific incidence data from GLOBOCAN 2012. Risk factors being considered were smoking, alcohol, high body mass index (BMI), insufficient physical activity, diet (salt, red meat, processed meat, fruit, and vegetables consumption), suboptimal breastfeeding, infections, and air pollution. Prevalence of these risk factors came from different sources including international literature, World Health Organisation, NCD-RisC, or the Food and Agriculture Organization. Based on the prevalence of the selected risk factors and the relative risks obtained from meta-analyses, we estimated sex-specific population-attributable fractions (PAF) in the 22 countries of the Eastern Mediterranean region.
Results We estimated that about 43% (or 210,000 cases) of all new cancer cases in adults aged 30 years and older in 2012 were attributable to the selected eight potentially modifiable risk factors. In terms of risk factors, the highest PAF was estimated for infections (15.3%), followed by smoking 14.9% among men. In women, the highest PAF was estimated for insufficient physical activity (23.1%), followed by infections (12.2%). The EMR is culturally and economically heterogeneous region and the estimated PAF therefore varied greatly by country. The overall PAF ranged from 26.6% in Djibouti to 53.0% in Tunisia among men and from 38.3% in United Arab Emirates to 51.0% in Lebanon among women. In terms of risk factors, the highest PAFs for some risk factors were observed in Tunisia (36.0%) for smoking, in Egypt (5.8%) for high BMI, in Qatar (9.3%) for insufficient physical activity, in Afghanistan (24.8%) for diet, in Egypt (29.3%) for infections, and in Bahrain (3.4%) for PM2.5 among men. Among women, the highest PAFs were estimated in Lebanon (5.2%) for smoking, in Kuwait (9.9%) for high BMI, in Kuwait (34.4%) for insufficient physical activity, in Afghanistan (12.1%) for diet, in Lebanon (4.1%) for suboptimal breastfeeding, in Somalia (27.6%) for infections, and in Bahrain (1.1%) for PM2.5.
Conclusions Reduction in exposure to major lifestyle and environmental risk factors may potentially prevent a substantial number of cancer cases. Although the contribution of the risk factors varied greatly between countries, strategies tackling smoking, programmes promoting healthy diet and physical activity, and policies controlling infections in the population would largely reduce the cancer burden in the EMR.
Disclosure of interest The authors declare that they have no competing interest.
https://doi.org/10.1016/j.respe.2018.05.154

P2-28
Genome-wide association study to discover susceptible loci for gastric cancer in Korean population
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Introduction Several genetic variants for gastric cancer have been reported, however further study to find more novel genetic markers are still needed. This study was conducted to discover candidate single nucleotide polymorphisms (SNPs) for gastric cancer in Korean population.
Methods We conducted a genome-wide-association study (GWAS) with 551,842 SNPs in 803 gastric cancer cases and 3675 controls from the Korea Biobank Project (KBP). Regional association plots of candidate SNPs were generated and linkage disequilibrium (LD) correlation coefficient values (r²) between candidate SNPs and other SNPs were also calculated.
Result We discovered a total of thirty-eight candidate SNPs, which are associated with gastric cancer. Among 38 candidate SNPs, a SNP (rs13361707; P = 1.95 × 10−10) is located in the PRKAA1 gene and another SNP (rs11125033; P = 2.08 × 10−8) is located in the PRKCE gene. These two genes (PRKAA1 and PRKCE) were previously reported to be associated with gastric cancer and gastrointestinal or gastric ulcer, respectively. We also found that three genetic variants having strong LD (r² > 0.8) with rs13361707. One of these three SNPs was also significantly associated gastric cancer risk (rs1345778 in PTGER4; P = 8.00 × 10−8).
Conclusion This study suggests gastric cancer susceptibility loci represented by rs13361707 in PRKAA1, rs11125033 in PRKCE, and rs1345778 in PTGER4 in Korean population. Fine mapping around these potential SNPs in PRKAA1, PRKCE, and PTGER4 gene may help to confirm suggestive genetic variants for gastric cancer.
Keywords Genome-wide association study; Stomach neoplasms; Cohort; Prevention
Disclosure of interest The authors declare that they have no competing interest.
https://doi.org/10.1016/j.respe.2018.05.155

P2-29
Implementation of a program based on adapted physical activity and recommendations for second cancers prevention for adolescents and young adults with cancer
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Introduction Around 700 adolescents and young adults aged from 15 to 25 years old (AYAs) are diagnosed each year with cancer in the French Auvergne-Rhône-Alpes region. While long-term survival is about 80%, they are six times more likely to develop a second primary cancer (SPC) compared to their peers. This risk is multifactorial and depends on the type of first cancer, the treatment received and the prevalence of risk factors (smoking, overweight, sedentary lifestyle, environmental exposures, …).
Objectives This project aims to implement a clinical program based on adapted physical activity and cancer prevention recommendations for AYAs with cancer.
Methods Patients attended adapted physical activity sessions during the active treatment period (4–6 months). They were given questionnaires about physical activity (IPAQ) and quality of life (QLQ-C30) at baseline (T1) and at the end of treatment (T2). They participated to individual information meetings on SPC prevention (T3), and responded to a final QoL questionnaire by phone 1 year after T1 (T4).
Results So far, 63 AYAs (39 boys, 24 girls; median age = 19 [15–25]) have been included and completed T1 and T2. On average, they participated in 4 supervised sessions at the hospital and 16 unsupervised sessions at home during 3.5 months [2–6]. Preliminary results indicate an increase in the level of physical activity between T1 360 MET-min/week [0–2373] and T2 1059 MET-min/week [0–9690] and an increase in the six-minute walk test from T1 391 m [205–714] to T2 464 m [305–690]. Sedentary time seems to decrease on average from 53.3 h/week [10–100] at T1 to 37.5 h/week [7–73] at T2. Currently, 37 AYAs have completed the T3 assessment and were highly satisfied with the program.
Acknowledgement This work was provided with bioresources from National Biobank of Korea, the centers for Disease Control and Prevention, Republic of Korea and supported by the National Research Foundation of Korea (NRF) grant funded by the Korean government (MSIP) (No. NRF-2016R1A2B4014552).
https://doi.org/10.1016/j.respe.2018.05.155
Socioeconomic status and breast cancer in Lithuania

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Introduction
In Lithuania, breast cancer (BC) is the most common non-malignant cancer and the most common cancer death among women. The aim of this study was to determine the influence of SES on female BC incidence, mortality and survival during the period 2001–2009, using population-based census-linked registry data covering the entire population of Lithuania.

Methods
The study was based on a census-linked dataset which is based on the linkage of all cancer cases from the Lithuanian Cancer Registry (cancer incidence) and all deaths and emigration records from the Statistics Lithuania for the period 6 April 2001–31 December 2009 to the 2001 population census records at the beginning of the follow-up period (6 April 2001). Emigration records were needed in order to estimate population exposures under risk. The population under study included all of the permanent residents of Lithuania aged 30–74 years on the census day (6 April 2001). Information about urban-rural place of residence and education was taken from census records. Education was classified according to three broad categories of completed education: higher education (at least 14 years of schooling), secondary education (10–13 years of schooling), and lower than secondary education (up to 9 years of schooling). Incidence rate ratios (IRR) and mortality rate ratios (MRR) by education and urban-rural residence were estimated by means of multivariable Poisson regression models controlling for age and using higher education and urban place of residence as reference categories using higher education and urban as a reference category. In order to calculate relative survival rates, life tables for the general population by each educational category and each place of residence were calculated using the same census-linked dataset (cumulative five-year survival rates for the period 2001–2009 were estimated). The expected survival estimates were derived using the Ederer II method. STATA statistical software was used to calculate relative survival and avoidable deaths.

Results
IRRs showed substantial and statistically significant inverse effects of education and place of residence. The lowest risk of BC was observed in the group of women with lower than secondary education (0.63 times, CI: 0.59–0.67) and in rural areas (0.77 times, CI: 0.73–0.80). Statistically significant lower risk was also observed in the secondary education group (0.80 times, CI: 0.76–0.84), as compared to the higher education. Mortality rate ratios also showed a statistically significant inverse educational mortality gradient. The lowest MRRs were in women with lower than secondary education (0.87 times, CI: 0.79–0.96). There were no significant differences in MRRs by place of residence. We found the same inverse gradient in BC survival, with the worst survival indicators in the lower than secondary education group. Survival rates were significantly decreasing with decreasing education. Five-year relative survival in the higher education group was 80.2%. The absolute difference in survival rates between the highest and the lowest educational groups was 15.3%. The study found a moderate disadvantage in survival among rural women. The same gradient was observed by place of residence too.

Conclusions
The higher risk of BC in the highest SES in Lithuania corresponds to the results from other countries. For BC, the risk gradient may be explained by other well-established breast cancer risk factors such as postpone-ment of childbearing and low parity which are also more common among females with high SES in Lithuania. Higher SES women are also more likely to obtain routine mammography screening due to better access to preventive healthcare, thereby increasing the detection of breast cancer in this group. SES differences in access to healthcare, modern treatment, as well as inequalities in time of diagnosis may explain the observed differences in BC survival.

Disclosure of interest
The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.156

P2-32
Barriers and facilitators related to adherence in cervical cancer screening among women living in the French Island of Reunion: A cross-sectional study

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Introduction
Reunion Island is a French overseas region located in the Indian Ocean, with a multietnic and multireligious population of about 850,000 inhabitants. Reunion Island is affected by large social inequalities and geographical disparities. Cervical cancer incidence and mortality rate are significantly higher than in mainland France. Furthermore, cervical cancer screening (CCS) coverage by Pap smear is rather low.

Objectives
The aims of this study were. Primary objective: to describe socio-demographic, financial and logistical barriers to and potential facilitators for CCS. Secondary objective: to determine factors associated with non-participation to CCS during the past three years.

Methods
During the year 2017, a cross-sectional phone survey was conducted on a representative sample of 1000 women aged 25–65 years living in Reunion Island. Demographic and socioeconomic characteristics, healthcare use, health literacy, ethnicity, and knowledge, attitudes, beliefs and practices (KABP) concerning prevention and screening were collected by a standardized KABP questionnaire. Logistic regression models were used to determine the association between these factors and adherence to CCS.

Results
Twelve percent of the women declared not having had a CCS in the past 3 years. The main individual barriers reported by these women were psychosocial (50%): lack of information and knowledge about cervical cancer and its screening, a low perceived susceptibility to cancer, no perceived benefit of screening, embarrassment about the test and fear of the results. Omission (27%), logistic barriers (23%), and lack of time were also mentioned. The most important structural facilitators for screening included the opportunity to have access to a specific preventive consultation close to the place of residence (74%), and paper or call reminders (69%). Moreover, 67% requested more information about CCS from physicians, and 63% were favorable to Human Papilloma Virus self-collected testing. Women aged over 55 (adjOR: 2.02, 95% CI: 1.09–3.73), having had no primary care physician visit in the past 12 months (adjOR: 3.19, 95% CI: 1.75–5.84), with a low literacy level (adjOR: 3.11, 95% CI: 1.99–4.88), with a low medical insurance coverage (adjOR: 1.93, 95% CI: 1.18–3.14), having low incomes (adjOR: 1.81, 95% CI: 1.02–3.22) and with a low-level of knowledge (adjOR: 1.13, 95% CI: 1.03–1.21) were more likely to not attend CCS.

Discussion
In order to increase the rate of CCS among women in Reunion Island, awareness campaigns and screening programs should pay special attention to vulnerable populations.

Disclosure of interest
The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.159
P2-33
Occupational exposure to organic solvents and risk of breast cancer: Results of the CECILE study, a population-based case-control study in France
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Introduction Breast cancer is the leading cause of cancer death in women worldwide. Its incidence is only partially explained by well-established risk factors related to hormones and reproduction. It has been suggested that exposure to organic solvents in the workplace may play a role in the etiology of breast cancer, but epidemiological studies on these occupational exposures in female breast cancer did not assess exposure to specific solvents and reported inconsistent results.

Methods We examined the risk of breast cancer-related to lifetime exposure to organic solvents in a large population-based case-control study carried out in France between 2005 and 2008; 1230 women newly diagnosed for a breast cancer and 1315 population controls were included. A standardized questionnaire was administered during in-person interviews by trained interviewers to obtain information on socio-demographic characteristics, medical and family history, anthropometric measurements, reproductive history, tobacco and alcohol consumption, diet, and lifetime occupational history. All jobs held during occupational history were coded using the International Standard Classification of Occupations (ISCO 1968) and the Classification of Activities in the European Community (NACE 1991). Exposure to chlorinated (n = 4), petroleum (n = 5) and oxygenated (n = 5) solvents was assessed using a detailed job-exposure matrix (JEM) developed by the French National Agency for Public Health. Each job held was assigned indices of exposure probability, frequency and intensity. A Cumulative Exposure Score (CES) was calculated for each subject as the sum of the products of exposure probability, frequency and intensity, and duration for each job held over the entire occupational life. Odds ratio (ORs) and their 95% confidence intervals (95% CI) were estimated using unconditional logistic regression adjusting for potential confounders.

Results The highest lifetime exposure prevalence was found for alcoholic solvents (41.8% of the cases and 41.4% of the controls); white spirit (8.3% of the cases and 10.2% of the controls); and trichloroethylene (10.7% of the cases and 11.8% of the controls). Compared to non-exposed subjects, women in the highest cumulative exposure quartile for alcoholic solvents had an OR of 1.17 (95% CI = 0.90–1.52). This OR increased to 1.61 (95% CI = 1.06–2.46) in premenopausal women. Exposure to ethylene glycol was also associated with an increased OR of 1.36 (95% CI = 0.93–1.97) in premenopausal women. No association was observed for other oxygenated solvents, petroleum solvents or chlorinated solvents.

Conclusions These findings suggest a role of occupational exposure to oxygenated solvents, notably to alcohols, in the occurrence of breast cancer. Further studies conducted in cohorts of women with high prevalence of exposure to solvents are needed to confirm this results.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.160

P2-34
Cancer in children and adolescents with AIDS in the city of São Paulo: A population-based linkage study
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Introduction Previous studies revealed an elevated risk of cancer in children and adolescents with AIDS. However, there is limited population-based data from developing countries. The objective of the present study was to describe the cancer spectrum in children and adolescents with AIDS in the City of São Paulo from 1997 to 2012.

Methods It is a population-based registry linkage study using the databases of the Population-based Cancer Registry of São Paulo (1997–2012) and of the Sistema de Informação de Agravos de Notificação (SINAN)/Information System on Disease Notification (1984–2013). Children and adolescents with AIDS and cancer have been identified by means of a probabilistic record linkage process between the aforementioned databases.

We calculated crude and age-standardized incidence rates (world standard population, 0–19 years) per million. To assess trends, we calculated the annual percent change (APC) and its 95% confidence intervals (95% CI) using Joinpoint software. To compare risk of cancer in children with AIDS to that of the general pediatric population of São Paulo, we estimated the standardized incidence ratio (SIR) and respective 95% CIs. Analysis were stratified by AIDS-defining cancers (ADCs) and non-AIDS-defining cancers (NADCs).

Results We identified 24 cases of cancer in patients with AIDS aged < 20 years. Most patients were boys (15; 62.5%) and the transmission of HIV was vertical (14; 58.3%), followed by homosexual (3; 12.5%) and intravenous drug use (3; 12.5%). The median ages at AIDS and cancer diagnosis were 8.9 and 12.7 years, respectively. The majority of cancers were ADCs (15; 62.5%). Non-Hodgkin lymphoma (NHL) accounted for 37.5% of all cases (n = 9). Three cases (12.5%) of Burkitt lymphoma (BL) and three of Kaposi sarcoma (KS) were also found in this population. Among NADCs, Hodgkin lymphoma (HL) was the most frequent cancer type (6; 25.0%). Other cancers found in this population were: acute myeloid leukemia (1; 4.2%), ovarian cancer (1; 4.2%) and unspecified primary site (1; 4.2%). The trend analyses revealed a significant reduction in the incidence of all cancers (APC = −14.5; 95% CI = −22.9–−5.2), driven by the decrease in the incidence of ADCs (APC = −17.0; 95% CI = −24.3–−8.9). A steep decrease was observed for KS (APC = −70.8; 95% CI = −81.2–−54.3). As for all NHL (including BL) decreasing trends were also identified (APC = −12.7; 95% CI = −20.9–−3.7). The incidence of NADCs remained stable in this period. The overall risk for cancer was significantly increased (SIR = 3.9; 95% CI = 2.6–5.8), as a reflex of the elevated risk for ADCs (SIR = 27.8; 95% CI = 16.7–46.1). Risk was significantly higher for NHL (SIR = 22.5; 95% CI = 11.7–43.2), BL (SIR = 29.7; 95% CI = 9.6–92.1) and HL (SIR = 18.7; 8.4–41.6).

Conclusion To our knowledge, this is the first population-based study to describe cancer spectrum in children and adolescents with AIDS in Brazil. ADCs still account for an important share of cancer cases in this pediatric population. Between 1997 and 2012, there has been a reduction in the incidence of all cancers, driven by the decrease in the incidence of ADCs because of wide use of antiretroviral therapy. The finding of the present study is in line with previous research conducted in the United States, Spain and Italy. However, children and adolescents with AIDSremain at increased risk for developing ADCs as well as HL in comparison to the general population.
P2-35
Is there link between occupational physical activity levels and lung cancer? A case-control study in Canadian men
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Background/Aim Many studies have looked at the association between daily physical activity levels and risk of lung cancer, but very little research has been conducted where occupational physical activity (OPA) levels are isolated from recreational physical activity levels. As Canadian jobs are becoming increasingly sedentary, and Canadians spend roughly 50% of their waking day at work, this is a concern. The purpose of this study was to determine whether a link exists between occupational physical activity levels and risk of lung cancer in Canadian men.

Methods This study used National Enhanced Cancer Surveillance System (NECSS) data, a questionnaire-based case-control study conducted across eight Canadian provinces between 1994 and 1997. Cases of lung cancer were identified using provincial cancer registries and controls were selected from a random sample from the same province and with a similar age and sex distribution as that of the cancer cases. Occupational physical activity levels were defined by the Canadian Classification and Dictionary of Occupations (CCDO), which includes ancillary information on occupational physical activity scores in categories of sedentary, light, moderate, heavy, and very heavy physical activity. Analysis was conducted using last job held. Basic descriptive statistics were calculated to compare cases and controls as part of a preliminary analysis. SAS software was used to fit categorical linear models to the response frequencies.

Results The NECSS data includes information on 1682 male lung cancer cases and 2054 male controls. For analysis purposes very heavy OPA and heavy OPA were combined due to small sample sizes. Overall, workers fell into four categories; heavy OPA (16%), moderate OPA (35%), light OPA (31%), and sedentary OPA (17%). The remaining 1% of workers had unknown OPA and were excluded from further analysis. Further stratification for smoking status showed similar distributions across OPA categories. Of cases who never smoked, 2% worked heavy OPA jobs, 1% worked moderate OPA jobs, 3% worked light OPA jobs, and 3% worked sedentary OPA jobs. Of cases who are ex-smokers 80% worked heavy OPA jobs, 80% worked moderate OPA jobs, 80% worked light OPA jobs, and 83% worked sedentary OPA jobs. Of cases who currently smoke, 18% worked heavy OPA jobs, 19% worked moderate OPA jobs, 17% worked light OPA jobs, and 14% worked sedentary OPA jobs. A main effects model yielded statistically significant results for OPA (P < 0.0001) and smoking category (P < 0.0001). Parameter estimates show an 11% reduction in log odds of developing lung cancer for heavy OPA workers (P < 0.0506) and 33% increase in log odds of developing lung cancer for heavy OPA workers (P < 0.0001), compared to sedentary OPA workers. Parameter estimates for moderate OPA category did not yield statistically significant results.

Conclusion We found some evidence that occupational physical activity levels are associated with an increased risk of lung cancer among Canadian males. Further analyses should consider other covariates and modelling interactions.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.161
The risk of cancer attributable to diagnostic medical radiation: Estimation for France in 2015

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Introduction Although diagnostic medical ionizing radiation (IR) has clear clinical benefits, it is also an established carcinogen. Although the individual IR dose usually delivered from medical diagnostic procedures is small, the number of people undergoing these procedures is large. In France exposure to diagnostic medical IR represented 35% of the French total non-therapeutic IR exposure, being one of the highest exposures to diagnostic medical IR in Europe. This study quantifies the number of new cancer cases in France in 2015 attributable to lifetime IR exposure from medical imaging procedures.

Methods The cancer incidence attributable to medical diagnostic IR was estimated using cumulative exposure, risk of cancer for a given dose, and cancer incidence by site. We used national frequencies of medical diagnostic examinations by sex and age reported in 2007 to estimate the lifetime cumulative organ dose exposure adjusted for changes in use of diagnostic procedures over time. The Biological Effects of Ionizing Radiation (BEIR) VII risk models were used to estimate the excess cancer risk due to IR; alongside we used cancer incidence data from the French Cancer Registries Network, FRANCIM. A minimum latency period of 10 years was assumed. Exposures from both external (X-rays, CT scans and interventional radiology) and internal sources (nuclear medicine) were considered.

Results Of the 346,000 estimated new cancer cases in adults in France in 2015, 2100 cases (800 among men and 1300 among women) were attributable to diagnostic IR from external sources, representing 0.6% of all new cancer cases (0.4% for men and 0.8% for women). Furthermore, 220 new cancer cases, representing 0.1% of all cases, were attributable to diagnostic IR from internal sources. Overall, the leading cancers attributable to diagnostic medical IR in France were female breast (n = 560 cases), lung cancers (n = 500), colon (n = 290) and bladder (n = 250) cancers. In the sensitivity analyses, we found that the largest differences with the main model were observed when changing the dose-rate effectiveness. Assuming an over- or under-estimation of the dose by 30% also modified the attributable fraction. Using the UNSCEAR model instead of the BEIR VII model increased attributable fraction for all nine considered cancer sites.

Conclusion The contribution of diagnostic medical IR to the cancer burden in France is small compared to other risk factors, and the benefits largely outweigh its harms quantified here. However, some of these IR-associated cancer cases may be preventable through dose optimization and more enhanced justification thorough diagnostic examination.

Disclosure of interest The authors declare that they have no competing interest.

Prevalence of high-risk viral genotypes according to vaccination coverage by the quadrivalent and new nine valent HPV vaccines, and their association and impact on the risk of high-grade lesions

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Background The new nine-Valent human papillomavirus (HPV) vaccines includes the four HPV genotypes (6, 11, 16 and 18) targeted by the quadrivalent HPV vaccine, plus five additional oncogenic types (31, 33, 45, 52, and 58), and potentially increases the overall prevention of cervical cancer.

Objective To determine the prevalence of high-risk viral genotypes according to the protection offered by the actual HPV vaccines, and their association and potential impact on the incidence of high-grade lesions.

Methods Cross-sectional study. A total of 595 consecutive women in whom HPV infection had been detected in a cervical smear during routine gynaecological health checks were included. Smeared results were classified using the Bethesda system. HPV genotyping was performed using Linear Array HPV genotyping test and they were classified according to the International Agency for Research on Cancer assessment of the carcinogenicity of different HPV types. Odds ratios (OR) with their 95% confidence intervals (95% CI) were estimated by logistic regression, adjusting for age and immigrant status. Prevented fraction among the exposed (PFe-adjusted) was determined as a measure of impact.

Results At least one of the additional five high-risk HPV genotypes present in the nine-Valent HPV vaccine was detected in 37.66% of women. After excluding women with genotype 16 and/or 18 co-infection, high-risk genotypes (31, 33, 45, 52, 58) were associated with a higher risk of intraepithelial lesion or malignancy: adjusted OR: 3.51 (95% CI: 1.29–9.56), PFe-adjusted 0.72 (95% CI: 0.22–0.90). Genotypes that are still non-vaccine-targeted were detected in 17.98% of women, and non-significantly associated with high-risk lesions.

Conclusion The greater protection of the nine-Valent HPV vaccine is likely to have impact, because in the absence of genotype 16 or 18 infection, these five genotypes on their own would multiply the risk of a high-grade lesion by 3.5-fold and would be responsible for 72% of high-grade lesions.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.165

Association of human papillomavirus genotype 16 viral variant and viral load with cervical high-grade intraepithelial lesions

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Background Persistent human papillomavirus (HPV) infection with a high-risk oncogenic genotype is related to the development of cervical cancer. HPV genotype 16 (HPV 16) is by far the genotype most strongly associated with cervical cancer, but the viral variant and/or viral load of HPV 16 could specifically...
modulate this association. Our aim was to determine the association between the viral variant and viral load of HPV 16 and the presence of cervical high-grade lesions.

Methods This cross-sectional study included all women in whom HPV infection was found by cervical smear during routine gynecological health checks. Women with single or multiple HPV 16 infections (n = 176) were selected for viral variant and viral load analysis. Smear results were classified using the Bethesda system. HPV types were classified according to the International Agency for Research on Cancer. Odds ratios (ORs) with their 95% confidence intervals (CIs) were estimated by logistic regression, adjusted for age, immigrant status, and co-infection with other high-risk genotypes.

Results No statistically significant associations were found regarding the detected viral variants. A viral load above the median (> 1367.79 copies/cell) was associated with a significant risk of high-grade epithelial lesion or carcinoma, after adjusting for age, immigrant status, co-infections, and viral variant: (adjusted OR: 7.89; 95% CI: 2.75–22.68). This relationship showed a statistically significant dose–response pattern after categorizing by viral load tertiles: adjusted OR for a viral load greater than the third tertile was 17.23 (95% CI: 4.20–70.65), with adjusted linear P trend = 0.001.

Conclusion In patients infected with HPV 16, viral load is associated with high-grade intraepithelial lesions or cervical carcinoma. This could be useful as a prognostic biomarker of neoplastic progression and as a screening test for cervical cancer.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.166

P2-40
Presence of cancer pain, inadequate pain control and psychotropic drug use: A cross-sectional study
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Background Pain is a common symptom in cancer patients, and its control and management are complex. Despite the high concomitant prevalence of psychotropic drugs in these individuals, the association between pain, inadequate pain control and psychotropic drug use is not well determined. This study aims to determine the prevalence of cancer pain, inadequate pain control and its association with psychotropic drug use.

Materials and methods Cross-sectional study. A total of 402 medical records obtained by simple random sampling among all oncology patients in a hospital in northern Spain, seen between 2012 and 2014, were reviewed. Adjusted odds ratios were estimated together with their 95% confidence intervals (95% CI) by unconditional logistic regression for each type of psychotropic drug (anxiolytics, hypnotics and antidepressants).

Results Mean patient age was 61.17 (standard deviation [SD] ± 13.14) years; 57.5% were women and 42.5% were men. The prevalence of existence of pain was 18.4% and inadequate pain control was 54.2%. A statistically significant association was found between existence of cancer pain and anxiolytic use (adjusted OR: 3.15; 95% CI: 1.49–6.68) and hypnotic use (adjusted OR: 5.19; 95% CI: 1.77–15.25). Inadequate pain control was associated to a greater extent with the use of these drugs: adjusted OR for anxiolytic use 4.74 (95% CI: 1.91–11.80), adjusted OR for hypnotic use 6.09 (95% CI: 1.74–21.32). In contrast, no association was found between pain and antidepressant use (adjusted OR: 0.99).

Conclusion The existence of pain and, to a greater extent, poor pain control, were associated with increased use of certain psychotropic drugs, such as anxiolytics and hypnotics. There appears to be no association between pain and antidepressant use.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.167

P2-41
Anthropometry and risk of breast cancer among premenopausal women in Latin America: Results from the PRECAMA study
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Introduction Premenopausal breast cancer risk has been associated with greater height and inversely associated with excess adiposity in many studies conducted among Western populations. However, data are scarce on Hispanic populations, in particular in Latin American countries. Our work investigated the associations between excess adiposity, defined by several anthropometric factors, and risk of breast cancer among premenopausal Latin American women from the PRECAMA study.

Methods PRECAMA is an on-going multicentric population-based case-control study conducted in young, premenopausal women from four Latin American countries: Chile, Colombia, Costa Rica, and Mexico. Women aged 20 to 44 years are recruited in the study. Cases are women diagnosed with first primary invasive breast cancer and are recruited before any treatment. Population-based controls are matched to cases on age, area of residence and health institution. Anthropometric measurements were performed by medical staff at inclusion according to standardized protocols, and lifestyle data were collected. Height, weight, BMI, waist and hip circumferences, and their ratios were categorized into tertiles and analyzed using multivariate conditional logistic regression models adjusted for potential confounders.

Results Preliminary analyses on 283 cases and matched controls showed no difference in height (average of 1.58 m in cases vs. 1.57 m in controls). Average BMI was 26.9 kg/m² in cases and 29.1 kg/m² in controls. Twenty percent of the cases and 29% of the controls were classified as obese (BMI ≥ 30 kg/m²). Adjusted odds ratios (OR) showed a linear inverse association between BMI and breast cancer risk [OR T2 vs. T1 = 0.65; 95% confidence interval (CI) = 0.39–1.09; OR T3 vs. T1 = 0.38; 95% CI = 0.21–0.68; P-trend < 0.01]. No association was reported with height or any other anthropometric index. Stratified analyses show similar associations with BMI for all tumor sizes.

Conclusions In this population of Latin American women, BMI was the only anthropometric factor associated with risk of premenopausal breast cancer, and no association was observed with height. There results suggest that risk factors for breast cancer may differ from those in other populations.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.168
P2-42

The impact of lifetime overweight and obesity on cancer incidence–A population-based study in Icelandic women

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Introduction
The impact of risk factors on cancer development largely depends on time. In addition to the level of exposure, the time spent exposed or the cumulative exposure might provide a better measure of the cancer risk given a risk factor. In a large cohort of women, we assess the relationship between different patterns of overweight and obesity during adulthood and the incidence of three types of cancer that previously have been found to be associated with BMI; postmenopausal breast, colorectal and endometrial cancer.

Methods
The study population consisted of 90,299 women who attended organized nationwide screening for cancer of the cervix and breast in Iceland from between 1979 and 1989, corresponding to about 70% of the national adult female population. Data on reproductive factors and anthropometry were available at more than 300,000 occasions and information on cancer incidence was obtained through record linkage with the population-based Icelandic Cancer Registry. Repeated measurements of height and weight during follow-up were used in a growth curve model to predict individual-specific trajectories of body mass index (BMI) and to compute cumulative measures of overweight and obesity. The cumulative time spent above a given BMI value (e.g., 25 for the time spent with overweight and 30 for obesity) and cumulative overweight/obesity-years, taking into account the time spent as well as the degree of overweight/obesity, between ages 20–50 (between early adulthood and menopause), were calculated. To investigate the impact of these time-mediated and cumulative measures of overweight and obesity on the occurrence of postmenopausal breast, endometrial and colorectal cancer, Cox regression models were fitted, adjusting for important confounders.

Results
The mean BMI at 20 years was 21.9 and BMI was found to increase on average by 0.15 kg/m\textsuperscript{2} by year. Out of all women included, 64,015 reached age 50 during follow-up and among those, 2886 developed postmenopausal breast cancer. In addition, 891 colorectal and 404 endometrial cancers were observed in this subset of women. Taking into account the effects of relevant confounding factors, overweight and obesity before age 50 were associated with an increased risk of developing postmenopausal endometrial cancer (HR = 1.42, 95% CI: 1.04–1.94 and HR = 1.87, 95% CI: 1.13–3.10, respectively), with a 3% increase in risk for every additional year spent with obesity. The risk of colorectal cancer associated with obesity was HR = 1.34 and increased by 1% for every additional year spent with obesity. In contrast, there was no evidence for any statistically significant effect of mean BMI, overweight duration and cumulative exposure to overweight and obesity during adulthood on the risk of developing postmenopausal breast cancer.

Conclusions
The role of overweight duration in the aetiology of cancer differed between the three types of cancers. The results indicate that weight control is relevant at all ages. Furthermore, exploring time-dependent and cumulative effects of overweight and obesity increases our understanding of time-varying exposures and their association with disease occurrence. This knowledge is vital for the development of effective and targeted cancer prevention strategies in different stages of the life course.

Disclosure of interest
The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.169

P2-43

Epidemiological study on cancer patients in Bulgaria and the Plovdiv region and the application of bisphosphonates on patients with malignancies in the Plovdiv region

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Introduction
Bisphosphonates (BP) have been used for several decades for the treatment of multiple myeloma, bone metastases, osteoporosis, Paget disease and others. In recent years, reports of Bisphosphonate-associated osteonecrosis of the jaw (BAONJ) have increased, most often in oncological patients (breast cancer, prostate cancer, lung cancer and multiple myeloma) receiving intravenous BP. This is an extremely difficult and multifactorial process requiring monitoring and individual approach to each patient.

Aim
To conduct an epidemiological study of patients with oncological diseases in Bulgaria and in the Plovdiv region and to study the application of intravenous BP in patients with malignancies in the Plovdiv region.

Materials and methods
Official information on the total number of patients with neoplasms and the number of newly discovered neoplasms in Bulgaria and Plovdiv region is provided from the National Cancer Registry (NRC) of Bulgaria for the period 2012–2016 (5-year period). From the pharmacies of the hospitals in the Plovdiv region, where BP therapy is administered, was provided information on the oncology patients who received intravenous BP by years for the same period.

Results
In Bulgaria, from 2012 to 2016, were registered between 270,942 and 285,776 neoplasms per year, with an upwards trend, and with a significantly higher proportion of women. An average of 30,235 newly registered neoplasms per year have been registered, with a decreasing tendency of the number of cases. On average, the number of newly registered females for the period is 14,668 and for men - 15,567, with the proportion of men being credibly higher. In the region of Plovdiv, for the period an average of 35,634 neoplasms were registered per year, with a tendency for cases to grow, and with a significantly higher proportion of women. Newly registered cases in the region are an average of 3553, with a tendency to decrease the number of cases. On average, the newly registered males were 1908 and the females 1644, with an increase in the number of men and a decrease in the number of women, and a significantly higher proportion of men. In Bulgaria, and in the Plovdiv region, the most common localizations of malignancy for the 5-year period are: skin, mammary gland, female genital organs, digestive organs and respiratory organs. In the country and the district of Plovdiv, for the cases of breast and prostate cancer, there was an increase for the 5-year study. For the period, in the Plovdiv region, an average of 2.30% of cancer patients received BP, with a higher proportion of women, and a median of age from 63 (2012) to 68 (2016). Most of the BP receiving oncology patients were between 61–70 and 71–80 years old. Zoledronic acid is administered between 98.77% and 100.00% of the cases. In the Plovdiv region, the application of BP has the highest relative proportions in mammary carcinoma, lymphatic, hematopoietic and related tissues, prostate and lung cancer. There is a decline in the median of the number of applications of BP from an average of 5 to 3 per year in 2015 and 2016, with women receiving more infusions than men.

Conclusion
Oncological diseases, both in Bulgaria and in the Plovdiv region, have an upward trend, especially in the cases of mammary carcinoma and prostate cancer, which means an increase in patients with a potential need of BP therapy. The patients treated with BP in the Plovdiv region have an increasing tendency of age, and are treated mainly with Zoledronic acid, which increases the risk of developing BAONJ.
P2-44

Association between five lifestyle habits and breast cancer risk: Results from a case-control study in Morocco

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Introduction Some modifiable lifestyle factors have been associated with decreased breast cancer risk. This study aimed to assess the association of a combined healthy lifestyle index with the risk of breast cancer in Moroccan women.

Methods A case-control study was conducted in Fez region - Morocco, from February 2016 to August 2017. A total of 300 incident breast cancer cases and 300 controls, matched to cases by age (± 5 years) and area of residence, were recruited in the study. Cases were women newly diagnosed with histologically confirmed breast cancer at the University Hospital of Fez, and controls were healthy women recruited at one of six outpatient primary health care centers randomly selected from the Fez region. For each participant we calculated a healthy lifestyle score and breast cancer risk adjusting for confounding factors.

Results The mean of combined score in cases and controls were 3.22 (±0.60), for the two groups respectively. In multivariate adjusted analyses, a higher combined score was associated with a decreased risk of breast cancer. Healthy lifestyle was associated with a decreased risk of breast cancer, Odds ratios and corresponding 90% confidence intervals were calculated using multiple conditional logistic regression adjusting for potential confounding factors.

Conclusion Our findings indicate some occupational categories susceptible to the high-risks of breast cancer. Further investigations are warranted to clarify the role of chemical products involved in these occupations. Moreover, these occupational categories need more preventive actions and screening.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.172

P2-47

Safety of anti-PD1 in the treatment of melanoma: A survey in 90 patients treated in a French University Hospital

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Introduction Metastatic melanoma is an aggressive disease with a 16% 5-year survival rate and poor response to most standard chemotherapies. Immune checkpoint inhibitors pembrolizumab and nivolumab, two anti-programmed-death-1 (PD-1) drugs, have been approved for the treatment of advanced melanoma. Survival results reported to date are very promising, but several adverse effects (AE), such as immunological AE, are expected. The aim of this study is to report the rate of AE related to these drugs in 90 patients treated for malignant melanoma.

Methods An observational prospective study was conducted in 90 consecutive patients treated for malignant melanoma in a French university referral hospital. A standardized questionnaire was developed to collect data.

Results A total of 90 patients were included (51 men and 39 women) between January 2014 and June 2016. The median age of was 67.0 years (IQR: 50.3–75.3 years). Fifty-three patients were treated by nivolumab and thirty-four by pembrolizumab. Mutated BRAF was significantly more frequent in patients treated with nivolumab (48.2% vs. 17.6%, P = 0.004). Cutaneous (30%), hepatic (15.6%), gastrointestinal (12.2%) and renal (6.7%) AE occurred in 59 patients (65.6%). One patient developed a Vogt-Koyanagi Harada syndrome after 15 months of successful pembrolizumab treatment. Severe (grade 3–4) AE (17% of AE) occurred in 10 patients and motivated discontinuation (n = 3) or withdrawal of anti-PD1 (n = 2). Only 3 (30%) of these last cases were reported to the pharmacovigilance center.

Conclusion The rate of AE related to pembrolizumab and nivolumab in this study is similar to those previously reported in the literature. As severe AE were under-reported to the pharmacovigilance center, physicians need to be made aware of the possibility of severe AE and the importance of reporting them.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.172
Diagnosis and survival of pancreatic cancer in relation to depression and diabetes

Methods

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Changes in the working status after cancer. A population-based cohort study using a life course perspective approach
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Introduction The prevalence of cancer survivors increases through‐out the workforce. The issue of their return-to-work represents an important matter for their quality of life, but also a great challenge for the social security systems. Disease-specific return-to-work rates, broken down by groups are scarcely documented. This population-based cohort study aims at quantifying the return-to-work of Belgian workers and at identifying the determining factors.

Methods We requested data from the Belgian Cancer Registry, the Inter Mutuality Agency and the Crossroad Bank for Social Security. We included all soci‐ally insured Belgian workers diagnosed between 2004 and 2011 with colorectal, breast, head & neck, prostate, testis, lung and corpus uteri cancer and who were active on the labor market at diagnosis. The end of (administrative) follow-up was 31st December 2012. After having solved legal, ethical and technical issues for the coupling, we performed group-based modeling for longitudinal data using the ‘proc traj’ package in SAS. We included demographic, health-related and work-related factors in the analysis and observed how these factors interplay to determine the working status.

Results Among the 38,930 workers with cancer included, after 5 years follow‐up, 18% died, 69% were (partially) active, 5% were unemployed and 2% were disabled. The group-based modeling revealed the existence of 3 types of work trajectories: working probabilities being high and stable during the whole follow-up; or low and stable or decreasing in the first 2 years and then increasing. Different trajectories appear according to the follow-up time: after 3 years of follow-up, eight groups of individuals emerged, of which four have between 70% and 100% of their workers being active. After 4 years, 3 on the 9 groups have more than 80% of their workers being active; and after 5 years, 3 groups on 10 have more than 80% of the workers being active. Among the workers comprise on these groups, we mainly find women with breast cancer; men with prostate cancer and workers aged 36–50 years old.

Conclusion The results of our study reported that workers with cancer who resumed work were mainly self-employed and middle-age workers (36–50) with testis or breast cancers. Lung and prostate were negatively associated with RTW and young workers seem to be at-risk of unemployment. It suggests that an early assessment of the worker’s profile would allow the identification of those who would require support in order to prevent their exclusion from the labour market.

Sex steroids and risk of differentiated thyroid carcinoma: Results from the EPIC study
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Introduction The incidence of thyroid carcinomas has been rapidly increasing over the last 20–30 years in many Westernized countries. Large part of the increase is due to diagnostic improvements, however other changes may be involved. The only well-established risk factors for differentiated thyroid carcinomas (TC) (the most common forms of TC) are history of benign thyroid disease, notably goiter and benign nodules, and exposure to ionizing radiations (especially during childhood). However, recent studies have shown consistent evidence that body mass, including height and weight, are also positively associated with differentiated TC risk. However, mechanisms that may explain this association are currently not known but can include sex hormones. We therefore investigated the role of sex steroids and sex hormones binding globulin (SHBG) in the etiology of differentiated thyroid cancer in a case-control study nested within the large European Prospective Investigation into Cancer and Nutrition (EPIC) cohort.

Methods Within EPIC, during follow-up, we identified 329 primary incident cases of differentiated thyroid carcinoma (133 in pre-menopausal women, 118 in postmenopausal women, and 78 in men) among subjects who participated in the study and gave a blood sample at blood collection. To these cases, 710 controls, who did not develop any cancers, apart from non-melanoma skin cancer, at the time of the diagnosis of the case, were matched on study recruitment center, sex, age, date, time, fasting status at blood collection, duration of follow-up and, in women, menopausal status and phase of the menstrual cycle. Women taking exogenous hormones at blood donation were excluded. Plasma concentrations of testosterone (T), androstenedione (D4), dehydroepiandrosterone (DHEA), estradiol, estrone and progesterone (in pre-menopausal women only) were performed by a highly sensitive high-resolution liquid chromatography/mass spectrometry (LC-HS/MS/MS) method. SHBG concentrations were measured by a validated immunooassay. Odds ratios (ORs) of TC by levels of each biomarker were estimated using conditional logistic regression models adjusted for potential confounders (including height, waist circumference, physical activity, smoking status, alcohol consumption, education level, and for women, age at first full term pregnancy, number of full term pregnancies, and exogenous hormone use).

Results In pre-menopausal women, controls had a lower BMI, a shorter waist circumference, and a higher alcohol intake than the cases (24.2 vs. 25.7 kg/m2 for BMI, 76.5 vs. 80.0 cm for waist, 3.2 vs. 1.8 g/day for alcohol intake, respectively). Preliminary conditional logistic regression analyses suggest positive associations of borderline statistical significance of differentiated thyroid cancer with the concentrations of T, D4 and DHEA in pre-menopausal women (ORTvsT: 1.83 (95% CI: 0.99–3.39) for T; 1.99 (95% CI: 1.02–3.87) for D4; 1.84 (95% CI: 0.95–3.56) for DHEA). No associations could be observed in postmenopausal women nor in men. No associations were found with estrogens or progesterone.

Conclusions This study is the first prospective study conducted on sex steroids and differentiated TC risk and will provide insights on mechanisms relating overweight and obesity to TC risk. Our preliminary results suggest a possible positive association of differentiated TC risk with high androgen concentration in pre-menopausal women but no relationship with estrogens or progesterone.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.179
**P2-53**

Risk of pancreatic cancer and non-Hodgkin lymphoma associated with healthy lifestyle behaviors in the EPIC study

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**Introduction** Pancreatic cancer (PC) and non-Hodgkin lymphoma (NHL) are both rare cancers which are particularly prevalent in Western countries and for which increasing incidence rates have been observed for the past decades. Moreover, both of them have unclear etiology and only few risk factors identified so far. While PC has been firmly associated with cigarette smoking, type II diabetes, obesity, as well as chronic pancreatitis, NHL has been mainly related to immune disorders and occupational exposure like benzene. Roles of lifestyle factors in PC and NHL etiologies are still largely undefined, but recent evidences suggested that lifestyle, as well as high levels of alcohol consumption may be related to PC and NHL risks. Therefore, associations between modifiable lifestyle factors and either PC risk or NHL risk were investigated using an index expressing healthy lifestyle behaviors in the European Prospective Investigation into Cancer and Nutrition (EPIC) study.

**Methods** Within 14 years of follow-up, 1113 incident PC cases and 2244 incident NHL cases (1845 B-NHL, 372 DLCBL, 415 CLL/SLL, 278 FL, and 535 PCN/MM) were diagnosed in the EPIC study. A score named the Healthy Lifestyle Index (HLI) ranging from 0 to 20 was built combining lifestyle factors assessed at baseline, i.e. a score for diet, physical activity, smoking habits, alcohol intake, and BMI. A score of 20 corresponding to the highest level of adherence to primary prevention recommendations was meant to reflect a healthy lifestyle. HLI was modelled in categories (< 5, 6–10, 11–15 and > 15) and in continuous for a 1-category increase. Cox proportional hazard models with age as primary time variable were used to estimate PC and NHL hazard ratios (HR) and their 95% confidence intervals (95% CI) in relation to the HLI, adjusting for potential confounding factors.

**Results** The combination of healthy lifestyle behaviors into an increasing HLI was inversely associated with PC with a 29% (95% CI: 0.74, 0.78) decreasing risk for a 1-category increase of HLI among EPIC participants. Modifiable lifestyle factors driving PC risk’s reduction were smoking abstinence (pWald < 0.01) and avoidance of alcohol drinking (pWald = 0.01) and their 95% confidence intervals (95% CI) in relation to the HLI, adjusting for potential confounding factors.

**Conclusions** Findings from the EPIC study suggested that the risk of PC was inversely associated with healthy lifestyle profiles, whereas no association was found in relation to NHL risk among EPIC participants. The results support adhering to primary prevention guidelines in order to decrease PC incidence and should encourage policy makers to promote healthy lifestyle in general population, in particular for cancers with no available screening strategy. In addition, they provide more evidence in favor of investigating non-modifiable risk factors to further understanding NHL’s etiology.

**Keywords** Pancreatic cancer risk; Lymphoma risk; Healthy lifestyle; European prospective study

**Disclosure of interest** The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.180

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**P2-54**

Prescribed medications in survivors of adult-onset cancer in Norway: A register-based study

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**Introduction** Cancer patient’s survival has improved steadily in Europe during the past decades, mainly due to major changes in diagnostic work-up, treatment and follow-up of patients. Hence, the population of cancer survivors has increased. Increasing use of multimodal curative therapies and novel treatment options for advanced cancers may cause adverse health effects. Prescribed medications provide a comprehensive assessment of long-term health-related issues among cancer survivors. We conducted a registry-based study to explore long-term adverse health effects, using prescribed medications as a proxy of disease, in adult cancer patients surviving at least five years after diagnosis.

**Methods** The entire Norwegian population, born in 1990 or earlier, alive per January 1, 2005, approximately 3.8 million individuals were defined as our study cohort. The individuals were followed-up by linking compulsory national registers; the National Registry, the Cancer Registry of Norway (1953–2014), and the Norwegian Prescription Database (since 2004). Five-year cancer survivors were identified and the proportions of medication use in cancer survivors and cancer-free populations was calculated. The proportions were standardized for age per January 1, 2005; categorized as 0–19, 20–39, 49–59, 60–79, and over 80 years of age. Incidence rates of prescribed medication will be estimated using Cox proportional hazard models. Preliminary results A total of 299,326 cancer survivors, born during 1896-1990, were identified (47% males). The largest group of cancer survivors among males were those with cancer of the prostate (35%), skin (13%), bladder (8%), colon (7%), testis (5%) and rectum (5%). Among females, the largest group of survivors were those with cancer of the breast (32%), skin (14%), colon (8%), corpus uteri (7%), cervix uteri (5%), and rectum (5%). The study identified differences between cancer survivors and the cancer-free population in the use of medications (proportions presented as percentages) for the digestive tract and metabolism (22% versus 16%, respectively), blood and blood-forming organs (24% versus 17%), cardiovascular system (39% versus 28%), genito-urinary system and sex hormones (10% versus 16%), nervous system (39% versus 32%), systemic hormones other than sex hormones and insulin (12% versus 9%), musculo-skeletal system (23% versus 27%), and anti-neoplastic and immune-modulating agents (7% versus 2%). In contrast, similar medication use were found for antiparasitic products, insecticides and repellents (3% in each group), anti-infectives (for systemic use) (∼26%), dermatological (∼13%), sensory organs (∼13%), and for respiratory system (∼22%).

**Conclusions** Our preliminary findings indicate a higher use of various prescribed medications among cancer survivors compared with the cancer-free population. This could suggest increased health challenges among the cancer survivors. Optimized follow-up of cancer survivors as well as primary and secondary prevention strategies of major comorbidities are recommended. More specific analyses, both regarding type of cancer and medications, will be performed.

**Disclosure of interest** The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.181
P2-55
Mortality from cancer and other causes in German Airline Crew: Results from a third follow-up study using dose registry date, 1960–2014
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Background Commercial airline crews are one of the occupational groups with the highest exposure to ionizing radiation. The existing German cohort is one of the largest national cohorts set up to examine occupational health risks in cockpit and cabin crew with a focus on studying radiation-associated cancer mortality. The aim of this study was to extend the follow-up period for an additional 10 years and use newly available dose registry data for exposure assessment for the entire cohort including the cabin crew for the first time.

Methods The existing closed cohort was followed-up until the end of 2014. Data linkage with the German dose registry was performed for all individuals known to be active as pilots or cabin crew at the end of the previous follow-up (2004). Exposure data were retrieved for the time period 2004–2014. Vital status was assessed via population registries for all inactive cohort members. For deceased individuals, the cause of death was requested from the respective local public health office. Missing cause of death information (n = 223) was imputed proportional to the frequency of known causes in the cohort. A new method was developed to retrospectively estimate cabin crew dose for pre registry time (1960–2003). External analyses included calculating standardized mortality ratios (SMR and 95% CI) using German population rates as reference.

Results Among 26,846 cohort members, there were 1592 deaths (51.8% cancer-related) and 752,434 person-years of observation time at-risk between 1960 and 2014. A total of 510,564 dose records were available for the entire study period for dose-related analyses. Mean annual effective dose per cohort member was 1.99 mSv in 2014. For cockpit and cabin crew the mean cumulative dose was 43.9 mSv (max. 99.7 mSv) and 30.5 mSv (max. 115.9 mSv), respectively. All-cause mortality was significantly reduced in all cohort subgroups (SMR between 0.48 and 0.70). Mortality for all cancers and cancers associated with radiation, respectively, were similarly reduced, with the exception of brain cancers, which were increased both in male cockpit (n = 210, SMR = 2.01, 95% CI: 1.15–3.28) and female cabin crew (n = 14, SMR = 1.26, 95% CI: 0.60–2.36). Malignant melanoma mortality was non-significantly increased in cockpit crew (n = 10, SMR = 1.88, 95% CI: 0.78–3.85). Dose–response analyses indicated no significant increase in mortality rate per 10 mSv in cabin crew. For cockpit crew, the mortality rate for radiation-associated cancers as well as cerebrovascular and cardiovascular diseases significantly decreased with increasing dose.

Conclusion The results of this third follow-up study indicate no increased mortality risk for most cancers and other causes in the German airline crew cohort. Using dose registry data allowed for improved exposure assessment for the entire cohort from 2004 onwards and enabled a new approach to retrospectively estimate cabin crew dose for the years before registry data were available. The now established dose registry link may facilitate future follow-ups and improve cohort retention by providing nearly complete exposure assessment and convenient vital status ascertainment.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.182

P2-56
Types of tobacco and alcoholic beverages use and head and neck cancer: A case-control study in state of São Paulo, Brazil, 1999–2015
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Introduction Risk factors for health problems change over time and space. With regard to head and neck cancer (HNC), associations with smoking and alcohol consumption are well-established. Literature data suggest that the most prevalent types of tobacco and alcohol in a population are associated with higher risks of cancer. In Brazil, few epidemiological studies have investigated the effect of different types of tobacco and alcohol on HNC. The aim of this study was to measure the probabilistic risks for HNC by tobacco and alcohol types in non-exclusive consumption (use of more than one type of tobacco or alcoholic beverage) and exclusive consumption (use of only one type of tobacco or alcoholic beverage). Types of tobacco analysed were industrialized cigarette, hand-rolled cigarettes, pipe and cigar. The analyzed alcoholic beverages were distilled, beer and wine.

Methods The present study has origin from three multicentric projects: Latin American, conducted from 03/1999 to 12/2001; Clinical Genome of Cancer performed from 07/2000 to 08/2011; and the Thematic Markers of Aggression in Head and Neck Tumors (GENCAPO), conducted from 07/2011 to 06/2015. Thus, it is a case-control study with data from hospitals in the State of São Paulo. The cases were diagnosed with squamous cell carcinoma of the head and neck, histologically confirmed. The controls, patients with diseases other than cancer, were selected in some of the hospitals where the cases originated. Both cases and controls were interviewed through questionnaires with information on characteristics and habits, as well as data on education and occupational history. Associations between the variables tobacco type and type of alcoholic beverages with HNC were estimated by the odds ratio (OR) and respective 95% confidence interval (95% CI) through non-conditional logistic regression adjusted for confounding variables: sex (female, male), age (< 50 years, 50–59 years and ≥ 60 years), schooling (upper, intermediate and illiterate), occupation (qualified manual, unqualified manual and others), multicenter studies, smoking (Never smoked, < 20 pack-years, ≥ 20 and < 40 pack-years and ≥ 40 pack-years, to adjust the effect of alcohol) and total ethanol (Never drank, ≤ 100 kg, > 100 kg and ≤ 900 kg and > 900 kg, to adjust the effect of tobacco).

Results The risks due to smoking were more significant for the hypopharynx, particularly, in the non-exclusive pattern and consumption ≥ 40 packs per year OR: 36.1 (95% CI: 11.1–117.6); for oropharynx, larynx and oral cavity, the risks were: OR: 16.1 (95% CI: 10.4–24.9); OR: 14.2 (95% CI: 9.6–21.0); OR: 7.4 (95% CI: 5.6–10.0). In the exclusive consumption condition, for the same category ≥ 40 packets per year for industrialized cigarettes, the risks were slightly less intense: OR: 31.9 (95% CI: 9.7–104.3); OR: 15.4 (95% CI: 9.9–24.0); OR: 13.1 (95% CI: 8.8–19.5); OR: 7.1 (95% CI: 5.3–9.6), respectively, for hypopharynx, oropharynx, larynx and oral cavity. In alcohol consumption, higher associations of HNC with distilled beverages were observed. In the exclusive consumption condition, consumption level of distilled ≥ 2000 kg induced OR: 39.1 (95% CI: 12.7–121.8) for oropharynx. Simultaneous use of tobacco and alcohol increased the risk of HNC: OR: 10.5 (95% CI: 8.5–13.0). Conclusions Among smokers with the non-exclusive pattern of consumption, the greatest risks were observed for the hypopharynx. Among the consumers of alcoholic beverages, the distilled conferred greater risks in the two patterns of consumption. In beer and wine consumption, differences in intensity of associations with HNC became evident only in the higher consumption categories.

Keywords Head and neck cancer; Type of tobacco; Type of alcoholic beverages; Brazil
**P2-57**

**Prognosis of diffuse large B cell lymphoma related to occupational exposure to pesticides: A cohort study**

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This retrospective cohort study evaluated the influence of occupational exposure to pesticides on the prognosis of diffuse large B cell lymphoma (DLBCL). The study included 244 patients with newly-diagnosed DLBCL, with a follow-up period of at least 2 years. Occupational exposure was assessed using a specific exposure matrix for farming activities. The study found that occupational exposure to pesticides did not impact clinical and biological characteristics of DLBCL. Exposure to pesticides was associated with a lower complete response rate and a higher event-free survival rate in exposed patients compared to non-exposed patients, after adjustment for confounding factors. The results suggest that occupational exposure to pesticides may have a protective effect on the prognosis of DLBCL.

**Disclosure of interest** The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.183

**P2-58**

**Vitamin D and colorectal cancer risk: A gene pathway approach**

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This study aimed to investigate the association between vitamin D levels and colorectal cancer risk using a gene pathway approach. The authors analyzed 1420 cases and 1420 matched controls from the European Prospective Investigation into Cancer and Nutrition (EPIC) study. They found that vitamin D receptor (VDR) genotypes were significantly associated with colorectal cancer risk, particularly among farmers. The results indicate that high vitamin D levels may reduce the risk of colorectal cancer.

**Disclosure of interest** The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.184
P2-59  
Serum 25-hydroxyvitamin D levels and risk of lung cancer and histologic types: A Mendelian randomization analysis of the Hunt study


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Summary

Background Meta-analysis of observational studies have suggested an inverse association between serum 25-hydroxyvitamin D [25(OH)D] levels and lung cancer incidence. The aim of the current study was to explore if there were causal associations between serum 25(OH)D levels and incidence of lung cancer overall and different histologic types.

Methods We performed a Mendelian randomization (MR) analysis using data from a 19-year population-based prospective cohort study in Norway, including 54,580 individuals and 676 incident lung cancer cases. A 25(OH)D allele score was generated based on the number of vitamin D-increasing alleles of rs2282679, rs12785878 and rs10741657, and was used as an instrumental variable. Cox proportional hazards regression models were used to calculate hazard ratios (HRs) with 95% confidence intervals (CIs) for incidence of lung cancer and histologic types.

Results The allele score accounted for 3.4% of the variation of serum 25(OH)D levels. There were no associations between the allele score and lung cancer incidence overall, with HR being 0.99 (95% CI: 0.93 to 1.06) per allele score. A 25 nmol/L increase in genetically determined 25(OH)D level was not associated with the incidence of lung cancer overall (MR estimate HR: 0.96, 95% CI: 0.54 to 1.69). The allele score and genetically determined 25(OH)D were not significantly associated with any histologic types of lung cancer.

Conclusions MR analysis suggested that there were no causal associations between 25(OH)D levels and risks of lung cancer and histologic types in a homogeneous population-based prospective cohort study.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.186

Session 3 - Epidemiology and chronic diseases (yc mental health)

P3-1  
Epidemiological specificities of acute metabolic decompensation in diabetes: Case of tertiary healthcare center in Tunisia

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Introduction Diabetes is a chronic illness that requires continuing medical care and patient self-management education to prevent acute complications and to reduce the risk of long-term complications. It is considered a major public health problem with significant social and economic consequences. Yet, it continues to have an upward trend worldwide. Acute complications of diabetes remain relatively frequent, for which these patients continue to consult the emergencies. It can lead to increase morbidity and mortality if not efficiently and effectively treated. The aim of this work is to specify the epidemiological and some clinical characteristics of patients consulting at the emergency department of the university hospital center Farhat Hached of Sousse (Tunisia) for acute complications.

Materials and methods We conducted a prospective study of 168 consecutive patients who were admitted to emergency department at the Farhat Hached University Hospital Center, Sousse, Tunisia between January 2016 and July 2016 for acute decompensation of diabetes and whose age is older than 15 years. We included the five types of acute complication diabetic has to know: the hyperglycemia, hypoglycemia, the hyperglycemic hyperosmolar state, the ketosis and the ketoacidosis. Study was performed using a pre-tested questionnaire completed by the doctor at emergency department. Main sources of data were patients’ medical records, anamnesis and clinical examination. Variables measured were related to patients’ general characteristics, clinical profiles, etc. For each estimate, a confidence interval was calculated according to the conventional formula. When the application conditions of the conventional formula were not met, the Wilson procedure with continuity correction was used.

Results The mean age of patients was 45 ± 17.7 years. Almost 83.9% of them were under the age of 65 years with extremes ranging from 16 to 87 years and predominantly female (53.6%). Among all cases, 35.7% reported that they fortuitous discovered that they are diabetic versus 64.3% who are already diagnosed with diabetes. According the type of diabetes, we noted that type 1 diabetes mellitus (T1DM) were more frequent than type 2 (T2DM) (59.25% versus 40.75%), 71 patients (65.74%) were treated by insulin including 27 patients with T2DM. The proportions of acute complications in decreasing order were ketosis (36%), ketoacidosis (30%), hyperglycemia (25%), hypoglycemia (25%) and finally hyperglycemic hyperosmolar state (2%). Concerning hypoglycemia, it was significantly predominant in T1DM (P = 0.004). Thus, no cases of lactic acidosis has been noted in our cohort. The major reasons of consultations were no specific one such as fever, chest pain (25.6%) and deterioration of general status (20.8%). Inaugural diabetes and poor compliance to treatment were mostly the precipitating causes of acute complications with percentages of 32.2% and 31.6%, respectively. Furthermore, anamnesis and clinical examination revealed that 37.9% of patients were at degenerative complications stage. One case of death at emergency was reported.

Conclusion Diabetic Ketosis and ketoacidosis are still frequent complications and commonly encountered medical emergencies among patients with diabetes mellitus. Hypoglycemia is significantly more observed with T1DM. Henceforth, diabetes and its complications are preventable. More emphasis is required in order to decrease the prevalence of diabetes and to improve the prognosis in the short- and long-term. This concern should be shared by all healthcare providers and not be limited only to clinical experts.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.187
P3-3

Association between the 1-hour plasma glucose during oral glucose tolerance testing and clinical evolution in Canadian and French cystic fibrosis adult patients: A GLYC-ONE database longitudinal study

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Objectives As high plasma glucose was associated with worse CF outcome. Our objective was to evaluate the association between the 1-hour plasma glucose (PG1) during oral glucose tolerance testing (OGTT) with pulmonary function and nutritional status.

Methods Data from Glyc-one database regrouping two prospective observational cohorts of adult CF patients from France (Lyon) and Canada (Montreal). Inclusion criteria were patients with forced expiratory volume in one second (FEV1) ≥ 30% and OGTT PG1 value available both at inclusion (2003-2016). Linear mixed models were used to assess the association between annual changes of FEV1 or BMI and PG1 at baseline (< 11 mmol/L versus ≥ 11 mmol/L) over 4-year follow-up period. Models were adjusted for age, BMI and pseudomonas colonization at baseline, gender, CFTR mutation, the year of study entry and the group of patients.

Results The cohort included 119 French patients [mean ± standard deviation (SD): 24.9 ± 6.8 years] and 210 Canadian patients (24.5 ± 6 years) with a mean baseline FEV1 of 63.9 ± 20.8% and 71.4 ± 18.9% and mean baseline BMI of 20.3 ± 2.2 kg/m² and 21.4 ± 2.8 kg/m², respectively. The average follow-up time ± SD was 3.5 years ± 3.0. FEV1 at baseline was significantly greater for Canadian patients than French ones (+5.3%, 95% confidence interval (CI): 1.1 to 9.4; P = 0.013). The annual rate of decline in the FEV1 was not significantly different between groups and was estimated at −1.0% (95% CI: −1.4 to −0.5). PG1 greater than 11 mmol/L at baseline was associated with a lower mean inclin

Conclusion Canadian CF patients had a better pulmonary and nutritional status than French patients at their entry in the cohort, but changes over time were comparable between the groups. PG1 values were associated with the mean baseline FEV1 but not with clinical degradation over time. These data do not support a direct role of high PG1 values in clinical evaluation of CF adult patients.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.189

P2-4

Surgically verified endometriosis is associated with lower short. A long-term risk of death

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Introduction Endometriosis is a chronic disease where endometriel-like tissue is situated outside the uterine cavity affecting 5–10% of fertile-aged women. Chronic inflammation is linked to increased risk of various adverse health outcomes such as increased risk of cardiovascular disease, cancer, and neurodegenerative diseases such as Alzheimer’s disease. Endometriosis has also been linked to increased risk of several associated conditions, such as malignant disease, autoimmune/rheumatoid diseases, cardiovascular and atopic diseases. This register-based cohort study aims to assess the mortality risks between women with surgically verified endometriosis as compared to a reference cohort. A cohort of 49,956 women with surgically verified endometriosis and a reference cohort of 98,824 women matched with age and residence was retrieved from the Finnish Hospital Discharge Registry between 1987–2012 and followed for deaths (Statistics Finland) until 2014.

Methods We calculated the crude overall and cause-specific (classification of death causes by Statistics Finland) mortality rate ratios (MRR) as the number of deaths divided by person-years. The adjusted MRRs were calculated by applying multivariable Poisson models controlling for the calendar time at baseline, time-varying attended age and duration of follow-up (cubic splines), the highest educational level, parity as time-dependent covariate, and gynecological organ (uterus, ovary/ovaries, both) removals during the follow-up.

Results In total, 2.5 million person-years (34% in endometriosis cohort) accumulated during the median follow-up time of 17.3 years. The mean age of the study population at the end of the follow-up was 53.7 (± 12.1) years. There were 1656 and 4291 deaths in the endometriosis and reference cohorts, respectively. In endometriosis cohort, we observed a lower risk of death from any cause (crude MRR = 0.76, 95% confidence interval [0.72–0.80], adjusted MRR = 0.72 [0.67–0.77]). The difference between the cohorts of age-adjusted MRR remained significant over the follow-up time of 28 years. The major contributors to the overall mortality in the endometriosis cohort were deaths due malignant neoplasms (49%), diseases of the circulatory system (16%), accidents and violence (7%), and alcohol-related diseases and accidental poisoning by alcohol (5%). The overall mortality of malignant neoplasms was decreased in endometriosis cohort as compared to reference cohort (crude MRR 0.91 [0.83–0.98], adjusted MRR 0.71 [0.64–0.78]), whereas no statistically significant difference was seen for any specific cancer. The mortality due diseases of the circulatory system was significantly lower in endometriosis patients (crude MRR 0.60 [0.52–0.68], adjusted MRR 0.71 [0.60–0.85]) when compared to the reference cohort, and difference persisted across specific diseases: cardiovascular diseases (crude MRR 0.58 [0.50–0.68], adjusted MRR 0.72 [0.59–0.78]), ischemic heart disease (crude MRR 0.55 [0.45–0.68], adjusted MRR 0.75 [0.57–0.98]) and cerebrovascular diseases (crude MRR 0.63 [0.50–0.80], adjusted MRR 0.69 [0.51–0.93]). Mortality due to alcohol-related causes and accidental poisoning by alcohol was lower in endometriosis cohort (crude MRR 0.43 [0.34–0.54], adjusted MRR 0.60 [0.46–0.79]). Decreased mortality was also seen for other death causes, such as respiratory system diseases, total accidents, diabetes. No difference in mortality was seen with dementia, Alzheimer’s disease nor these together, other diseases of the nervous system and sense organs, suicides.

Conclusion The overall mortality was not increased among endometriosis cohort. The statistically significant difference persisted across the major causes of death, such as circulatory diseases, cancer, accidents, alcohol-related causes and accidental poisoning by alcohol. The decreased mortality could result partly
from the attention and care received by endometriosis patients, but also hormonal and life style factors may play an important role.

Disclosure of interest  The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.190

P3-6
Breastfeedings and cardiovascular disease hospitalisation and mortality in mothers from a large Australian cohort study
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Background  There is growing evidence that breastfeeding has short- and long-term maternal cardiovascular health benefits. However, few studies have investigated the longitudinal association between breastfeeding and maternal cardiovascular disease (CVD) outcomes. This study aimed to examine the association between breastfeeding and (1) CVD hospitalisation, and (2) CVD mortality in a large Australian cohort.

Methods  Baseline questionnaire data (2006–2008) from a sample of 100,864 parous women aged ≥ 45 years from New South Wales, Australia, were linked to hospitalisation and death data until June 2014 and December 2013, respectively. CVD hospitalisation was based on the first CVD-related hospitalisation since baseline in women without self-reported medically diagnosed CVD at baseline or without prior CVD hospitalisation in the six years prior to study entry. Self-reported lifetime breastfeeding duration was categorised as: never breastfed, > 0–6 months, > 6–12 months, > 12–24 months and ≥ 24 months. Ever versus never breastfeeding was also compared. Cox proportional hazard models were used to explore the association between breastfeeding and CVD outcomes. Covariates included sociodemographic characteristics, lifestyle risk factors, and medical and reproductive history.

Results  There were 3,428 (3.4%) first CVD-related hospital admissions and 418 (0.4%) deaths during a mean follow-up time of 6.1 years for CVD hospitalisation, and 5.7 years for CVD mortality. In the unadjusted and fully-adjusted models, ever breastfeeding was associated with lower risks of CVD hospitalisation and CVD mortality compared to never breastfeeding (all P < 0.01). Longer duration of lifetime breastfeeding was associated with lower risk of CVD hospitalisation and mortality in the unadjusted model only (P for trend < 0.05) with no significant linear trend in the fully-adjusted models. There was no evidence of effect modification by age, parity, time since last birth or smoking (P for interaction > 0.1).

Conclusions  Ever breastfeeding, and to some extent lifetime breastfeeding duration, are associated with lower maternal risk of CVD hospitalisation and mortality in this large cohort of middle-aged and older Australian women. Breastfeeding may offer long-term maternal cardiovascular health benefits.

Disclosure of interest  The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.192

P3-7
Prevalence and associated factors of ischemic heart disease in Thai patients with diabetes mellitus: A Nationwide cross-sectional survey
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Background  Ischemic heart disease (IHD) is the first rank among most common cause of death in cardiovascular and overall disease. The information on the prevalence of IHD in Thailand is lacking especially in patients with diabetes mellitus. The objectives of this study were to determine prevalence of IHD in patients with diabetes mellitus and to determine factors associating with IHD in a nationwide survey.

Methods  A cross-sectional study for the national outcome assessment among diabetic patients who visited 831 public hospitals in Thailand was conducted in 2013 to evaluate status of care in diabetic patients aged at least 18 years old who had received medical treatment in the target hospital for last 12 months. Results  There were 25,902 diabetic patients were included in this study. IHD was detected in 918 patients (3.54%). Multivariate modeling was conducted to access which factors were most associated with IHD, and the result showed older age, male gender, hypertensive comorbidity, 4th regional health, insulin therapy, Hyperglycemic crisis were most associating factors for IHD in this population.

Conclusion  This study can implicate for health policy should be provided for the diabetic patients who had comorbidity or any risk factors should be aware for IHD.

Keywords  Ischemic heart disease; Diabetes mellitus; Prevalence; Factors; Nationwide

Disclosure of interest  The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.193

P3-8
Prevalence and associated factors of uncontrolled hypertension among Thai patients with hypertension: A nationwide cross-sectional survey
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Background  Hypertension is the most common causes of cardiovascular diseases. The information on the prevalence of uncontrolled hypertension in Thailand is lacking. The objectives of this study were to determine prevalence of uncontrolled hypertension among Thai patients with hypertension and to determine factors associated with uncontrolled hypertension in a nationwide survey.

Methods  A cross-sectional study to assess national outcomes among patients with hypertension who visited 831 public hospitals in Thailand was conducted in 2015 to evaluate status of care among patients with hypertension aged at least 18 years who received medical treatment in the target hospital for the last 12 months. Results  A total of 32,440 patients with hypertension were included in this study. Uncontrolled hypertension was detected among 8312 patients (25.6%). Multivariate analysis was conducted to determine which factors were most associated with uncontrolled hypertension, and the results showed age AORs 0.97 (95% CI: 0.96–0.98), diabetes comorbidity AORs 1.35 (95% CI: 1.13–1.60), waist circumferences ≥ 90 cm. AORs 1.18 (95% CI: 1.04–1.34), body mass index (BMI) ≥ 30 kg/m2 AORs 1.37 (95% CI: 1.15–1.62) and uric acid level ≥ 7 mg/dL AORs1.15 (95% CI: 1.01–1.30) were the highest associated factors for uncontrolled hypertension in this population.
**Conclusion** Our data emphasized that uncontrolled hypertension was a problem among patients with hypertension. The results of this study could be used to recommend health information be provided to patients with hypertension having comorbidity or any risk factors to be aware of uncontrolled hypertension and its complication.

**Keywords** Uncontrolled hypertension; Nationwide survey; Prevalence; Associated factors; Thailand

**Disclosure of interest** The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.194

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**P3-9**

**Exploring the factors which affect quality of life in patients with type 2 diabetes mellitus**

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**Aims** The study aimed to investigate the impact of different factors on health-related quality of life of patients with diabetes mellitus type 2 (DM) in primary care.

**Design and methods** A cross-sectional multicentre study was conducted in a 540 random sample of adults with type 2 diabetes mellitus. Social and demographic data, habits, cardiovascular disease and risk factors, DM complications and data for use drugs were collected. Clinical parameters data and biological measures were collected from medical records. Patients’ reported outcome measurements (PROMs) were recorded via the Audit of Diabetes-Dependent Care. DM measures were collected from medical records. Patients’ reported outcome measures (PROMs) were recorded via the Audit of Diabetes-Dependent Care.

**Results** After excluding patients with missing data, the cohort consisted of 411 eligible patients. Mean age 59.9 ± 11.6 years; 52.6% men; 66% married; 71% living in cities. Mean years of evolution 8.7 ± 5.7. Prevalence of CVD 45.7%; current smokers 24% and 15.6% insulin-treated. We found a significant correlation between lower quality of life and gender (female, P < 0.05), marital status (singe, P < 0.05), education level (primary, P < 0.05), working situation (unemployed, P < 0.01), duration of diabetes (> 5 years, P < 0.001), complications (P < 0.001) and insulin treatment (P < 0.001).

**Conclusions** Improving the quality of life of patients with type 2 diabetes mellitus can be achieved by early prevention and diagnosis of the disease, prevention of its complications and effective treatment of chronic underlying conditions by primary care physician and specialists. Appropriate disease management could help to improve quality and patient-centeredness of care in this specific group of subjects.

**Disclosure of interest** The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.195

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**P3-10**

**Prophylactic hepatitis B immunization in chronic kidney disease patients, Oran, Algeria**

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**Background** It is estimated that > 2 billion people worldwide have been infected with HBV. Of these, approximately 360 million individuals are chronically infected and at-risk of serious illness and death, mainly from liver cirrhosis and hepatocellular carcinoma (HCC). Algeria is situated in areas of intermediate endemicity (prevalence of endemicity of HBsAg 2–7%). Patients suffering from chronic kidney disease (CKD) are at particular risk of infection with HBV, they are associated with reduced immunogenicity following vaccine administration. Because of that, these patients have been offered schedules containing more than 3 doses and larger doses of the vaccine (schedule containing 4 double doses of standard hepatitis B vaccine). Those found to have anti-HBs concentrations < 10 mIU/mL after the primary vaccine series, should be revaccinated (3 additional double doses).

**Aim** Determine the efficacy of the four double doses schedule of hepatitis B vaccine in preventing infection up postvaccination of chronic renal failure patients.

**Patients and methods** It is a retrospective descriptive study including 209 chronic kidney disease patients. All patients had received hepatitis B vaccine with follow-up at epidemiology service of Oran university hospital (EHUO), during a period 2011–2012. Patients have been offered immunization schedule containing double doses (40 µg) of monovalent recombinant hepatitis B vaccine. The primary immunization series consists of 4 doses of vaccine (at 0, 1, 2, 6 month) followed by anti-HBs testing. People who do not respond (anti-HBs antibody titres < 10 mIU/mL) to primary vaccine series were revaccinated (3 additional Doses) followed by anti-HBs test (testing 1–2 months after the third dose).

**Results** The average age of patients is 61.2 ± 1.1 years old with a sex ratio of 1.1. Non-dialyzed CKD patients accounted for 78.9%. Vaccine seroprotection was obtained in 82% of non-hemodialysis CKD patients and in 76% of CKD hemodialysis patients after primary vaccination. Nevertheless, 12% of non-hemodialysis CKD patients and 12.5% of CKD hemodialysis patients are low responders (10 ≤ AC-HBS < 100 IU/L). Low responder patients are at-risk of declining immunity, hence the value of rigorous annual monitoring.

**Conclusion** The four doses of 40 µg vaccine schedule has proven its effectiveness with good seroprotection in chronic kidney disease patients. The vaccination against hepatitis B represents a considerable advance in the prophylaxis of this disease but unfortunately no regulatory text governs this vaccination in CKD patients in our country. Early vaccination (before dialysis) is recommended.

**Keywords** Chronic kidney disease; Hepatitis B vaccine; Seroprotection

**Disclosure of interest** The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.196
P3-11
Financial strain modifies the association between inflammation and cardiovascular disease risk: The English longitudinal study of ageing
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Introduction Atherosclerosis and cardiovascular disease (CVD) have an inflammatory origin. Moreover, chronic psychological stress is associated both with inflammation and CVD. Fibrinogen, a coagulation factor and CVD risk factor, is also a positive acute-phase reactant protein, its concentration increasing with presence of inflammation. Elevated inflammation measured on a single occasion can reflect either systemic inflammation and be the consequence of chronic psychological stress or the acute response to a recent stressful event or infection in an otherwise healthy, non-psychosocially stressed individual. Therefore, the prognostic value for future CVD risk of a single inflammation test may depend on the presence of chronic psychosocial stress. We tested this hypothesis in middle-aged to older adults aged 52 and above participating in a nationally representative cohort study.

Methods A total of 4541 men and women, free of CVD and aged 52 to 92 at baseline (2004–2005), participants in the English Longitudinal Study of Ageing, provided serum levels of fibrinogen during the nurse visit at baseline, alongside with clinical measurements and other blood biomarkers. Psychosocial factors were collected during the computer assisted personal interview and included financial strain, depression, social isolation, loneliness and social support. The outcome of interest was CVD mortality as ascertained up to February 2013. Cox proportional hazards regression models using age as the underlying time variable were fitted to estimate the relationship (hazard ratios [HR]) and 95% confidence intervals) between fibrinogen and CVD death. Interactions terms between fibrinogen and each psychosocial factor were tested. Models were stratified by sex and adjusted for age, smoking, body mass index, physical activity, cholesterol, triglycerides and diabetes. Restricted cubic splines were used to assess the shape of the associations and test nonlinearity by using the likelihood ratio test, comparing nested models with a linear or linear and cubic term. The presence of fibrinogen and hazard of CVD mortality was linear and positive: HR for the increase in 1 g/L of fibrinogen = 1.56; 95% CI: 1.26, 1.94, P < 0.0001 and for curvature = 0.53 (non-significant value means the relation is linear). We found a strong interaction (P = 0.02) between fibrinogen and financial strain (“shortage of money stops from doing what I want”, classified as often vs. less, binary), but not with the other psychosocial indicators. In the presence of financial strain (n = 479, 21 deaths), the HR for 1 g/L fibrinogen increase was 4.04; 95% CI: 1.99, 8.19, whereas in the absence of financial strain (n = 4062, 109 deaths), HR = 1.39; 95% CI: 1.09, 1.79. When further adjusting for C-reactive protein, the association in the group experiencing financial strain attenuated but remained significant (HR = 2.74; 1.10, 6.78), whereas it became non-significant in the low financial strain group (HR = 1.24; 0.91, 1.69).

Conclusions The positive association between fibrinogen and CVD death was much stronger in the presence of financial strain. An implication of our findings is that, when assessing the presence of inflammation with a single test for estimation of CVD risk, it may be necessary to take into account the presence of chronic psychosocial stress.

Disclosure of interest The authors declare that they have no competing interest.
https://doi.org/10.1016/j.respe.2018.05.197

P3-12
The influence of mistreatment during childbirth on postpartum depression: Findings from the 2015 Pelotas (Brazil) birth cohort study
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Background Women worldwide face diverse forms of mistreatment during childbirth that puts their lives and well-being at-risk. Minimal research has focused on the impact of mistreatment experiences during childbirth on adverse maternal and perinatal health outcomes.

Aims To determine whether there is an association between mistreatment of women during facility-based childbirth and postpartum depression occurrence.

Methods We used data from the 2015 Pelotas (Brazil) Birth Cohort Study. Women who had given birth in a local medical hospital facility (either public or private) under the supervision of a skilled birth attendant in the year 2015 were considered eligible to take part in the study, as well as their newborns (cohort members). Self-report mistreatment experiences during childbirth (disrespect and abuse) and postpartum depressive symptoms were assessed by household interviews three months after delivery. Mistreatment included information on physical abuse, verbal abuse, denial of care, and undesired procedures. Binary variables were created to indicate the occurrence of at least one, and at least two mistreatment experiences. The Edinburgh Postnatal Depression Scale was used to assess postpartum depression. A positive screening was defined as EPDS ≥ 15. We used multivariable logistic regression to determine the odds of having a positive screening for postpartum depression between women who experienced mistreatment during childbirth and those who did not. We adjusted for potential confounders including family income, maternal education, age, skin color, parity, marital status, desire for pregnancy, fathers’ reaction when discovering the pregnancy, previous depression, pregnancy morbidities, and deliver type (C-section or vaginal). We tested for interaction between antenatal depression (EPDS ≥ 10) and mistreatment experiences on the occurrence of postpartum depression.

Results A total of 4275 cohort members took part in the perinatal follow-up. The three-month follow-up interviewed 4087 biological mothers; 18.3% and 5.1% reported having experienced at least one and at least two types of mistreatment forms during childbirth, respectively; 6.8% screened positive for postpartum depression (EPDS ≥ 15). Women reported having experienced at least one type of mistreatment presented higher odds for postpartum depression (OR: 1.53; 95% CI: 1.07–2.20) as well as the women who reported at least two mistreatment forms (OR: 1.85; 95% CI: 1.06–3.24). We observed an interaction between antenatal depression and mistreatment during childbirth on postpartum depression. We found higher odds of postpartum depression among women who did not experienced antenatal depression (OR: 2.32; 95% CI: 1.05–5.14) when compared those who did (OR: 1.26; 95% CI: 0.81–1.90) for at least one mistreatment experience. The odds of postpartum depression among women reporting both antenatal depression and mistreatment during childbirth was 15.5 (95% CI: 9.6–25.0).

Conclusions Mistreatment during childbirth higher the odds of postpartum depression three months after birth. The independent effect of having experienced mistreatment during childbirth on postpartum depression is greater for women not presenting depression during pregnancy. Strategies to promote high-quality and respectful maternal healthcare are essential to prevent mother–child adverse outcomes. Women presenting antenatal depression are a priority group for interventions.

Disclosure of interest The authors declare that they have no competing interest.
https://doi.org/10.1016/j.respe.2018.05.198
P3-13

Hemochromatosis HFE mutations: Penetration in 451,000 adults of European descent
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Introduction HFE C282Y mutations account for the majority of hereditary hemochromatosis (HH) in people of European descent. HH is characterised by progressive accumulation of iron, plus chronic pain, exhaustion, arthritis, diabetes, liver cirrhosis and liver cancer. Previous studies (mainly in 20- to 50-year-olds) suggested that development of related disease in those with the mutation was uncommon. As a result of the claimed low penetrance, identification of iron overload related to HFE mutations needs to be re-examined.

Methods We estimated C282Y homozygote associations with morbidity and mortality in 40- to 70-year-old UK Biobank volunteers, from England, Scotland and Wales. We included 451,243 subjects of European descent, and tested baseline and incident disease and mortality associations during follow-up (maximum 9.7 years). Follow-up was through hospital records, cancer registry and death certificates. Odds ratios and Cox hazard ratios were adjusted for age, sex and technical covariates.

Results There were n = 2890 C282Y homozygote subjects (0.64% of the 451,243 subjects, or 1 in 156). Excess morbidity was most common in older men (age 60 to 70). C282Y homozygous status was associated with increased presence of hemochromatosis, liver disease, diabetes, arthritis, osteoporosis, pneumonia and polymyalgia rheumatica. Overall, 51.8% of older male C282Y homozygotes had ≥ 1 of the associated diagnoses, compared to 28.6% of those with the wild type (common) genotype: odds ratio = 2.63 95% CI: 2.23 to 3.10, \( p \leq 3.1 \times 10^{-15} \). Increased risks for the associated conditions were also present in older women and younger groups but were less common. There was a modest increase in morbidity in heterozygotes.

Conclusion We conclude that HFE C282Y homozygosity has a far higher penetrance than previously reported, and is a major contributor to common disease occurrence, especially with advancing age. The case for systematic early identification of iron overload related to HFE mutations needs to be re-examined.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.199

P3-14

Prevalence of permanent childhood hearing impairment identified by universal newborn hearing screening: A systematic review and meta-analysis
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Introduction Universal newborn hearing screening (UNHS) programmes have been implemented in many very highly-developed (UN Development Programme, 2015) countries over the last 20 years. The prevalence of permanent childhood hearing impairment (PCHI) detected by these programmes has not been systematically evaluated to assess the expected burden on audiological and other clinical services. In addition, the PCHI risk associated with Neonatal Intensive Care Unit (NICU) admission, a known PCHI risk factor, has not been estimated. We addressed these research gaps using systematic review and meta-analytical techniques to calculate the population-based prevalence of PCHI (defined as more than or equal to 26 decibels of hearing loss in both ears (≥ 26 dB HL)) identified through UNHS (defined as universal screening using otosacoustic emissions and/or auditory brainstem response testing within the first 6 months of life, followed by referral for diagnostic investigations). Our secondary objective was to compare PCHI prevalence in infants who were and were not admitted to NICU.

Methods In accordance with the registered protocol (PROSPERO: CRD42016051267), six electronic databases (including Embase and Medline) were interrogated in January 2017 to identify eligible studies in very highly-developed countries to calculate prevalence of PCHI ascertainment through UNHS. We identified further reports through searching citations of included papers and unpublished literature (November 2017). Eligible papers could be in any language and published on any date. Papers reporting outcomes for at-risk populations only, with no English abstract (unless unpublished) or of ineligible study type (e.g. case report or letter) were excluded. One reviewer extracted data and quality assessed all papers while two further reviewers undertook independent data extraction and quality assessment of a random sample of papers to ensure consistency; differences were resolved by consensus. Quality was assessed using criteria adapted from the Newcastle-Ottawa scale, STARD and QUADAS-2 tools. Pooled prevalence was calculated using random effects modelling, Freeman–Tukey double arc sine transformation of prevalences and Wilson (Score) method for calculating 95% confidence intervals (CIs) (Stata: Release 15; StataCorp LP).

Results Literature searches identified 6195 non-duplicate references, from which 41 were eligible for inclusion (including 5 reports identified from the unpublished literature and citation searching). These reports contained data on 32 separate study populations (median size = 25,945 infants, interquartile range = 11,198, 83,691 infants). Studies took place between 1990 and 2014, with the majority in Europe (n = 23). Pooled prevalence of bilateral PCHI ≥ 26 dB HL identified through UNHS in the screened population was 1.08% (95% CI: 0.90–1.28) per 1000 infants. Infants admitted to NICU had 6.9 times (95% CI: 3.8–12.5) higher prevalence of PCHI than those not admitted, based on 3 studies reporting this information. Smaller studies were associated with significantly larger prevalences (Egger’s test: P = 0.017). Key strengths of this review include use of a systematic search strategy and robust statistical methods. The findings are limited to very highly-developed countries.

Conclusions In very highly-developed countries, around 1 in every 1000 infants will need referral to clinical services for investigation and management of PCHI. Infants admitted to NICU have a significantly increased prevalence of PCHI. Further analyses will evaluate screen test performance and other risk factors for PCHI.

ESRC-funded PhD: ES/J500185/1.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.200

P3-15

Association between secondhand smoke and depression in never-smokers and its moderation by sex. Results from a national sample in Germany
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Introduction Findings on the association between secondhand smoke (SHS) exposure and depression are ambiguous. While some studies have identified positive associations between SHS exposure and risk of depressive symptoms or major depression (MDD) among former, non- and never-smokers, others did not. Similarly, results concerning sex-specific associations are contradictory. Some studies revealed an increased risk for either men or women only, whereas other studies found no differences between sexes. Our aim was to contribute to this growing body of research. Using a large and representative secondary data set from Germany, we examined whether SHS is associated with
depressive symptoms/MDD and whether this association differs between males and females.

Methods  We pooled data from three waves of the German Health Update telephone surveys from 2009, 2010 and 2012. From the combined sample (n = 62,606) we included only never-smokers, resulting in a subset of 10,808 male and 17,862 female respondents. Exposure to SHS was determined from self-reported information on the number of days per week with SHS exposure. Being exposed on ‘no day per week’ was defined as being not exposed, exposure on at least one day per week was defined as being exposed. The outcome variable of interest was a reported medical diagnosis of a depressive episode or MDD. To determine potential interactions between sex and SHS exposure with respect to likelihood of depression, we applied logistic regression models with an interaction term, adjusting for age, socioeconomic status (low, middle, high), current gainful employment (yes or no), living together with a partner (yes or no), social support (Olslo-3 Social Support Scale), alcohol consumption (AUDIT-C categories), body mass index (BMI < 18.5, BMI 18.5 to < 25, BMI 25 to < 30, BMI ≥ 30) and presence of chronic diseases (yes or no). Odds ratios (OR) and their 95% confidence intervals (95% CI) are reported for main effects. Interaction effects were evaluated based on average marginal effects (AME) to avoid bias related to unobserved heterogeneity.

Results  In our data, 34% of male never-smokers and 21.5% of female never-smokers were exposed to SHS. Female never-smokers were affected by depressive episodes or MDD to a larger extent than male never-smokers. After adjustment for confounders, no significant association between SHS exposure and depressive episodes/MDD could be observed (OR = 0.92; 95% CI = 0.83, 1.01). There was a significant sex-by-SHS interaction. An inspection of AMEs revealed that male never-smokers exposed to SHS were at a significantly lower likelihood of depression than male never-smokers not exposed to SHS (AME = −0.017; 95% CI = −0.029, -0.006). No significant differences were observed between exposed and non-exposed females (AME = −0.002; 95% CI = −0.016, 0.011).

Conclusions  In our analysis, we found no significant association between SHS exposure and risk of depression in the combined sample of males and females. Among males, the association was counter-intuitive by indicating that exposure to secondhand smoke decreases the likelihood of depression. As sensitivity analyses revealed, the findings were robust to the selection of covariates. Never-smokers exposed to SHS are presumably more frequently involved in social interactions than those not exposed which may be protective for the development of depressive symptoms. This confounder could perhaps not been sufficiently accounted for by adjusting for social support. Our investigation confirms that studies on the association between SHS exposure and depression do not provide a clear picture. Additional research with high-quality primary data accounting for all relevant confounding variables is necessary to allow further insights into the relationship of SHS and depression.

Disclosure of interest  The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.201

P3-17
Overweight trajectory and cardiometabolic risk factors in young adults
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Background/Objectives  To assess the association between patterns of overweight over the life course and cardiometabolic risk factors in young adults.

Subjects/methods  In 1982, the maternity hospitals of Pelotas, a southern city of Brazil, were visited daily and those newborns whose family lived in the urban area of the city were identified (n = 5914) and have prospectively followed for several occasions. Weight and height were measured at every visit. BMI-for-age z-score was calculated using the WHO Child Growth Standards. At 30 years, overweight was defined as a BMI greater than or equal to 25 kg/m² and obesity by BMI greater than or equal to 30 kg/m². The participants were divided into eight groups according to the presence of overweight or obesity in childhood, adolescence and adulthood. Blood pressure, random blood glucose, HDL cholesterol, LDL cholesterol triglycerides and fat mass were measured at 30 years.

Results  From 2219 participants with anthropometric data in childhood, adolescence and adulthood, 25% never had been overweight, whereas 11.6% were overweight in the three periods. Random blood glucose, SBP and DBP were higher among those subjects who were always overweight/obese or only overweight/obese during adolescence and adulthood. The participants who were...
P3-18
Prevalence and clinical characteristics of diabetes mellitus in Lebanon: A national survey
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Introduction Diabetes Mellitus (DM) in all its forms has been rapidly increasing all over the world, especially in the Eastern-Mediterranean Region. This national study aimed to assess the prevalence and clinical aspects of DM in Lebanon with a special focus on type 1.

Methods A national multi-stage, random household sample survey was conducted, using face-to-face interviews with one questionnaire per household. A total of 4500 households were selected from all areas based on a pre-existing sampling frame of the Lebanese population.

Results The prevalence of previously diagnosed diabetes in the surveyed population of 17,832 persons (mean age=36) was 7.95% (95% CI: 7.55–8.35). The prevalence of type 1 DM in particular, was estimated at 0.1%, or almost 1% of all detected diabetes cases. Most persons with diabetes reported obtaining their usual care from endocrinologists rather than primary healthcare (PHC) physicians. Delayed performance of HbA1c test was reported in 25% of 1418 patients. Hypoglycemic episodes recently occurred in 30%, of whom at least 1/3rd required medical attention, including hospital admission. Diagnosed complications were reported in 22%, with retinopathy being the most common one.

Conclusions The prevalence of type 1 DM in this population is lower than international estimates. Diabetes management appears to be deficient based on delays in standard control testing, hypoglycemic episodes, and diabetes-related complications. Coordination of diabetic care management should be devolved to PHC physicians, who can keep track of the need for referral to various aspects of diabetes care.

Disclosure of interest The authors declare that they have no competing interest.
https://doi.org/10.1016/j.respe.2018.05.204

P3-19
Suicide trends in Panama: Results from the national mortality registry
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Background According to the World Health Organization (WHO), suicide is the second leading cause of death among 15–29-year-olds globally. Consequently, it represents a major public health concern. In Central-American countries, population-based studies on the epidemiology of suicide are scarce. The aim of this study is to investigate mortality trends due to suicide in Panama at a national and regional level from 2001 to 2016, and to characterize the suicide rates by sex and age groups.

Material and methods Data was derived from the National Mortality Registry (NMR) from the National Institute of Statistics and Census. Death was recorded according to the International Classification of Disease - 10th Revision (X60.0-X84.0). Crude mortality rates (MR) were calculated as the number of deaths per 100,000, using the mortality data and the estimates and projections of the total population of Panama to July 1st for each year, according to sex and age, based on the last census. MR were then standardised for 5-year age groups using the direct method and the world standard population of the WHO as a reference. Joinpoint regression analyses were performed to estimate and evaluate trends over time in women and men, expressed as annual percentage change (APC) with 95% confidence intervals (CI). Age-specific suicide trends were also evaluated and categorised according to the age groups 14–24, 25–44, 45–64 and ≥ 65 years.

Results During the study period (2001–2016), a total of 2526 deaths due to suicide were recorded in Panama (2174 men and 352 women), representing 1.01% of all causes of death; 68.9% of the deaths were due to intentional self-harm by hanging, strangulation and suffocation, followed by intentional self-poisoning by exposure to pesticides (17.5%). National MR per 100,000 decreased from 9.7 and 1.6 in 2001 to 5.4 and 0.8 in 2016, in men and women, respectively. Joinpoint analyses revealed that suicide rates changed differently across sex, age groups and provinces. Overall, the national MR trends due to suicide decline in women with an APC of −4.8, 95% CI −7.8, −1.7, whereas the trend began to decline from 2006 in men; APC −6.9, 95% CI −8.9, −4.9. A sustained decrease in the trend of mortality rates due to suicide was observed across all age categories, except for the group of younger men (< 25 years), with and APC of 1.73 (−4.0, 7.8), although confidence intervals were wide. During the last three years of the study period, men from the Provinces of Los Santos (28.0, 17.2, 11.7) and Darien (7.1, 4.4, 26.0) presented the highest MR per 100,000, compared with the national ones. The decrease in the trend was observed only in the Provinces of Panama, Colon, Chiriqui and Cocle.

Conclusions Mortality rates due to suicide have declined at a national level. However, sex, age and geographical disparities were observed. New studies at the individual level are warranted to investigate main suicidal risk factors, in particular across Provinces such as Los Santos and Darien, which are affected by the highest suicide rates in the country. Moreover, it seems crucial to evaluate future trends in adolescents and young adults, and particularly in men, whose mortality rate was approximately six times higher than women. Our findings highlight the need of elaborating suicide prevention programs tailored at a national context, as claimed by WHO.

Disclosure of interest The authors declare that they have no competing interest.
https://doi.org/10.1016/j.respe.2018.05.205
P3-20
Long-term asthma-related readmission in children previously admitted to the intensive care unit for asthma
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Introduction
Childhood asthma is a significant public health problem in the United States, where more than 6 million children are affected by asthma. In 2011, a national survey showed that almost 611,000 Emergency Department visits and 200,000 hospital admissions annually among children are associated to asthma. There are no studies that have exhaustively described the characteristics of asthmatic pediatric patients admitted to ICUs and their long-term follow-up assessing the asthma-related readmissions. The objective of this study was to compare time to asthma-related readmission between children with a previous hospitalization for asthma requiring ICU admission and those with a non-ICU hospitalization in the United States.

Methods
State Inpatient Database for 4 states from 2005 to 2014 was used in a retrospective cohort study. Children aged 2–17 years were included. The index hospitalization was defined as a hospitalization with a primary diagnosis of asthma (ICD-9 code 493.XX). Time to asthma-related readmissions and the time to asthma-related ED visit that did not result in a hospitalization were recorded. The log-rank test was used to study differences in the time to readmission and ED visit between children who were admitted and those who were not admitted to the ICU during the index hospitalization. The Cox regression was used to evaluate the associated risk of some variables to the readmission, estimated by the calculation of the hazard ratio (HR) and its 95% of confidence interval.

Results
A total of 66,835 subjects were hospitalized. Fifteen percent of the hospitalizations required ICU admission. The mean (SD) age was 5.7 (3.8) years, with 60.5% being males. Children admitted to the ICU were older [71.4 (3.4) and 6.4 (4.1) years in the ICU and non-ICU groups]. A total of 12,844 children were readmitted for asthma during the study period while 22,915 had an asthma-related ED visit. The time to asthma-related readmission was lower in the ICU group compared to the non-ICU group (P < 0.0001). The time to asthma-related ED visit not resulting in a hospitalization was not significantly different between the 2 groups (P = 0.43). The risk of readmission in patients aged 2 to 6 years was HR: 1.09; 95% CI (1.03 to 1.16), female patients, HR: 1.08; 95% CI (1.04, 1.26).

Conclusion
Children previously admitted to the ICU for asthma were at increased risk of asthma-related readmission, underlining the importance of the long-term follow-up of these children.

Disclosure of interest
The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.206

P3-21
Patients with Balkan endemic nephropathy from Mehedinți County, Romania: An epidemiological approach
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Introduction
Balkan endemic nephropathy (BEN) is a tubulointerstitial nephropathy, which evolves to symmetric kidney atrophy, renal failure and frequent upper urinary tract malignancies. Patients’ survival is conditioned by dialysis or renal transplantation. The causative agent is considered to be aristolochic acid, but the mode of natural exposure in the endemic Danube region (Romania, Bulgaria, Serbia, Croatia, Bosnia) was not exactly established. In Romania no confirmatory studies have been done so far, but the endemic area is considered to be the rural localities from Mehedinți and Caraș Severin counties. The purpose of this study was to describe the epidemiological characteristics of Mehedinți BEN cases in order to create the premises for future studies about disease’s determinants identification, the ways for achieving the exposure in the natural environment and suggesting paths to identify possible diagnostic criteria in an early stage of the disease.

Method
A cross-sectional study was conducted between July and September 2009, including the patients diagnosed with BEN and assisted in three dialysis centres from Drobeta Turnu-Severin. Data were collected using an original questionnaire, which included demographic data, symptomatology and investigations. Statistical analysis with descriptive indicators was performed in Epi info and Excel.

Results
A total of 74 patients were included in the study sample being in dialysis treatment in all three Drobeta Turnu-Severin dialysis centres. Patients, more women than men (gender ratio male to female of 0.81), were aged between 38 and 83 years, with an average age of 66.2 ± 9.5 years (± standard deviation: SD). They lived different time period in 38 villages in Mehedinți County, except for only one patient. Only in endemic area lived 57.7% of BEN patients and 22.6% of them have had interposed periods of staying in outside area. Others, 19.7% of them, after having originally lived in the endemic area, they permanently moved to non-endemic areas where they developed the disease. The mean age at diagnosis was 58.2 ± 11.5 years (range: 23–79 years), in men 59.4 ± 11 years (range: 23–71), and in women 57.5 ± 11.8 years (range: 33–79), without significant differences (P = 0.532) between the two genders. If in those living continuously in the endemic area BEN was diagnosed at an average age of 57.8 ± 11.6 years (range: 23–75 years), in the others who permanently left the endemic area the disease appeared after an average of 40.4 years (range: 10–69 years) after leaving the area, respectively to an average age of 59 ± 11.7 years (range: 33–79 years), differences being insignificant (P > 0.05) as time interval. Symptomatology reported by patients before diagnosis was installed slowly, with the most frequent being asthenia (93.1%), nycturia (81.9%), inappetence (77.8%), palsy (59.7%), polydipsia (54.2%), vomiting (52.8%), dysuria (45.8%). Of the laboratory parameters, beside those revealing renal dysfunction, consistently low values for hemoglobin (64.9%), erythrocytes (81.1%) and hematocrit (86.5%) were reported in patients. Concomitant malignancies had 11 patients (14.9%), mainly as urinary tract tumours. One patient had lung cancer, one colorectal and one ovarian cancer.

Conclusions
BEN affects only adult persons who live or have lived in the endemic area, especially in the 60th and 70th decade of life, regardless of their gender. Installation of the disease was similar regardless of whether or not the person left the endemic area. Patients presented as main associated pathology anemia and malignancies of urinary tract and other localizations.

Disclosure of interest
The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.207
was associated with a significantly increased risk of suicide, especially in insulin-deficient (type 1) diabetic patients.

Methods We have analyzed the intertwined external causes of death due to alcohol-related causes, accidents and suicides in a large national cohort containing all the patients treated with insulin and a random sample of half of those treated with oral antidiabetic drugs as being matched with a reference population. The study population was constructed based on the data of CARING Project [2] in Finland (http://www.caring-diabetes.eu/). The study population consisted of 475,360 individuals, 220,110 men and 206,472 women. We used suicides and sequelae of intentional self-harm, accidents, and alcohol-related diseases and accidental poisoning by alcohol as the endpoint events. We categorized subject into four groups by the diabetes drug at the start of the follow-up: no DM (reference), only oral antidiabetic drugs (OAD), OAD and insulin, and only insulin. The following variables were adjusted for age, calendar year in start of follow-up, usage of statins, usage of HRT, time since start of follow-up, cancer before start of follow-up, and hospital district. Adjusted mortality rate ratios (MRR) were estimated using Poisson regression model. Separate models were calculated for men and women.

Results The mean follow-up time was 6.6 years and 2.8 million person-years were cumulated during follow-up. We observed 2716 deaths caused due to alcohol-related causes, 3220 due to accidents, and 832 due to suicides. All diabetic groups, both men and women, had higher risk of alcohol-related death. Risk was high especially in insulin group, with MRR for men 4.56 (95% CI: 4.12, 5.05) and for women 4.32 (2.99, 6.24). Similar pattern was observed in accidents. MRR varied between men with OAD only group 1.16 (1.03, 1.30) and women in insulin only group 1.71 (1.47, 1.98). Also risk of suicide were higher in diabetics with highest MRR 2.04 (1.48, 2.81) in women in OAD only group.

Conclusions To conclude, we found in this large nationwide cohort that diabetic patients showed higher mortality due to suicides, alcohol-related causes and accidents than nondiabetic population, and that this premature mortality was most clearly associated with the use of insulin, reflecting the severity of diabetes, and with male gender. These findings underscore the importance of identifying high-risk patients early enough as well as effective psychosocial support and interventions among these individuals.

Disclosure of interest The authors declare that they have no competing interest.

References

P3-23 Association of postmenopausal hormone replacement therapy on metabolic syndrome components among diabetic and nondiabetic women

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Introduction It has been reported that high prevalence of metabolic syndrome and increased risk of diabetes in postmenopausal women. This may be hormone imbalance caused by ovarian failure in menopause periods. Although many studies have reported the effect of hormone replacement therapy (HRT) on chronic diseases, the risk and benefits of HRT are still controversial. Most of studies are focused on older white women, and studies target for younger menopausal Asian women are insufficient. In this study, we investigated the effect of HRT on metabolic syndrome components according to diabetes status in Korean women.

Methods This study was conducted in the Health Examinees (HEXA) study, a multicenter-based cohort using baseline data from 2004 to 2013. A total of 47,307 nondiabetic and 4003 diabetic postmenopausal women aged 40–69 years were included after excluding participants without information of menopause status, HRT and diabetes. Data was collected using interviewer-administered self-reported questionnaires. HRT was categorized into never, past and current users. Diabetes was defined as fasting glucose level ≥ 126 or reported medication use (hyperglycemic drug or insulin) by considering diagnosis of diabetes at recruitment. The mean differences of metabolic syndrome components (fasting glucose (FG), total cholesterol, high-density lipoprotein (HDL), triglyceride (TG), systolic and diastolic blood pressure (SBP and DBP), body mass index (BMI), waist circumference (WC), waist-hip ratio (WHR) and visceral fat) were assessed by using a general linear model (GLM) and Tukey’s multiple comparisons tests by adjusting for age, education, smoking, drinking, physical activity, hypertension, dyslipidemia and family history of diabetes or hypertension. The associations of HRT on metabolic syndrome components were performed stratified by diabetes status and the duration and the period of initiation of HRT after the menopause were considered among current users.

Results HRT use was associated with lower FG, total cholesterol, TG, SBP, DBP, BMI, WC, WHR and visceral fat among nondiabetic women, which were more stronger among current HRT users; mean differences for FG (past vs. never: 0.43 [95% CI: 0.16, 0.69] and current vs. never: 2.98 [95% CI: 2.57, 3.39]), total cholesterol (past vs. never: −0.08 [95% CI: −0.96, 0.81] and current vs. never: 11.39 [95% CI: 10.02, 12.76]), TG (past vs. never: 2.13 [95% CI: 0.16, 4.10] and current vs. never: 12.30 [92, 15.33]), WC (past vs. never: 0.77 [95% CI: 0.56, 0.97] and current vs. never: 1.26 [95% CI: 0.94, 1.57]), and visceral fat (past vs. never: 0.06 [95% CI: 0.04, 0.09] and current vs. never: 0.11 [95% CI: 0.07, 0.16]). The associations of HRT use on FG, total cholesterol, TG, SBP and WC were still significant among diabetic women. Considering the duration and the period of initiation of HRT after the menopause among current users, we could not confirm the differential associations between the groups, though.

Conclusion Healthy postmenopausal women could be expected to reduce of metabolic syndrome components by using HRT. It is still necessary to further study to evaluate the risks and benefits of HRT applied for younger healthy menopause women.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.209


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Introduction Inflammatory bowel disease (IBD) is a disease with chronic inflammation in large bowel, which consists of Crohn’s disease (CD) and Ulcerative colitis (UC). The incidence rate of IBD is the highest in Western countries, but the number of IBD cases is rising in Asia. Although IBD is believed to be associated with urbanization, such mechanism is not fully understood. Korea has a national health insurance system covering over 97% of the population. This study aims to find out the regional difference related to urbanization as well as the secular trends in IBD incidence by age and sex in Korea.

Methods We extracted all claim data of IBD patients in National Health Insurance Database (NHID) from 2002 to 2015, which was defined as those who had main diagnostic code of Crohn’s disease (CD) [K50] or Ulcerative colitis (UC) [K51] and have been prescribed relevant drugs simultaneously. We excluded patients who were diagnosed as IBD patients between 2002 and 2003 to select...
incident cases only. Annual age-standardized incidence rate was calculated as the number of incident IBID cases divided by the number of population who were registered in NHIS in the same year and stratified by age, sex, and region (metropolitan area or non-metropolitan area). Joinpoint regression was used for statistical analysis to compute annual percent changes (APC) in incidence rates.

Results A total of 55,613 IBID patients (17,178 for CD and 38,435 for UC) were identified from 2004 to 2015. The age-specific incidence rate of CD peaked at 10–29 years old in both men (9.04/100,000) and women (3.37/100,000) between 2004 and 2015. The incidence rate of CD was significantly increased in men aged 10–19 (APC = 12.2%), 20–29 (5.8%), and 30–39 (2.3%) and women aged 10–19 (11.4%), and 20–29 (3.0%), whereas significant decreases were observed for men aged 50–59 (−2.5%), and 80+ years (−9.8%) and women aged 40–49 (−4.9%), 50–59 (−4.0%), and 60–69 years (−4.9%). The age-specific incidence rate of UC peaked in 60–69 years old in both men (12.87/100,000) and women (9.86/100,000) between 2004 and 2015. Significant increase in incidence rates of UC was observed in men aged 10–19 (6.8%), 20–29 (5.5%), and 30–39 (2.0%), and women aged 10–19 (9.7%), and 20–29 (3.7%), whereas significant decrease was observed for men aged 80+ years (−4.8%) and women aged 40–49 (−2.2%), 50–59 (−3.1%), 60–69 (−4.6%), and 70–79 (−4.8%) years old. The incidence rate of CD was 3.29/100,000 in metropolitan area and 2.96/100,000 in non-metropolitan area, which were both annually increasing (APC of CD in metropolitan area: 4.7%, non-metropolitan area: 4.0%). The incidence rate of UC was 7.15/100,000 in metropolitan area and 7.02/100,000 person-years in non-metropolitan area, which were increasing in both areas (APC of UC in metropolitan area: 1.6%, non-metropolitan area: 1.1%).

Conclusion The incidence of both CD and UC in Korea was increased between 2004 and 2015. Metropolitan area showed higher incidence rate than non-metropolitan area. The most prominent increase of CD incidence was observed in 10–39 years old men and 10–29 years old women during the study period.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.210

P3-25

Predictors of readmission at 60 days after an admission by a COPD exacerbation

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Introduction COPD patients suffer repeated exacerbations (eCOPD) in the course of their disease. Some of them, causes the patient being admitted to a hospital. But, after discharge for that index admission, the rate of a new readmission at 30 to 90 days for these patients is higher than 20%. Exploring preventable factors related to those readmissions, and mainly at the time the patient is discharged from their index admission, has not been solve so far. Our goal was to explore possible variables related to readmissions up to 60 days after an index admission by an eCOPD.

Methods This was a prospective cohort study of patients who attended an emergency department (ED) at one of 16 hospitals and were admitted by an eCOPD. Information on possible predictor variables was recorded from the medical records and from the patient during the ED stay, 24 hours after admission to the hospital, during admission, and at hospital discharge. A readmission after an eCOPD within 2 months was the outcome of interest. Multivariable logistic regression models were employed for patients admitted to the hospital from the ED.

Results Of the 1537 patients included in the study, 382 (24.85%) had a readmission within 60 days from the index admission. In the multivariable logistic model, variables related to those readmissions at 60 days were: eCOPD-related hospital admissions in the previous year [for those with 2 admissions vs. none, the odds ratio (OR) was 2.44/95% confidence intervals (95% CI): 1.579–3.783]; if ≥ 2 vs. none, the OR was 3.340 (95% CI: 2.250–4.958); the baseline FEV1% [if FEV1% was < 30 the OR was 1.614 (95% CI: 1.083–2.407)]; and the use of diuretics [1.537 (1.47–2.059)]. And, additionally, among parameters recorded at the discharge day from the patient, the fatigue perception by the patient at that time [too much or much fatigue vs. none, OR of 1.927 (95% CI: 1.055–3.519)]. Some fatigue vs. none, OR: 1.490 (95% CI: 1.077–2.062) and having anxiety or depression at that time [OR: 1.722 (95% CI: 1.086–2.941)] were also related. The AUC (95% CI) for the model was 0.697 (0.663–0.732) and the p-value of the Hosmer–Lemeshow test was 0.6711. Additionally, the hospital where the patient was admitted also has a relationship with the readmission at 60 days. Being admitted in a few specific hospitals of our study had a higher likelihood of readmission at 60 days for their patients. Model AUC increases to 0.712 (0.678–0.746).

Conclusions The severity of the disease and its evolution (as measured by the FEV1% and the eCOPD-related hospital admissions in the previous year) jointly with an indirect measure of the presence of other comorbidities (use of diuretics for cardiac disease) had a relationship with readmissions at 60 days. But also had the presence of severe fatigue and psychological distress at the time of discharge. These last variables should be taken into account when introducing possible preventive measures at discharge time from an index admission to reduce readmissions in these patients. Finally, another modifiable variable, though more complex, was the hospital where the patient was admitted.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.211

P3-28

Low fasting values of serum insulin in a cohort of nondiabetic women followed over 34 years: Evidence for an alternative pathway to dementia

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Background A previous study reported a U-shaped association between fasting insulin and dementia in a 5-year follow-up of a male cohort [1]. More recently, a cross-sectional study of 262 older adults free of diabetes and cognitively normal showed that decreased blood insulin below optimal levels was associated with higher beta amyloid deposition and neurodegeneration [2]. The purpose of the present study was to investigate the prospective association between fasting serum insulin and dementia in a representative population of women followed over 34 years, taking into account the incidence of diabetes.

Methods Fasting values for insulin and glucose were obtained from serum samples in 1212 nondiabetic women aged 38–60 at the 1968 baseline. Risk of dementia was assessed by Cox proportional hazard regression adjusting for insulin, glucose, and other covariates, and, in a second model, after censoring for incident cases of diabetes. Incident diabetes was considered as a third endpoint, for comparison with dementia.

Results Over 34 years, we observed 142 incident cases of dementia. The lowest tertile of insulin was associated with excess risk for dementia, hazard ratio (HR) = 2.33, 95% confidence interval = (1.52, 3.58), compared to the intermediate tertile, but the highest tertile of insulin was not, HR = 1.27 (0.81, 2.02). These associations were also seen for dementia without diabetes comorbidity. In contrast, high but not low insulin predicted incident diabetes (115 cases), HR = 1.69 (1.08, 2.66) and HR = 0.76 (0.43, 1.36), respectively.

Conclusion This study provides epidemiological evidence for a new pathway to dementia that is characterized by low fasting serum insulin and differs from the metabolic pathway via hyperinsulinemia or diabetes. The identification of the tails of the U-shaped risk curve for insulin and dementia with distinct pathways was possible due to the long follow-up, and by comparing the associations of insulin with different dementia endpoints and diabetes. The distinction between alternative pathways will explain inconsistent epidemiological findings regarding risk factors of dementia and its subtypes.

Disclosure of interest The authors declare that they have no competing interest.
Type 2 diabetes mellitus and risk of dementia: A population-based 14-year follow-up study in Germany

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Introduction: In the face of population ageing, dementia is an urgent public health problem. Dementia has been reported to be a comorbidity of type 2 diabetes mellitus in older people, but the pathological mechanisms linking both conditions remain unclear. The major gene associated with pathology of dementia, especially Alzheimer’s disease, is the apolipoprotein E (APOE) gene, which has also been implicated in predisposition to diabetes. Given the scarcity of epidemiological studies on possible interactions so far, we examined the association of type 2 diabetes alone and combined with APOE genotype with incidence of dementia in a cohort of older Germans followed for approximately 14 years while accounting for competing risk of death.

Methods: We used data from an on-going population-based prospective cohort study (ESTHER) in the state of Saarland in the south-west of Germany. In total, 9949 elderly participants aged 50–74 years were recruited from July 2000 to December 2002 by their general practitioners followed by 5 waves of interviews up to now. Data were collected using standardized self-administered questionnaires including health-related information and basic sociodemographic, self-reported medical diagnoses of diabetes were validated by general practitioners at each interview. Dementia-related information was collected retrospectively among all ESTHER participants, including those who dropped out or deceased after the follow-up. APOE genotype was measured using TaqMan SNP genotyping assays and participants were divided into e4 allele carriers and non-carriers. Standard Cox proportional hazard regression models were used to analyze the association of diabetes, as well as diabetes combined with APOE e4 carrier status, with incidence of all-cause dementia and its main subtypes (vascular dementia and Alzheimer’s disease). Fine and Gray competing risk models were used to analyze the association of diabetes and dementia after adjusting for competing risk of death.

Results: Of 5648 eligible participants with complete information, 793 had type 2 diabetes (mean age 63.8 ± 6.4 years) at baseline, and 4855 did not have type 2 diabetes (mean age 61.4 ± 6.5 years). Among the overall sample, 304 developed dementia, including 90 with Alzheimer’s disease and 113 with vascular dementia. In the fully-adjusted Cox model, the risk of all-cause dementia was 61% higher (hazard ratio [HR]: 1.61; 95% confidence interval [CI]: 1.22–2.12) among type 2 diabetes patients than among non-diabetes patients. Adjusted HRs for Alzheimer’s disease and vascular dementia were 2.30 (95% CI: 1.38–3.86) and 1.41 (95% CI: 0.89–2.25), respectively. After adjusting for competing risk of death, type 2 diabetes was associated with an adjusted HR of 1.47 (95% CI: 1.10–1.96) for all-cause dementia, 2.18 (95% CI: 1.27–3.75) for Alzheimer’s disease and 1.27 (95% CI: 0.78–2.02) for vascular dementia. Compared with those who were neither type 2 diabetes patient nor APOE e4 carrier, those with both risk factors had significantly higher risk of Alzheimer’s disease (HR: 4.10; 95% CI: 1.67–10.07), vascular dementia (HR: 2.41; 95% CI: 1.14–5.09) and all-cause dementia (HR: 2.18; 95% CI: 1.37–3.46), and the HRs were higher than that of each factor alone.

Conclusions: Our data indicates that type 2 diabetes is associated with increased incidence of dementia in older population, and particularly with Alzheimer’s disease. The association between diabetes and dementia was attenuated after accounting for competing risk of mortality but remained strong. Carrying the APOE e4 genotype further increases the risk of dementia in type 2 diabetes patients, especially for Alzheimer’s disease.

Disclosure of interest: The authors declare that they have no competing interest.

Prevalence and characteristics of metabolic phenotypes: The Rhineland study, Germany

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Background: Body mass index (BMI) is a commonly used yet crude indicator of obesity as it does not provide any information about body composition or metabolic characteristics. The definition of obesity needs to be improved and is still a matter of on-going debate. Other single body measurements and/or metabolic characteristics perform better at capturing adiposity-related health risk. Percent age of body fat (PBF) is an indicator of risk for several comorbidities related to obesity. Nevertheless, obese individuals differ not only in the amount of excess fat mass but also in regional fat distribution. Thus, waist circumference (WC) and waist to hip ratio (WHR) have been used as proxy measures for body fat distribution and identifying individuals at-risk. More recently, metabolically healthy (MH) and metabolically unhealthy (MU) phenotypes based on several metabolic profiles have been suggested as a clinically more relevant classification for obesity.

Objective: To estimate (a) the prevalence of metabolic healthy and unhealthy phenotypes and (b) the prevalence of individuals at-risk defined by PBF, WC and WHR in German adults aged 30–93 years and (c) the proportion of overlap between these two risk assessments.

Method: We used cross-sectional data on anthropometric measures, body composition and clinical characteristics from the Rhineland Study, Germany. Metabolically healthy and unhealthy phenotypes were defined by a pre-established classification combining the following clinical criteria: blood pressure ≥ 130/85 mmHg, triglycerides ≥ 150 mg/dL, HDL cholesterol < 40 mg/dL in men or < 50 mg/dL in women, C-reactive protein > 0.1 mg/L, glycated haemoglobin (HbA1c) ≥ 6.5%. Study participants having two or more of these cardio metabolic abnormalities were considered as MU. We identified 6 metabolic phenotypes: normal weight (BMI < 24.9 kg/m2), overweight (BMI 25–29 kg/m2) and obesity (BMI ≥ 30 kg/m2) combined with either metabolically healthy or metabolically unhealthy status. We used established cut-offs for PBF (≥ 35% for women [W] and ≥ 25% for men [M]), WC (≥ 94 cm for W and ≥ 80 cm for M) and WHR (≥ 0.85 for W and ≥ 0.90 for M) to identify individuals at-risk for overall adiposity or abdominal adiposity. We performed descriptive statistics i.e. calculated frequencies to estimate prevalence of metabolic phenotypes and mean and standard deviations to describe clinical characteristics of the study participants.

Results: Based on data from the first 990 participants (440 M and 550 W), overall prevalence of MU phenotype was 13.3%, with higher prevalence in men (7.8%) than in women (5.5%). The mean (± SD) age for the MH group was 55.8 ± 14.0 y and for the MU group 62.5 ± 12.2 y. According to BMI groups, the prevalence of MU for normal weight, overweight and obese participants were 4.3%, 16.9% and 33.5%, respectively. The prevalence of individuals at-risk identified by PBF was 46.8% of which 6.3% were classified as MU for WC the prevalence was 52.4% of which 11.6% were categorized as MU. The
Prevalence of high blood pressure differs across regions in France: Estimations from a cross-sectional analysis of the CONSTANCES cohort

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Introduction
In France, important territorial variations of diseases such as cardiovascular or chronic kidney diseases have been reported. For example, incidence of end stage renal disease in the east of France is twofold higher compared to that in the north. These diseases share common risk factors, mainly high blood pressure (HBP) which is the leading preventable cause of premature death worldwide. However, few studies had the scope and sufficient power to explore territorial variations of HBP within France. The aims of this study are first to identify the geographical variations of prevalence of HBP across the country using the data from the French cohort CONSTANCES; second to explore the potential contributions of behavioral, socioeconomic and access to care characteristics in these variations.

Methods
CONSTANCES is a population-based cohort targeting adults aged 18 to 69 years old living in different regions of France. Information on lifestyle was collected by self-administered questionnaire. Blood pressure was measured in 16 different recruitment centers using a standardized protocol. HBP has been defined as blood pressure over 140/90 mmHg and/or taking antihypertensive medication as indicated by matched records from the national database or reimbursements from the French health insurance. Analyses were stratified by gender.

We first calculated prevalence of HBP as well as proportion of treated hypertensive individuals across the different centers. We then performed logistic regressions to estimate changes in predicted prevalence of HBP between centers after taking into account individual behavioral and socioeconomic as well as neighborhood variables.

Results
A total of 33,665 individuals (52.5% women) recruited in 2013 and 2014 were included in the analyses. Mean age in men and women was 48.8 ± 12.9 years and 47.3 ± 13.0 years respectively. In total, 10,285 individuals were classified hypertensive, yielding a crude prevalence of HBP of 30.6%. Using 2014 French population as reference, age-standardized prevalence of HBP was 27.1% [95% CI: 26.6–27.7], higher among men (33.7% [95% CI: 32.8–34.6%]) than women (20.8% [95% CI: 20.1–21.4%]). Prevalence increased with age, from 10.3% [95% CI: 9.5–11.2] in 18–34 years to 62.7% [95% CI: 60.2–65.2] in people aged 65 years and more. Pronounced differences between regions were observed. The region of Lille had the highest prevalence both in men (48.6% [95% CI: 44.5–52.6%]) and women (28.3% [95% CI: 25.6–31.1%]), and in all age groups. The lowest prevalence was observed in Paris in men (26.0% [95% CI: 24.2–27.9]) and in the region of Saint-Brieuc in women (16.5% [95% CI: 14.5–18.4]). The proportion of treated hypertensive individuals also varied across regions, from 37.1% in the region of Saint-Nazaire to more than 66% in Saint-Brieuc in women and from 32.5% in Lille to 49.1% in Saint-Brieuc in men. Taking into account behavioral risk factors reduced moderately variations in prevalence of HBP. In men, adjusting on body mass index, physical activity and smoking status was associated with a 3.9% diminution of the difference between extreme regions in prevalence of HBP (from 22.7% to 18.8%). Adjusting in addition on socioeconomic individual factors such as education, accessibility to a general practitioner or a pharmacist, and on rural/urban typology of residence was associated with a further 3.5% diminution of the difference between extreme regions in prevalence of HBP (from 18.8% to 15.3%). Thus the global reduction from 22.7% to 15.3% corresponds to a decrease of around 33% in the spread of territorial variations.

Conclusions
Prevalence of HBP differs markedly between geographical areas in France. The gradient observed in this analysis is in accordance with results from the previous French MONICA study, with a higher prevalence of HBP in the north and the east of France compared to the south. Behavioral and socioeconomic risk factors explain nearly a third of the difference in prevalence of HBP between regions.

Disclosure of interest
The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.216

P3-32
Ischemic heart disease as a multiple contributing cause of death among diabetes mellitus deaths, and their association with demographic and clinical factors

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Introduction
Comparability of mortality statistics between countries is a global public health challenge, in particular for cause-of-death assignment of diabetes mellitus (here after diabetes) in relation to cardiovascular disease including ischemic heart disease (IHD). Diabetes increases risk of IHD. As the underlying cause of death (UCD) becomes the cause of death, the multiple contributing causes of death (MCD) representing comorbidity are not used to classify mortality cause. The demographic and clinical factors for having IHD as MCD among diabetes deaths were determined in this study to aid in policy making for preventing IHD deaths as comorbidity of diabetes.

Methods
Originally from the Centers for Disease Control and Prevention (CDC) in the US for years 2012–2015, and from Sistema de Información sobre Mortalidad en Brasil for years 2006–2009 and 2011–2013, causes of death data from death records were accessed through the World Health Organization. A logistic regression analysis was conducted to determine factors associated with having IHD as an MCD among deaths with diabetes as the UCD.

Results
Ischemic heart disease emerged as an MCD in 38% and 16% of 305,885 deaths in the US, and 367,717 deaths in Brazil that were deaths with diabetes as the UCD, respectively. Marital status, age, place of death, existence of autopsy, smoking, and high cholesterol were significantly associated to having IHD as an MCD in both countries. In the US, race was significantly associated to having IHD as an MCD. In Brazil, significant factors also included assistance of medical staff, education, having hypertension, and obesity (P-values < 0.05).

Conclusions
Multiple contributing causes of death could play an important role in better characterizing diabetes mortality estimates. Differences in the existence of IHD as comorbidity of diabetes deaths were recognized between the US and Brazil. Factors identified in this study could aid in detecting population subgroups with masked IHD among diabetes deaths. Representation of IHD comorbidity among diabetes deaths is needed for adequate public health
P3-33
Prevalence and trends in overweight, obesity, diabetes and hypertension among women of reproductive age

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Background Non-communicable diseases (NCDs) and their risk factors, among women of childbearing age, beyond of been associated with increased cardiovascular risk, also imply a greater likelihood of adverse maternal and neonatal outcomes. International studies have shown high prevalences and increasing trends of NCDs and their risk factors in this specific population.

Objective Thus, the objective of this study was to analyze the temporal evolution of the prevalence of overweight, obesity, diabetes and hypertension in the population of Brazilian women of reproductive age between 2008 and 2015.

Methods This is a population-based time series study that used data from the Surveillance and Monitoring System for Risk Factors and Protection by Telephonic Inquiry (Vigitel) of Brazilian women aged 18 to 49 years who answered the survey in the period from 2008 to 2015. The prevalence of overweight, obesity, diabetes and hypertension in each year was estimated for the study population, considering sociodemographic characteristics (age, schooling, home region, skin color and marital status). The Praiss-Winsten generalized linear regression model was used and the annual rates of change were calculated.

Results Prevalence of overweight and obesity in all age groups, schooling, color, marital status and region was observed to be increasing, except for the prevalence of overweight in women aged 30 to 39 years (P = 0.053), black (P = 0.558) and living in the southern region (P = 0.075). The women studied had the highest increase (5.8%) in the prevalence of overweight compared to the Brazilian population (3.5%), and those from 18 to 29 years of age also had a greater increase (9.4%) in prevalence of this aggravation compared to 40 to 49 years (3.3%). Prevalence of diabetes (P = 0.087) and hypertension (P = 0.307) showed a steady trend. However, there was an increasing trend in the prevalence of diabetes among women aged 40–49 (P = 0.001), single (P = 0.023), 12 years or more (P = 0.007) and living in the North (P = 0.014) and Center-West (P = 0.018).

Conclusion Among the results found, it is worth noting the increasing and alarming prevalence of overweight and obesity, which are important risk factors for NCDs. In addition, there was a greater increase in the prevalence of overweight for younger women, which increases the likelihood of these to experience pregnancy complications associated with obesity, diabetes and hypertension.

Funding National Council for Scientific and Technological Development (CNPq), MCTI/CNPq/Universal 14/2014 (Process No. 449087/2014-0), Brazil.

Keywords Overweight; Obesity; Diabetes mellitus; Hypertension; Women’s health; Epidemiological surveys; Time series study

Disclosure of interest The authors declare that they have no competing interest.

P3-34
Risk of cerebral palsy in relation to parental chronic diseases: Mother or father, does it matter?

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Introduction Cerebral palsy (CP) is the most common cause of physical disability of childhood affecting approximately 2 per 1000 live born. Lifetime disability burden is high and assessing modifiable risk factors are important. An antenatal origin is likely in most cases. Some maternal chronic diseases have previously been associated with increased risk of CP in offspring, with inflammation and genetics postulated as possible causal pathways. The aim of this study was to investigate associations between maternal and paternal chronic diseases and risk of CP in offspring. Additionally, we aimed to explore the importance of the maternal chronic diseases being present during pregnancy.

Methods We used information on children born during 1990–2013 registered in the Medical Birth Registry of Norway. Information on CP status was retrieved from the Norwegian Insurance Scheme and the Norwegian Patient Registry. By record linkage between the birth registry and patient registry, we were able to extract information on maternal and paternal diagnosis unrelated to time of pregnancy. We constructed 870,212 mother–children-pairs including 2190 CP cases (2.5 per 1000) and 719,179 father–children-pairs including 1736 CP cases (2.4 per 1000). In additional analyses, we used information on maternal diagnosis registered in the birth registry as present before or during pregnancy as the exposure [1.3 million children and 3356 CP cases (2.6 per 100)]. We used log binominal regression models to estimate the risk of CP by parental disease status.

Results The majority of the maternal diseases from the patient registry were positively associated with CP in children. Type 2 diabetes was associated with a 2.5-fold excess risk [relative risk (RR) 2.5, 95% confidence interval (CI) 1.9–3.3], type 1 diabetes with a 2.2-fold excess risk (RR: 2.2, 95% CI: 1.7–3.0) and gestational diabetes with a 1.8 fold (RR: 1.8, 95% CI: 1.4–2.4) excess risk. Markedly increased risk was also seen for chronic hypertension (RR: 1.8, 95% CI: 1.4–2.4), lupus (RR: 1.7, 95% CI: 0.8–3.7), chronic kidney disease (RR: 1.5, 95% CI: 1.0–2.1), Crohn’s disease (RR: 1.5, 95% CI: 0.9–2.4) and hypothyreosis (RR: 1.4, 95% CI: 1.0–2.0). For many of the diseases present before or during pregnancy retrieved from the birth registry, the association were even stronger, including diabetes type 2 (RR: 3.5, 95% CI: 2.0–6.2), lupus (RR: 2.9, 95% CI: 0.9–9.9), Crohn’s disease (RR: 2.3, 95% CI: 1.2–4.4) and rheumatoid arthritis (RR: 2.0, 95% CI: 1.3–2.9). Paternal diseases did not imply the same excess risks as maternal diseases. Except for psoriasis (RR: 1.6, 95% CI: 1.2–2) the risks were lower than for mothers.

Conclusions We found positive associations between maternal, but not paternal chronic diseases and CP in children. Some associations were stronger when the disease was present during pregnancy. Our results do not add strength to the hypotheses of a common genetic pathway for chronic diseases in parents and CP in offspring. However, our findings may indicate that intrauterine environment is important with chronic inflammation as a possible causal pathway.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.219

https://doi.org/10.1016/j.respe.2018.05.220
P3-35 
Trajectories of pain, physical function and physical activity components in patients with symptomatic knee and hip osteoarthritis: A group-based multi-trajectory approach
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Introduction The aims of this study were to identify homogeneous subgroups with distinct trajectories of pain, physical function and physical activity (PA) components in patients with symptomatic knee and/or hip osteoarthritis (OA) and to identify the baseline predictive factors associated with these trajectories. Methods The KHOALA cohort is a French population-based multicenter cohort of 878 patients with symptomatic knee and/or hip OA, aged between 40 and 75 years old recruited between 2007 and 2009. Six outcomes assessed annually during a period of 5 years were modeled in the multi-trajectory model. Pain and physical function were measured with the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) questionnaire while PA intensity [in metabolic equivalent of task (MET)], frequency (times per week), duration (hours per week) and type (weight-bearing exercises or not) were assessed by the Modifiable Activity Questionnaire (MAQ). At baseline, the radiological severity of OA was analyzed using Kellgren and Lawrence (KL) grades, comorbidities by the Functional Comorbidity Index (FCI) and perceived vitality with the Short Form Health Survey (SF-36). Group-based multi-trajectory modeling was used to identify subgroups with distinct trajectories of pain, function and PA components. Patients with at least two available measures were included in the analyses. First, trajectory models were estimated with varying number of groups for each of the outcomes separately to clarify the types of distinct trajectories to be represented in the multi-trajectory model. The selection of the optimal models was based on maximizing the Bayesian information criterion, the proportion of patients in each trajectory group (> 5%) and the statistical significance of the equation modeled (intercept only, linear, quadratic or cubic). Then, each outcome trajectories characteristics were included in the multi-trajectory model and the optimal one was chosen according the same selection criteria. Multinomial logistic regressions were performed to identify the predictive baseline characteristics associated with each group and were adjusted for sociodemographic and clinical factors. Results Among the 878 patients, 609 (69.4%) were women, 222 (25.3%) had hip OA, 607 (69.1%) knee OA and 49 (5.6%) both hip and knee OA. Group-based multi-trajectory modeling revealed 3 distinct trajectories of pain, physical function and PA components over 5 years. The first (n = 187, 35.2%) included patients with low pain levels, no functional limitations and who practiced intense PA and weight-bearing exercises. The second (n = 218, 41.0%) included patients with moderate levels of pain and functional limitations and who practiced a less intense PA. Patients belonging to the third group (n = 127, 23.9%) had severe pain, severe functional limitations and a low-intensity practice with rare weight-bearing exercises. Overall, a decrease in intensity, frequency and duration of PA was observed in all groups over 5 years, even in the group of subjects with low pain levels and no functional limitations. In multivariate analyses, female sex (odds ratio [OR] = 2.76, 95% confidence interval [CI] = 1.48–5.17), increasing age (OR = 1.05, 95% CI = 1.01–1.08), a high number of comorbidities (OR = 1.51, 95% CI = 1.21–1.90), a low vitality score (reflecting a high level of fatigue; OR = 0.94, 95% CI = 0.92–0.97) and a high KL grade (reflecting a high radiological severity; OR = 3.42, 95% CI = 1.53–7.65) were associated with the third group membership.

Conclusion Based on the 5-year follow-up data, we identified 3 distinct trajectories of pain, physical function and PA components. A high number of comorbidities, a high level of fatigue and a high radiological severity were associated with the trajectories of severe pain and functional limitations. The management of these factors seems important to maintain physical function, limit pain and maintain PA practice in patients with symptomatic knee and/or hip OA.

Disclosure of interest The authors declare that they have no competing interest.
https://doi.org/10.1016/j.respe.2018.05.221

P3-36 
Impact of active video games on body mass index in children and adolescents: Systematic review and meta-analysis evaluating the quality of primary studies
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Introduction Overweight and obesity in children and adolescents is a major concern in public health. Our objective is to study through a meta-analysis of primary studies, the impact of active video games on body mass index (BMI) in children and adolescents. Methods A comprehensive literature research was conducted due clinical trials (both controlled and uncontrolled) in children and adolescents, written in English or Spanish, whose intervention was based on active video games. Different bases of international bibliographic databases were consulted: Medline through PubMed, ISI Web of Knowledge and SCOPUS. A manual search was also conducted in the references of retrieved studies as well as meta-analyses and systematic reviews found that addressed active video games. All relevant primary studies (published or about to be published) were identified. Data were pooled in meta-analysis using the method of random effects or fixed effects, as convenient, after examination of statistical heterogeneity using the Cochran Q test and heterogeneity, and t2, teI 2 statistics. The origin of heterogeneity and publication bias was also investigated.

Results The individual results of the determinations of the 12 included studies that fulfilled the inclusion criteria, showed a high heterogeneity among them (Q = 102.71, df = 15, P < 0.001, I2 = 85.40%, r = 0.55). The overall intra-group effect of the intervention based on active gaming was in favor of the intervention, reaching statistical significance using the fixed effects model: standardized mean difference (SMD) = −0.169; 95% CI (−0.276 to −0.064), P = 0.002 and was of borderline statistical significance in the random effects model: DEM = −0.201; 95% CI (−0.408 to 0.006), P = 0.057. Seven out of the 12 included studies were controlled clinical trials (two arms) and 5 were non-controlled trials (only one intervention arm). The overall intra-group effect in the control group was close to zero (SMD = 0.065), presenting the individual results also high heterogeneity among them. When the intervention was applied to children and adolescents with greater than or equal to 85 (overweight or obese) BMI percentile showed a greater effect in favor of the intervention with a SMD = −0.590, 95% CI (−1.036 to −0.144) P = 0.01 under the random effects model. Making a restriction to controlled studies, the mean difference meta-analyzed the group intervened with active video games and the control group was also in favor of the first one and statistically significant game for both BMI (kg/m2) with a DM = −0.339, 95% CI (−0.461 to −0.271), P ≤ 0.001 under the random effects model; as for BMI z-score with a DM = −0.091, 95% CI (−0.162 to −0.019), P = 0.013 under the random effects model. The relation to a possibility in the existence of a possible publication bias, according to procedure of “Duval and Tweedie (Trimm and fill)” were slightly more in favor of the intervention with active video games with a DEM = −0.407 for intra-group effect in the intervention group, a DM between groups of −0.372 for BMI (kg/m2), and −0.135 for BMI z-score, by the random effects model.

Conclusions Our meta-analysis shows a statistically significant effect in favor of using active video games on BMI in children and adolescents. Given the novelty of active video games, and that the analyzed studies have evaluated short-term interventions, it is necessary to conduct long-term studies with larger sample size, in order to reach valid and reliable comparisons. The clinical relevance of the positive effect must be also evaluated.

Disclosure of interest The authors declare that they have no competing interest.
https://doi.org/10.1016/j.respe.2018.05.222
P3-37
Are there gender differences in the risk of asthma exacerbations?
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Introduction
Several studies support that the risk of asthma exacerbations (AE) is higher in women than in men. We analyze whether there are actually gender differences, or whether this association can be explained by confounding.

Methods
Retrospective population-based cohort study including 2000 asthmatic patients > 14 years old obtained by simple-random-sampling. AE requiring oral corticosteroid were considered as ‘moderate’, and AE requiring ‘parenteral corticosteroid and/or magnesium sulphate’ were considered as ‘severe’.

Adjusted odds ratios (OR) and their 95% confidence intervals (95% CI) were estimated by logistic regression.

Results
The overall mean age was 41.7 years [SD=19.7], with 46.2% of men and 53.8% of women. Women had a higher risk of suffering at least one moderate exacerbation the follow-up year: OR: 2.01; 95% CI (1.42 to 2.85).

Both obesity: OR: 2.40; 95% CI (1.51 to 3.81) and age: OR (increase per decade) 1.31; 95% CI (1.21 to 1.41) were associated with a higher risk of AE, meeting the criteria to be treated as confounding variables. After including age as a confounding variable, the association between being female and the risk of AE did not change substantially: OR 1.56; 95% CI (1.09 to 2.25). After including obesity (BMI) association also remained: OR: 1.73; 95% CI (1.16 to 2.57). However, after including both obesity and age together in the same multivariable model, the association between being female and the risk of AE diminished and lost statistical significance: OR: 1.44; 95% CI (0.95 to 2.17).

Conclusions
Female gender is associated with an increased risk of AE. However, this association can be explained by women’s older age and obesity, acting both as confounders.

Disclosure of interest
The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.223

P3-38
Frequent exacerbator phenotype in milder grades of COPD severity according to FEV1
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Introduction
The epidemiology of the frequent exacerbator (FE) phenotype is limited in patients with a mild-grade of the disease, because they usually are not included in epidemiological studies. Our objective was to study predictors of FE in mild-grade COPD patients in comparison with more severe COPD patients.

Methods
We conducted a retrospective population-based cohort study including 723 patients with confirmed COPD and FEV1 data available. Exacerbation frequency was observed for the previous year and the following year. Patients were defined as FE phenotype if they suffered ≥ 2 exacerbations in a year and were categorized according to severity of COPD: GOLD grade 1 (≥ 80%), grade 2 (≥ 50–79%), grade 3 (≥ 30–49.9%), grade 4 (< 30%). Odds ratios (OR) and their 95% confidence intervals (95% CI) were estimated by logistic regression adjusting for age, gender and smoking status.

Results
Seventy-five out of the 723 patients (10.4%) were classified as FEV1-mild-GOLD grade 1 patients; 433 (59.9%) were FEV1-moderate-GOLD grade 2; 190 (26.3%) severe-GOLD grade 3 and 25 patients (3.5%) very severe-GOLD grade 4. The main predictor of being FE among all grades of COPD severity, was a history of frequent exacerbations the previous year: crude odds ratios: 5.87, 4.73, 6.32 and 4.00 for GOLD grades 1, 2, 3 and 4, respectively. In the multivariable analysis, association in mild-GOLD grade 1 patients strengthened: adjusted OR: 15.90 (95% CI: 3.22–78.59), whereas in the rest of patients associations range from 4.20 to 6.58.

Conclusions
The FE phenotype susceptibility seem to be also important in patients with milder disease (GOLD grade 1), supporting a reconsideration of a more in-depth monitoring and treatment.

Disclosure of interest
The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.224

P3-44
Trends in renal transplantation among people with diabetes in Ireland
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Introduction
439 million adults will be affected by diabetes by 2030 with a global prevalence among adults of 7.7%. As the prevalence increases, integrated care primary and secondary healthcare settings is crucial. For planning of health services, it is important to know the burden of diabetes-related complications including renal transplantation for end stage renal disease. The aims of this study are:

—to describe trends in renal transplantation in adults with and without diabetes;
—to estimate the relative risk of an individual with diabetes undergoing renal transplantation compared to an individual without diabetes in Ireland.

Methods
This is a retrospective study using hospital discharge data i.e. Hospital Inpatient Enquiry (HIPE) systems in Ireland. All adults aged > 18 years who underwent a renal transplant between 2009 and 2015 were identified using International Classification of Disease (ICD) 10 codes. Participants were classified as having diabetes or not. Incidence rates were calculated using estimates for the general population with and without diabetes.

Results
The overall incidence of transplant was higher in people with diabetes compared to those without diabetes from 2009 to 2015. The incidence of transplantation in patients with diabetes ranged from 24.9 per 100,000 population in 2009 to 8.8 per 100,000 population in 2015. The relative risk of a renal transplant in 2015 in patients with diabetes was found to be 2.13 (95% CI: 1.30–3.53).

Discussions
This study provides national estimates of the incidence of transplantation in those with and without diabetes in Ireland. In the absence of a diabetes or renal register, this is the best available data to assist decision makers on allocation of valuable resources to develop an integrated health system.

Conclusions
People with diabetes are at increased risk of requiring a transplant. Policymakers and service-planners should be mindful of this when planning future integrated care services.

Lessons learned
Ideally, the burden of all end stage renal disease (requiring dialysis and/or transplantation) would have been described. However, pilot work highlighted that it was not possible to identify individual patients on dialysis from hospital records due to the absence of a unique patient identifier.

Limitations
These rates are based on hospital discharge data from all public hospitals, but only a few private hospitals. HIPE relies on the accuracy of the discharge data. Some concerns have been raised about the accuracy of HIPE. However, no coding system is 100% accurate and in the absence of a renal or diabetic registry, HIPE represents a suitable alternative.

Suggestions for future research
This study provides baseline data on transplantation rates in people with and without diabetes; further analysis of annual trends should be undertaken. It is envisioned that a unique patient identifier for each person in Ireland will become operational in the near future. When available, monitoring of trends in dialysis should be undertaken to capture the national picture, review changes over time, explore if regional variation exists and benchmark Irish activity against other countries.
P3-46
Biological influences on health-ratings: The relationship of self-rated health, biomarkers, and diabetes and how it differs across groups
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Introduction Self-ratings of health (SRH) are the most widely used single-indicator of health in many scientific disciplines as well as in epidemiology. Accordingly, many researchers rely on SRH in describing, examining, and explaining (social) inequalities in health. How these ratings come about, however, is still relatively unexplored. For instance, little is known about the extent to which undiagnosed diseases or the severity of present diseases play a role in rating one’s health. Biomarkers, such as HbA1c for diabetes, play an interesting role in this regard since they give objective and highly relevant health information beyond what a respondent is willing - or able - to tell. Thus, they offer the possibility of investigating the relevance of diseases unknown to respondents or the severity of diseases.

Methods Through the example of diabetes and the pertinent lab-measured HbA1c-concentration in the respondents’ blood, this paper analyzes the relative roles of diagnoses and biomarkers in the evaluation of general health. To do so, this paper draws on diverse health data from 2890 respondents aged 50–79 collected in the 2007 and 2009 waves of the Canadian Health Measures Survey (CHMS). The paper quantifies and compares the contribution of self-reported diagnoses of diabetes and biomarker-identified diabetes, undiagnosed diabetes, prediabetes, and diabetes-severity to explaining SRH. Their contributions are compared between genders, age, and education. Additionally, separate analyses of all 359 self-reportedly diagnosed diabetics in the sample were conducted in order to investigate the role diabetes-severity plays within diabetics when rating their health.

Results Across all subgroups, the influence of undiagnosed (pre)diabetes as well as HbA1c on SRH appears to be subordinate to a manifest diagnosis of diabetes. With the exception of older men (aged 65–79), all models show a greater influence of diagnoses than lab-indicated diabetes while lab-indicated prediabetes generally does not affect SRH when controlling for other health indicators. General and subgroup analyses of the influence of severity within diabetics reveal that HbA1c indeed influences diabetics’ SRH, although only for older respondents (65+) as well as respondents with at least post secondary education.

Conclusions While further research is needed, these results highlight the importance of diagnoses of chronic diseases in rating one’s health. This paper also suggests that SRH is primarily based on information known to and relevant for the daily lives of respondents while undiagnosed diseases and disease-severity are - at least in the case of diabetes - less relevant.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.230
Pierre-Bénite, France. had CFRD before LT. The mean patients were delF508 homozygous. All were pancreatic insufficient, and 42
Results Sixty-three adult CF patients were transplanted. Thirty-two (53.3%) patients were delF508 homozygous. All were pancreatic insufficient, and 42
Material and methods We analyzed pregnancies reported to the French cystic fibrosis registry between 2000 and 2012, in women without lung transplantation with a first delivery and a valid FEV1 measurement the year before pregnancy. We compared pregnancy outcome, clinical evolution (body mass index and pulmonary function) before and after pregnancy in women with and without pre-gestational poor pulmonary function.

Methods CF patients treated in the Lyon CF reference centre and transplanted at the Lyon University Hospital (France) between 2004 and 2014 were retrospectively included. Genotype (classified in delF508 homozygous, delF508 heterozygous or other), pancreatic status, age at LT and survival were recorded. The following criteria were recorded three months before LT, between three and six months after LT, and at each year of follow-up until December 2016: glucose tolerance status (CFRD or others), daily insulin dose requirement; renal function, defined by the estimated glomerular filtration rate (GFR, calculated with the Modification of Diet in Renal Disease formula); and daily glucocorticoid (GC) dose. Analysis for repeated measures data was conducted by using linear mixed-effect regression models that included fixed and random effects.

Results A total of 149 women had a first delivery and 36 (24.2%) of these had pre-gestational FEV1 < 50%. No death and no lung transplantation were observed during the 2 years of follow-up after pregnancy. Age was not different between the two groups (P=0.7). No difference was observed for the rate of assisted conception among women with FEV1 < 50% (35.3%) than women with FEV1 > 50% (39.4%, P=0.8), and the rate of cesarean section was significantly higher in women with FEV1 < 50% (43.7% vs. 21.1%, P=0.01). The rate of preterm birth did not differ significantly between the two groups. Median infant birth weight was significantly lower in women with FEV1 < 50% [2705 g (650–3700) versus 3044 g (1590–3860), P=0.003]. Despite lower FEV1 and BMI the year before pregnancy for women with FEV1 < 50%, the decline in forced expiratory volume and body mass index following pregnancy did not differ between the women with and those without pre-gestational poor pulmonary function.

Conclusion Pre-gestational poor pulmonary function in women with cystic fibrosis is associated with a higher rate of cesarean section and a clinically significant impact on fetal growth. The changes in maternal pulmonary and nutritional status following pregnancy in women with cystic fibrosis were not influenced by pre-gestational pulmonary function status.

P3-51
Pattern of alcohol consumption in relation to meals and the risk of liver cirrhosis in a large prospective study of UK women
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Introduction Alcohol is an important cause of liver cirrhosis. Many previous studies have examined the effect of the amount of alcohol consumed on the risk of cirrhosis, but there has been little research on the effect of mealtime habits and the type of alcohol consumed.

Methods In total, 710,623 middle-aged UK women answered questions relating to alcohol consumption on a re-survey questionnaire three year after recruitment. They were followed up for incident cases and deaths attributed to liver cirrhosis by record linkage to national hospital and death records. Cox regression models were used to produce adjusted relative risks and 95% confidence intervals (CIs) for cirrhosis depending on amount, type of alcohol consumed and mealtime habits, and taking into account changes in alcohol consumption over time and regression dilution bias.

Results Thirty-eight percent (n = 266,699) of participants consumed less than one drink per week and amongst those consuming a larger amount, 58% (n = 255,417) drank less than seven drinks per week. During a mean of 14.3 (SD 2.7) years of follow-up, 2939 cases or deaths from cirrhosis were reported. Those consuming an average of 17.5 g alcohol/day (7–14 drinks/week) and 31.8 g alcohol/day (15+ drinks/week) had a significantly higher risk [RR: 1.54 (95% CI: 1.33–1.79) and RR: 3.62 (95% CI: 3.09–4.25), respectively] compared to the reference group of 3.9 g alcohol/day (1–2 drinks/week). Those consuming alcohol with meals had a lower risk of cirrhosis than those drinking outside of meals or in a varied manner (P=0.01). Relative to consumptions of 1–2 drinks/week with meals, those consuming 15 or more drinks/week with meals had a relative risk for cirrhosis of 2.58 (95% CI: 1.92–3.46) whereas those drinking a comparable amount without meals or in a varied way had a relative risk of 4.37 (95% CI: 3.44–5.53). This pattern remained true for women who drank wine and no other type of alcoholic beverage and for all other alcohol consumers.

Conclusions The relative risk of liver cirrhosis increases with even moderate levels of alcohol consumption, although drinking alcohol with meals appears to have a lesser effect on cirrhosis risk than drinking at other times.

P3-50
Pregnancy outcome in women with cystic fibrosis and poor pulmonary function
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Introduction To investigate how pre-gestational poor pulmonary function [forced expiratory volume (FEV1) < 50%] influenced pregnancy outcome and clinical status evolution in women with cystic fibrosis.

Results A total of 149 women had a first delivery and 36 (24.2%) of these had pre-gestational FEV1 < 50%. No death and no lung transplantation were observed during the 2 years of follow-up after pregnancy. Age was not different between the two groups (P=0.7). No difference was observed for the rate of assisted conception among women with FEV1 < 50% (35.3%) than women with FEV1 > 50% (39.4%, P=0.8), and the rate of cesarean section was significantly higher in women with FEV1 < 50% (43.7% vs. 21.1%, P=0.01). The rate of preterm birth did not differ significantly between the two groups. Median infant birth weight was significantly lower in women with FEV1 < 50% [2705 g (650–3700) versus 3044 g (1590–3860), P=0.003]. Despite lower FEV1 and BMI the year before pregnancy for women with FEV1 < 50%, the decline in forced expiratory volume and body mass index following pregnancy did not differ between the women with and those without pre-gestational poor pulmonary function.

Conclusion Pre-gestational poor pulmonary function in women with cystic fibrosis is associated with a higher rate of cesarean section and a clinically significant impact on fetal growth. The changes in maternal pulmonary and nutritional status following pregnancy in women with cystic fibrosis were not influenced by pre-gestational pulmonary function status.

Disclosure of interest The authors declare that they have no competing interest.
The relationship between healthy life expectancy and smoking, hypertension and body mass index in a Japanese population: A multistate life table method using Nippon Data90


Introduction
Healthy life expectancy (HLE) is an important measure for describing population health. Human factors such as smoking, hypertension, and obesity can reduce overall HLE in a population. Little is known about the relationship between HLE and cardiovascular risk factors in Asian populations. Our study aimed to estimate HLE in various combinations of cardiovascular risk factors in a Japanese population using a multistate life table approach.

Methods
Data were obtained from NIPPON DATA90, which is a nationwide cohort study of nine thousand Japanese people that was established in 1990. From among the NIPPON DATA90 participants, our analysis focused on people who were aged 60 years or older at the baseline survey and had received activities of daily living (ADL) assessment. Participants underwent a two-wave interview survey process using the Katz ADL index in 1995 and 2000. The participants were queried on five items of the Katz ADL index, and any participant who answered that they were “not independent” for at least one item was designated “disabled” in the multistate life table. Smoking status was categorized into non-smokers (never-/ex-smokers) and current smokers. Blood pressure (BP) was categorized into four groups (optimal, normal, stage 1 hypertension, and stage 2 hypertension). Obesity was defined using body mass index (BMI).

Results
The study sample comprised 6676 participants (2840 men and 3836 women). Among all the BMI and BP groups, HLE at age 60 in current smokers was shorter than that of non-smokers. Among obese men with optimal BP, HLE in current smokers was 20.0 years, whereas that of non-smokers was 17.7 years. Among obese women with optimal BP, HLE in current smokers was 21.0 years, whereas that of non-smokers was 19.8 years. We also found a slight impact on HLE at age 60 for both smoking status and BMI.

Conclusions
We examined the relationship between HLE at age 60 and combinations of BMI, BP, and smoking status using a nationwide cohort study of the Japanese population. HLE at age 60 was clearly shorter in smokers and individuals with higher BP. Furthermore, both thin and obesity has a slight impact on HLE at age 60.

A population-based cardiovascular cohort in Subsaharan Africa: The pilot project Tanve Health Study (TAHES) in Benin

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Introduction
Sub-Saharan Africa (SSA) is facing a growing burden of non-communicable diseases due to epidemiological transitions following increasing urbanization and changing lifestyle. But available tools for prediction of these diseases including cardiovascular disease (CVD) are largely adapted from western regions data. So, there is an urgent need for building appropriate tools from large and long population-based cohorts in SSA.

Objective
The objective of the pilot project TAHES was to explore the feasibility of a large cohort study focused on CVD and risk factors in Benin.

Methods
TAHES pilot project is a prospective cohort ongoing since February 2015 among all people aged 25 years or above living at Tanvè, a village of Agbanglouzoun in the center of Benin Republic. CVD risk factors data were collected using a standardized questionnaire adapted from the WHO Steps instrument through a baseline door-to-door survey, followed by annual visits. A daily surveillance was implemented by visits of medical network for recording events of interest: peripheral artery disease, myocardial infarction, stroke, congestive heart failure and death. This had been supported by a community surveillance through household weekly visit to offset the low health services coverage and limited use of formal health services by the population. Community agent notifies events and administers a verbal autopsy in case of death. To perform a good follow-up and bypass specifics challenges as no house addresses and lack of civil registration, geographic data were collected for each household.

Results
Up to date a total of 1793 participants were enrolled equaling to 4068.7 persons years of follow-up. Women represented 61.1% and the mean age was 42.7 ± 16.5 years. At baseline, we recorded a prevalence of 2.3% (95% CI: 1.7–3.2) of daily smoking, 9.15% (95% CI: 7.9–10.6) of harmful use of alcohol, 9.3% (95% CI: 8.0–10.8) of obesity, 32.1% (95% CI: 29.9–34.3) of high blood pressure, and 3.5% (95% CI: 2.7–4.5) of diabetes.

Conclusion
CVD had a high burden among this rural population and was associated to a high rate of death. TAHES methodology is being improved by adapting to local specifics challenges. Lessons from the pilot phase will help building strong and large cohort that should survives generations for being useful.

Keywords
Cardiovascular disease; Stroke; Peripheral artery disease; Benin; Sub-Saharan Africa

https://doi.org/10.1016/j.respe.2018.05.237
Introduction  Cerebral palsy is the most common severe motor disability in childhood, but its etiology is incompletely understood. Studies have suggested that prenatal thyroid hormone disturbances affect child neurodevelopment and may alter motor function.

Objective  To investigate the association between maternal thyroid disorder in pregnancy and risk of cerebral palsy in the child in two large study populations in Denmark and Norway.

Method  We conducted a population-based cohort study using two study populations. (1) 1,270,079 children born in Denmark 1979–2007 identified in nationwide registers, and (2) 192,918 children born 1996–2009 recruited into the Danish National Birth Cohort and The Norwegian Mother and Child Cohort study, combined in the MOBAND collaboration cohort. Register-based and self-reported information on maternal thyroid disorder were studied in relation to risk of cerebral palsy and its unilateral and bilateral spastic subtypes using multiple logistic regression. Information on CP was derived from the Danish and Norwegian National Cerebral Palsy Registries, and all CP cases registered from age one to age six years, which were verified by neuro-pediatricians, were included.

Results  In register data, hypothyroidism was recognized in 12,929 (1.0%) and hyperthyroidism in 9943 (0.8%), and unclassifiable thyroid disorder in 753 (< 0.1%) of the mothers. The odds ratio for an association between maternal thyroid disorder and bilateral spastic cerebral palsy was 1.0 (95% CI: 0.7–1.5). Maternal thyroid disorder was not related to bilateral spastic cerebral palsy. The risks of unilateral spastic cerebral palsy were: hyperthyroidism 3.1 (95% CI: 1.2–8.4), hypothyroidism 1.0 (95% CI: 0.7–1.5), and unclassifiable thyroid disorder 1.5 (95% CI: 0.9–2.5). Maternal thyroid disorder identified during pregnancy was associated with elevated risk of unilateral spastic cerebral palsy [odds ratio 3.1 (95% CI: 1.2–8.4)]. In MOBAND, 3042 (1.6%) of the mothers reported a thyroid disorder in pregnancy, which was not associated with cerebral palsy overall [odds ratio 1.2 (95% CI: 0.6–2.4)].

Conclusion  Maternal thyroid disorder was not related in this study to bilateral spastic CP, which is the predominant CP subtype, but we do find a higher risk of unilateral spastic CP in children of mothers whose thyroid disorders were identified in pregnancy. The offspring of such women are more likely to have been exposed to abnormal thyroid hormone levels in utero than the offspring of women whose thyroid disorders were diagnosed and treated prior to conception. A useful extension of our findings would be to see whether they can be replicated in studies making use of maternal blood samples.

Disclosure of interest  The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.241
P3-57
The metabolic pattern could be used for early detection of stable ischemic heart disease and hypertensive heart disease
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Introduction Cardiovascular diseases are a leading cause of morbidity and mortality worldwide accounting for 32% of all deaths across EU countries. Ischemic heart disease (IHD), known also as coronary artery disease (CAD) comprised 17% of all deaths. For up to 20% of patients, the first manifestation of IHD is sudden cardiac arrest occurring outside the hospital. Estonia stands out with the much higher prevalence of the cardiovascular diseases than Western-European countries. In Estonia, half of deaths are caused by circulatory system diseases according to the Estonian Causes of Death Registry. An urgent necessity for more sensitive biomarkers identifying altered health conditions specifically among the variety of patients with different risk factors is foreseeable. Metabolomics of human biofluids has turned into a rapidly developing area and as a quantitative molecular level method may offer extra advantages in clarification of the pathogenesis and therapy monitoring.

Methods We profiled the metabolic pattern of serum of patients classified according to International Classification of Diseases (ICD10). Most of the patients were treated with statins, ACE-inhibitors (ACEI) or angiotensin receptor blockers (ARB) and acetylsalicylic acid as an anticholesterol, an antihypertensive, and an anticoagulant medication. The control group was selected from healthy volunteers without known heart and vascular diseases and without medication. This study was performed in accordance with the Helsinki Declaration and was approved by the Tallinn Medical Research Ethics Committee. The filtered venous serum from age and gender matched IHD patients ICD10 coded I20 (n = 12), I25.2 (n = 6), I11 (n = 25) and control individuals (n = 20) were analyzed using one-dimensional proton nuclear magnetic resonance (1H NMR) spectroscopy. These spectra were used for metabolic profiling and concentration calibration (Chenomx Inc.) followed by statistical analysis using one-way Anova and principal component analysis (PCA).

Results The study evaluates serum of 43 individuals of Estonian origin. We identified from serum spectra about 83 metabolites. The metabolite concentrations are in good accordance with results provided by clinical chemistry reference values, the Human Metabolome Database (HMDB) library and various studies. The IHD patients are characterized by the increased concentration of acetylacetate, choline, pyruvate, betaine, formate and by the decreased concentration of alanine, creatine, glycine, histidine, lactate, proline, urea and other biomolecules. The major implications found in the serum of IHD patients are related to energy metabolism. A number of calibrated metabolites are related to human microbiome according to the information provided in the literature: trimethylamine-N-oxide (TMAO), formate and hippuric acid. Interestingly, the altered health conditions might be potentially characterized by altered microbiome. Chemometrics analysis showed a significant distinction between the patients and control individuals. The metabolic profile of ischemic patients with or without previous myocardial infarction appears to be similar. The pattern of HHD patients follows the changes of the serum of IHD patients in regard of some amino acids concentrations but is negatively correlated in regard to formate and 3-hydroxybutyrate.

Conclusion PCA of 1H NMR detected serum metabolites exhibit a significant difference among the IHD patients, HHD patients and control individuals. These data demonstrate that metabolomics approach may be useful for the early detection of some circulatory diseases, for detection of synergistic pathways involved in the development of altered health conditions, and molecular understanding of particular health condition. This relatively inexpensive, non-invasive and reproducible approach may be useful for the molecular understanding and early prevention of health conditions, improvement of surveillance and therapy. This work was supported by the Estonian Research Council grant PUT 1534.

Disclosure of interest The authors declare that they have no competing interest.
https://doi.org/10.1016/j.respan.2018.05.243

P3-58
Military and risk of motor neurone disease: A French nationwide case-control study
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Introduction There is evidence of an increased risk of motor neuron disease (MND) in military that is mainly based on studies performed in the US. We used health insurance databases to conduct a French nationwide case-control study in order to study the association between being military and MND.

Methods We identified incident MND cases between 2010 and 2015 in France using a previously developed algorithm that is based on drug claims (Riluzole), hospitalization records (ICD-10 code G122), and benefits for long-term chronic diseases. Each case was randomly matched on age, sex, and residency area (département) to 10 controls selected among all persons who were reimbursed any health care during the year of incidence of the matched case. We defined military personnel as persons affiliated to the “Caisse Nationale Militaire de Sécurité Sociale” (CNMSS) or the general scheme of the social security with a military status. We examined the association between military and MND using conditional logistic regression in order to compute odds ratios (ORs) and 95% confidence intervals (95% CI). All analyses were performed separately in men and women. We also performed analyses restricted to retired military (specific code for retired CNMSS affiliates).

Results Of all the MND cases identified in France during the study period (n = 13,082), 12,729 (97%) had correct data for the matching variables and information on type of social security; they were matched to 127,283 controls. Among cases, mean age at incidence year was 67 years in men and 70 years in women, and 55% were men. The proportion of military was of 1.8% and 1.6% among male cases and controls, and of 0.7% and 0.8% among female cases and controls. There was no association between military and MND in women (OR = 0.89; 95% CI: 0.65–1.23). In men, there was a trend towards a small increased risk of MND both for military overall (OR = 1.13; 95% CI: 0.94–1.36) and retired military (OR = 1.16; 95% CI: 0.95–1.43) that was not statistically significant.

Conclusion This French nationwide study did not show a statistically increased risk of MND among military personnel between 2010 and 2015, although there was a trend towards a small increased risk in men. The broad definition of military in our study that includes workers with different occupations and professional exposures is a limitation of our study. We plan to pursue these analyses by adjusting for additional covariates and extending the study period.

Disclosure of interest The authors declare that they have no competing interest.
https://doi.org/10.1016/j.respe.2018.05.244

P3-59
Prediction of myocardial infarction, stroke and cardiovascular mortality with urinary biomarkers of oxidative stress: Results from a large cohort study
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Introduction Oxidative stress contributes to endothelial dysfunction and is involved in the pathogenesis of cardiovascular diseases (CVD). However, associations of biomarkers of oxidative stress with CVD have not yet been addressed in large cohort studies.
Methods  The associations of urinary 8-hydroxy-2′-deoxyguanosine (8-oxo-dG) and 8-isoprostanone (8-isop) with total, fatal and non-fatal myocardial infarction (MI), total, fatal and non-fatal stroke and CVD mortality were examined in a population-based cohort of 9949 adults from Germany with 14 years of follow-up in multi-variable adjusted Cox proportional hazards models.

Results  Both 8-oxo-dG and 8-isole were associated with CVD mortality independently from other risk factors (hazard ratio [HR] [95% confidence interval (CI)] for top vs. bottom tertile: 1.31 [1.04–1.64] and 1.67 [1.33; 2.11], respectively). Moreover, CVD mortality risk prediction was significantly improved when adding both biomarkers to the Systematic Coronary Risk Evaluation (SCORE): area under the curve (AUC) increased from 0.735 to 0.749, P=0.002. In addition, 8-oxo-dG levels were associated with total stroke incidence (HR for 1 standard deviation increase: 1.07 [1.01; 1.13]) and 8-isole levels were associated with fatal stroke incidence (HR for top vs. bottom tertile: 1.72 [1.04–2.85]). For MI, associations were only observed for 8-oxo-dG in subgroups defined by history of CVD or BMI ≥ 30 kg/m².

Conclusions  These results from a large cohort study add evidence to the involvement of an imbalanced redox system to the etiology of CVD. In addition, urinary 8-oxo-dG and 8-iso level measurements were shown to be useful biomarkers for an improvement of CVD mortality prediction.

Disclosure of interest  The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.245

P3-60  Association of serum markers of oxidative stress with myocardial infarction and stroke: Pooled results from four large European cohort studies

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Introduction  Oxidative stress contributes to endothelial dysfunction and is involved in the pathogenesis of myocardial infarction (MI) and stroke. However, associations of biomarkers of oxidative stress with MI and stroke have not yet been addressed in large cohort studies.

Methods  A matched case-control design was applied in four population-based cohort studies from Germany, Czech Republic, Poland and Lithuania. Derivatives of reactive oxygen metabolites (d-ROM) levels, as a proxy for the reactive oxygen species (ROS) burden, and total thiol levels (TTL), as a proxy for the reductive capacity, were measured in serum samples of 476 incident MI cases and 454 incident stroke cases as well as five controls per case individually matched by study center, age and sex. Statistical analyses were conducted with multi-variable adjusted conditional logistic regression models.

Results  d-ROM levels were associated with both MI (odds ratio [OR]: 1.21 [95% confidence interval (CI): 1.05–1.40] for 100 Carr units increase) and stroke (OR: 1.17 [95% CI: 1.01–1.35] for 100 Carr units increase). TTL were only associated with stroke incidence (Quartiles 2–4 vs. quartile 1: OR: 0.79 [95% CI: 0.63–0.99]). The noted relationships were stronger with fatal than with non-fatal endpoints and the associations of TTL with fatal MI was statistically significant (OR: 0.69 [95% CI: 0.51–0.93] for 100 μmol/L-increase).

Conclusions  This pooled analysis of four large cohort studies suggests an important contribution of an imbalanced redox system to the etiology of mainly fatal MI and stroke events.

Disclosure of interest  The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.246

P3-61  Comparison of methods for calculating healthy life expectancy in a Japanese population: An analysis of Nippon Data90


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Introduction  There are several methodological approaches to calculating healthy life expectancy (HLE). Sullivan’s method (prevalence-based life tables), which uses age-specific disability prevalence, is conventionally employed to estimate HLE. The multistate life table method presents an alternative approach that permits transitions from one health state to another using Markov models. Although these two approaches are frequently applied to calculate regional and national HLE, little is known about the differences in their estimates. To examine these differences, we applied both approaches for estimating HLE in a nationwide cohort study of the Japanese population and compared the resulting estimates.

Methods  The National Integrated Project for Prospective Observation of Non-communicable Disease And its Trends in the Aged (NIPPON DATA90) is a nationwide cohort study involving nine thousand Japanese participants. Data from this project were used in our analysis. We identified participants who were aged 60 years or older at the baseline survey and had provided activities of daily living (ADL) information based on the Katz index. Two-wave interview surveys of ADL were conducted in 1995 and 2000. Participants who answered “not independent” to any of five stipulated items in the Katz ADL index were designated “disabled” in the analysis. Both Sullivan’s method and the multistate life table method were used to estimate HLE in participants aged 60 to 99 years. In both estimations, smoking status was categorized into three groups (never-smokers, ex-smokers, and current smokers). Blood pressure was fixed at an optimal level (systolic blood pressure <120 mmHg and diastolic blood pressure <80 mmHg) using Poisson regression analysis. Multistate life table analysis was performed using iMaCh version 0.98r7 (A Maximum Likelihood Computer Program using Interpolation of Markov Chains).

Results  Our analysis was conducted on 6676 individuals (2840 men and 3836 women). The HLE estimates at age 60 from Sullivan’s method in never-smokers, ex-smokers, and current smokers were 23.24, 22.55, and 19.33 in men and 25.04, 20.84, and 20.74 in women, respectively. The corresponding HLE estimates from the multistate life table method were quite similar to those of Sullivan’s method both in men (23.23, 21.88, and 19.71, respectively) and in women (25.39, 23.37, and 22.22, respectively). The disparity in HLE estimates at age 60 between these two methods was virtually negligible but widened gradually as the index age increased. The HLE estimates at age 70 from Sullivan’s method in never-smokers, ex-smokers, and current smokers were 14.95, 14.36, and 11.58 in men and 16.26, 12.68, and 12.41 in women, respectively. The corresponding HLE estimates from the multistate life table method were 14.98, 13.68, and 12.06 in men (23.32, 21.88, and 19.71, respectively) and in women (25.39, 23.37, and 22.22, respectively). The disparity in HLE estimates at age 60 between these two methods was virtually negligible but widened gradually as the index age increased. The HLE estimates at age 90 from Sullivan’s method in never-smokers, ex-smokers, and current smokers were 8.06, 7.37, and 6.84 in men and 9.86, 7.66, and 6.99 in women, respectively. The corresponding HLE estimates from the multistate life table method were 8.11, 7.37, and 6.92 in men and 9.86, 7.66, and 6.99 in women, respectively.

Conclusions  Two different approaches to calculating HLE were compared using a nationwide Japanese cohort study. The HLE estimates at ages 60 and 70 were generally similar between Sullivan’s method and the multistate life table method, but the latter produced higher estimates when the index age was 90

years. Analysts should be aware that the choice of method may influence HLE estimates.

Disclosure of interest The authors declare that they have no competing interest.
https://doi.org/10.1016/j.respe.2018.05.247

Session 4 - Epidemiology and environment (climate change, disasters, environmental health, injury)

P4-1
The effects of aircraft noise exposure on objective sleep quality: The results of the DEBATS study in France
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https://doi.org/10.1016/j.respe.2018.05.248

Abstract
Noise in the areas near airports is considered as a public health issue. Exposure to aircraft noise has been shown to have adverse effects on health and particularly on sleep. Sleep disturbances are the most investigated health effects related to environmental noise. Many studies support that noise at night can affect subjective and objective sleep quality. If habituation to noise can be observed for subjective sleep quality, no habituation has been shown with objective sleep quality. However, few studies have evaluated the effects of aircraft noise on sleep quality with objective measurements at home. No such studies have been performed around French airports.

Objective
The aim of the present study was to investigate the association between aircraft noise exposure and objective sleep quality in the population living near airports in France.

Methods
Our study includes 112 people living around Paris-CDG and Toulouse-Blagnac airports. Actimetric measurements were performed during eight nights to objectively evaluate the sleep quality of the participants in terms of sleep onset latency, wake time, total sleep time and sleep efficiency. Simultaneously, acoustic measurements were performed inside and outside (at the façade) the participants’ bedroom in order to measure aircraft noise levels. Thus, integrated (that is related to energetic average for a given period of time) as well as noise event indicators (that is the number of events that exceeds a given threshold) were estimated. Logistic regression models taking into account measurements repetition were used with adjustment for potential confounders: age, gender, marital status, education and body mass index (BMI).

Results and discussion
Integrated indicators as well as noise event indicators were significantly associated with objective sleep quality. Increased levels of aircraft noise or increased numbers of aircraft noise events increased time to fall asleep, total wake time and decreased sleep efficiency. Unexpectedly, noise indicators also increased total sleep time, time in bed and delayed get up time. These latter results can be interpreted as an adaptation mechanism to sleep deprivation. If a deterioration of the sleep quality has been observed with an increase in time to fall asleep and in total wake time, a process of recovery and sleep maintenance has been shown with an increase in total sleep time. Noise event indicators have been shown to be more often associated with sleep disturbances than integrated indicators. Increased numbers of noise events during the sleep period have been found to degrade objective sleep quality.

Conclusion
The present study is the first one to investigate the effects of aircraft noise exposure around French airports on sleep quality evaluated with objective measurements. The findings contribute to the overall evidence suggesting that aircraft noise exposure at nighttime may decrease objective quality of sleep. Aircraft noise exposure affects objective sleep quality whatever the type of noise indicators. In front of this nuisance, adaptation mechanisms to sleep deprivation could be observed.

Disclosure of interest The authors declare that they have no competing interest.
https://doi.org/10.1016/j.respe.2018.05.249

P4-2
Trauma brain injury following a road traffic accident: Data from the Rhône Register, France
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Introduction
Road accidents cause serious cranial lesions and affect a young population. They constitute a major public health problem in terms of mortality and morbidity. The objective is to describe the cranial trauma resulting from a road accident according to the accidental and individual characteristics of the casualties, the severity of injuries and evolution in time.

Methods
The data come from the Rhône Register of victims from road traffic accidents. It is a permanent and exhaustive collection of any person killed or injured as a result of an accident occurring in the Rhône area. It has its source in the health environment. The information collected concerns the victim, his accident, his injuries and outcome. The lesions are coded according to the Abbreviated Injury Scale (AIS), which has six levels of severity ranging from 1 (minor) to 6 (fatal). The selected victims are those with cranio-encephalic lesions, injured during the period 2005–2014.

Results
Over the 2005–2014 period, the Registry counted 4913 victims with traumatic brain injuries. The average annual incidence is 28.5 traumatic brain injuries per 100,000 population. The sex ratio is 2.6. There is a shift in the peak of incidence between men and women, earlier and more marked in men (15–19 years) than women (20–24 years). Victims with traumatic brain injuries are mainly motorists (36%), followed by motorized two-wheelers (24%), pedestrians and cyclists (17% each). The lethality is 7.7%. Severe head injuries (AIS ≥ 3) were less observed in two-wheeled motorized helmet users: 26% versus 37% for those who did not wear a helmet. The base of the skull is more often injured than the vault. The most frequent intra-cranial lesions are, in order of frequency, subarachnoid hemorrhages (15%), brain contusions (8%), subdural haematomas (7%), cerebral edemas (6%), intracerebral haematomas (3%), and finally the extra-durals (3%). The injuries of cerebellum (2%) of brainstem (1%) and vascular nervous system (1%) are less frequent. The type of lesion varies according to the types of users: subdural haematomas are frequent in pedestrians; extra-dural haematomas are more common in motorized and non-motorized two-wheelers users; brain contusions are mostly observed in car occupants. Since 2005 there has been a decrease in head injuries (−48%) for motorists, (−38%) for pedestrians, (−20%) for motorized two-wheelers. It is less pronounced for the cyclists (−11%). This noticeable decline among motorists is due to the road safety policies implemented in France since 2002. Cyclists are hardly affected by this decline due to their increase in numbers, due to the introduction of self-service bikes and due to the fact that wearing the helmet are not mandatory.

Conclusion
Head injuries have almost divided by two among motorists, but efforts need to be made for vulnerable road users. An effective strategy for all types of users must prevail. A first measure taken in France in March 2017, making the use of bicycle helmets mandatory for children under twelve, could be evaluated in the following years on the incidence of head trauma.

Disclosure of interest The authors declare that they have no competing interest.
https://doi.org/10.1016/j.respe.2018.05.249
P4-3 Early assessment of public health impacts of major floods in France in June 2016 and winter 2018
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Introduction
The Seine River rises at the northeast of France and flows through Paris before emptying into the English Channel. On June 2016 (week 22) and January 2018 (weeks 4 to 6), major floods occurred in the Basin of Seine River, after important rainy periods. The second period was also marked by the occurrence on the same area of a cold wave including heavy snowfall and ice conditions on week 6. Floods are known to have potential health impacts on population living in those regions, both at short-, medium- and long-term both on physical and mental health. The objective of the study is to present the results of the daily monitoring of health indicators conducted by the French public health agency (SpFrance) during the two major floods, in order to early identify potential impact of those disasters on the population.

Methods
Since 2004, SpFrance set up a national syndromic surveillance system SurSaUD, enabling to ensure morbidity and mortality surveillance. Morbidity data are daily collected from a network involving emergency departments (ED) and emergency general practitioners' associations SOS Médecins. Both administrative (age, gender, date and location of consultation) and medical information (medical diagnosis using ICD10 codes in ED and specific thesauri in SOS Médecins associations) are recorded for each patient. The daily and weekly evolution of the number of all-cause ED attendances and SOS Médecins consultations during the flood periods were compared to the evolution on the two previous years. The number of hospitalisations after ED discharge was also monitored. The immediate health impact of floods was assessed by monitoring eight syndromic indicators related to flood exposure: gastroenteritis, carbon monoxide poisoning, burnt, stress, faintness, drowning, injuries and hypothermia. Analyses were performed by age group and at different geographical levels (national, Paris region and districts located in the Basin of Seine River).

Results
During week 22-2016, a decrease of total number of ED attendances all ages and more specifically for children aged less than 15 years old was observed in region Centre (-15% compared with weeks 21 and 23) and to a lesser extent in Paris area (-4% and -12% respectively compared with week 21 and week 23). Locally, in the most impacted cities, an increase of total ED attendances was also observed for people aged 65 years and more. At the opposite, the number of all-cause SOS Médecins consultations remained stable in all age groups. Analysis by syndromic indicator did not show unusual variations during the first flood period. In 2018, syndromic surveillance did not show any major impact on all-cause ED attendances and SOS Médecins consultations from week 4 to week 6, neither in Paris area nor in other areas along the Seine River. The numbers were comparable to the two precedent years in all age groups. During week 6 in Paris area, an increase of ED attendances was observed for children aged less than 15 years old (16 attendances compared to less than 9 for the past weeks).

Conclusion
For both flood episodes the rising water level was slow with foreseeable evolution, compared to other sudden flood events occurring in south of France in 2010 due to violent thunderstorms. This progressive evolution allows French authority to deploy wide specific organization in order to mitigate impact on concerned populations. That may explain the limited impact observed during the two flood disasters. The evolution of injuries during 2018 episode is attributable to the cold wave that occurred simultaneously. As the French syndromic surveillance system is implemented on the whole territory and collects emergency data routinely since several years, it constitutes a reactive tool to assess the potential public health impact of both sudden and predictable disasters. It can either contribute to adapt management action or reassure decision makers if no major impact is observed.

Disclosure of interest
The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.250

P4-5 The Rhône-Alpes Observatory of Trauma (France): Frequency, nature and severity of the different types of accidents
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Introduction
Traumatisms constitute a major public health issue. Each year in Europe, they cause 240,000 deaths and are at the origin of disability in one million people. They represent the first cause of death among young people aged between 15 and 24. The unintentional injuries are the most frequent. They fall into three broad categories: road crashes, home and leisure injuries and work accidents. As these injuries are diversified and fall under different areas of decision and prevention, they are most of the time the subject of specific data collection. The Rhône-Alpes Observatory of trauma proposes to collect all types of injuries with the same methodology. The objective is to describe frequency, nature and relative severity of the different types of unintentional injuries occurring on a geographically defined area.

Methods
The Rhône-Alpes Observatory of trauma is a systematic data collection of all the victims consulting emergency rooms in public and private hospitals of the county of Ain following a road crash, home and leisure injury or work accident occurring in this county. The data collection took place over a period of 12 consecutive months on the 2013–2014 period. The coding of accidental characteristics is based on the classification specific to each type of accident. Injuries are coded according to the Abbreviated Injury Scale (AIS), an international trauma scale that assigns to each lesion a severity score (from 1 “minor” to 6 “beyond any therapeutic resource”). The analysis consists in providing descriptive statistics.

Results
A total of 32,492 victims of unintentional injuries were included in the analysis. The distribution of victims according to the type of accident showed that home and leisure injuries were the most frequent (80.7%). Next came work accidents (14.3%) and road crashes (6.8%). Some home and leisure injuries were also road crashes (0.4%) and some road crashes were also accidents at work (1.4%). The victims of work or road accidents were more often men and young people than those of home and leisure injuries. Victims of road crashes had the highest proportion of serious injuries (AIS ≥ 3).

Conclusions
Given the similar conditions in data collection, the Rhône-Alpes Observatory of trauma makes it possible to compare the incidences of different types of accidents. It also makes it possible to measure the frequency of accidents related to mobility, by widening the conventional perimeter of road accidents to pedestrians who fall alone on the road.

Disclosure of interest
The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.252

P4-6 Quantitative health impact assessment of outdoor air pollution in the Arve valley, France
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Introduction
Traumas constitute a major public health issue. Each year in Europe, they cause 240,000 deaths and are at the origin of disability in one million people. They represent the first cause of death among young people aged between 15 and 24. The unintentional injuries are the most frequent. They fall into three broad categories: road crashes, home and leisure injuries and work accidents. As these injuries are diversified and fall under different areas of decision and prevention, they are most of the time the subject of specific data collection. The Rhône-Alpes Observatory of trauma proposes to collect all types of injuries with the same methodology. The objective is to describe frequency, nature and relative severity of the different types of unintentional injuries occurring on a geographically defined area.

Methods
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Results
A total of 32,492 victims of unintentional injuries were included in the analysis. The distribution of victims according to the type of accident showed that home and leisure injuries were the most frequent (80.7%). Next came work accidents (14.3%) and road crashes (6.8%). Some home and leisure injuries were also road crashes (0.4%) and some road crashes were also accidents at work (1.4%). The victims of work or road accidents were more often men and young people than those of home and leisure injuries. Victims of road crashes had the highest proportion of serious injuries (AIS ≥ 3).

Conclusions
Given the similar conditions in data collection, the Rhône-Alpes Observatory of trauma makes it possible to compare the incidences of different types of accidents. It also makes it possible to measure the frequency of accidents related to mobility, by widening the conventional perimeter of road accidents to pedestrians who fall alone on the road.

Disclosure of interest
The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.252
with high levels of traffic. This topography, the concentrations of air pollutants sources in a restricted area, and the frequency of cold temperature inversions common in the valley during winter time, result in an exceeding of air quality target values for several pollutants. This situation has led some local stakeholders to claim that the valley was one of the most polluted areas in France and several non-governmental associations to ask for a better air quality.

**Method** A quantitative health impact assessment (HIA) was conducted to help local stakeholders measure the expected benefits of improving air quality. It evaluated the effects of chronic exposure to fine particles (PM$_{2.5}$) on mortality and life expectancy. Annual mean concentrations of fine particles from a fine-scale environmental model were coupled with land-occupancy data to estimate population exposure in 2007–2008 in the 41 municipalities affected by the atmospheric protection plan. The health benefits associated with several scenarios of improved air quality were computed based on a relative risk derived from European and French cohorts.

**Results** The study shows that 8% of the mortality in the Arve Valley could be attributable to chronic exposure to PM$_{2.5}$, representing 85 deaths per year. These results can be compared with the French nationwide estimate that on average PM$_{2.5}$ contributed to 9% of the mortality, 8% in urban areas between 20,000 and 100,000 inhabitants, and 13% in urban areas larger than 100,000 inhabitants. A 30% reduction of average annual concentrations of PM$_{2.5}$ would lead to a 4% decrease in mortality, representing 45 deaths avoided per year, and 967 life-years gained on average, or 5 months of life expectancy at 30 years. The qualitative analysis of uncertainties suggests an underestimation of health impacts, this quantitative HIA having provided a minimum scale of magnitude of the impact. The spatial and temporal heterogeneity of the exposition of the population in the Arve valley result in lower annual mean than in urban settings where concentrations are less influenced by meteorological conditions. This HIA does not take into account the wide range of possible health benefits in terms of avoided morbidity and mortality.

**Conclusions** The study, based on an innovative method used for the first time in such an heterogeneous area, shows the large impact of outdoor air pollution on health in the Arve valley. This impact is similar to the one observed in French metropolitan areas between 20,000 and 100,000 inhabitants, without reaching the level found in the most polluted urban areas. In a context of acute debate, HIA is an efficient tool to provide comprehensive figures and to promote public actions. Given the seasonality of the PM concentrations, actions should primarily target winter sources, especially residential wood-burning. Examples from the literature document that rapid and measurable health benefits were observed after interventions targeting biomass burning in similar context of residential wood-burning in valleys with common winter maize temperature inversions. Those long-term interventions should not prevent for immediate actions in case of acute episodes, involving the punctual reduction of some emissions sources, and information to protect the most vulnerable populations.

**Disclosure of interest** The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.254

**P4-8 Froebtite in the Norwegian Armed Forces. Incidence of froebtite among conscripts serving in the Northern Norway, and self-reported long-term sequela following froebtite injury among Norwegian Armed Forces personnel**

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**Introduction** Humans have suffered froebtite at all times when exposed to cold surroundings. The oldest known case of froebtite is a 5000-year-old Chilean mummy. Most Norwegian military personnel are exposed to temperatures below the freezing point during a part of their service period, and a portion of the soldiers will suffer froebtite each year. Froebtite may cause chronic sequela, with symptoms such as cold-hypersensitivity, chronic pain, hyperhidrosis and paresthesia with an electric-shock feeling. The Norwegian Armed Forces Health Registry (NAFHR) was established in 2005 to supervise the health of Norwegian soldiers, and to produce statistics and research to get new knowledge about the health of military personnel. Norwegian soldiers who experience a froebtite during military service, and consult a military medical doctor for this injury, are registered in the NAFHR. In this study, we assessed the incidence of froebtite among conscripts in the Norwegian Armed Forces during a five year period (2010–2014). We also report on self-reported long-term sequela following a froebtite injury during service in the Armed Forces in the same period.

**Methods** To calculate the incidence of froebtites, we identified all conscripts suffering a froebtite (ICD-codes T34, T35) during service at the garrisons in Northern Norway in the period January 1st, 2010 to December 31st, 2014, registered in the NAFHR. The Norwegian Armed Forces Personnel Register supplied us with an estimate of the total number of conscripts doing their military service at the same garrisons during the same period. To assess long-term sequela after froebtite, all military personnel diagnosed with froebtite during the same period received a questionnaire via the internet-based tool Confirmit, asking them to confirm their froebtite-diagnosis. We also asked if they had any sequela from the froebtite injury, and if so, the degree of symptoms from the sequela.
A GIS-based method to define geographical determinants of environmental exposure to agricultural pesticides in France

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Introduction
Exposure to pesticides has been suggested as a risk factor for several diseases or adverse health outcomes. The use of geographic information systems (GIS) in epidemiological studies to assess environmental exposure to agricultural pesticides (EEAP) is growing. Residential proximity to agricultural crops is frequently used as a surrogate of EEAP. Previous studies have suggested that application of pesticides near residences results in contamination of indoor surfaces. US studies have recently reported a positive correlation between the proximity or crop acreage and the contamination of indoor dust by agricultural pesticides in nearby homes. There is however no validated and applicable model in France: the US model is based on pesticide use registries and adapted on large crops and local practices. However, most of these studies did not consider spatial information on environmental factors such as wind direction and physical barriers (structural or natural) to pesticide drift from the field to receptors. In France, the availability of public data on these aspects allows to describe the relationship between the proximity of agricultural areas and residential exposure to pesticides. We aimed to assess geographical determinants of the indoor dust contamination by agricultural pesticides in different crop areas (SIGEXPO project).

Methods
A GIS was developed for 239 households, from three different agricultural sectors (69 near orchards and cereals, 66 near cereals, 68 near vineyards) and an urban area (n = 36). For each residence, the GIS considers the agricultural land use, the proximity of household to agricultural zones (fields). For five different buffer sizes (250 m–1250 m), we used GIS to determine targeted crop acreage, prevailing winds, and vegetative, topographic and structural barriers to pesticides drift from crops. Two additional dimensions have been considered in the development of the GIS: prevailing winds direction that influence pesticide drift and obstacles that mitigate on pesticide drift from agricultural applications, i.e. the presence of topographical, vegetal (hedges, forests) or structural barriers (built areas). The effect of obstacles is reflected in the presence of topographical, vegetal (hedges, forests) or structural barriers (built areas). In parallel, both recent (< 30-day) and settled (> 6 month) indoor dust samples were collected from households without professional pesticide users and analyzed. Pesticide applicators were excluded from the study. Information household characteristics and domestic pesticide users were collected by questionnaire. Redundancy analyzses were conducted to define the geographical determinants that best explain the indoor dust concentrations of the 27 agricultural pesticides detected in more than 10% of study households.

Results
Overall, main determinants of agricultural pesticides contamination in indoor dust were crop acreage within 500 m (orcharde(s) or 1000 m buffer size (vineyards and cereals), as well as prevailing winds, and the presence of vegetative barriers. Our different models explained up to 18.3% of the variability of the pesticide contamination in indoor dust.

Conclusion
While the explained variability remains modes overall, it was above or comparable to previous studies. The determinants identified should be taken into account in future GIS-based approaches aiming to assess EEAP in the French context. The approach developed to assess the impact of wind and barriers need to be validated on additional datasets. Future studies should include the analyses of the impact of seasonal variations into the geographical determinants selection.

Disclosure of interest
The authors declare that they have no competing interest.

https://doi.org/10.1016/j.esper.2018.05.256
procreation appeared as risk factors (P > 0.2), which could exclude subfertility as a risk factor.

**Conclusion** Our study based on more than 1500 cases and controls, with a good statistical power and without identified selection bias, confirms the previous observation of a link between the risk of hypospadias and exposure to agricultural pollutants in early pregnancy. As prevalence was not homogeneous across the studied region (P < 0.00001 under H0), environmental factors may likely be involved. Moreover, some regions with a significant excess of cases appeared as high-risk zones using both spatial data mining method. Although agricultural pollution in these zones may explain why they appear as high-risk zones, some alternative explanations including misclassification and residual confounding cannot be excluded.

**Keywords** Hypospadias; Endocrine disruptors; Environmental factors; Subfertility; Generalized linear model; Spatial data mining

**Disclosure of interest** The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.257

**P4-12**

**Modelling and predicting drowning risk along the Gironde’s Oceanic Coast:**

Retrospective, prospective observational and pilot experimental studies

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**Introduction** In France, a national study about drowning is conducted every three years to register all cases of drowning leading to a hospitalization or death, from June 1st until September 15th. In 2015, 596 drowning occurred on seashore, including 38 drowning implicating 7 deaths on beaches of Gironde, Southwestern France. Gironde’s oceanic coast is a 126-km-long sand beach; the main touristic areas are watched during summer, but bathing season can begin in April and last till mid-October. Most drowning are related to rip currents, shown by Castelle et al. to be controlled by wave conditions, tides levels and local topography. To orient prevention and surveillance strategies, our study aimed to create a risk prediction model of drowning along Gironde’s coast, based on weather and marine forecasts.

**Methods** Retrospective derivation cohort data were collected from the emergency call centre of Gironde, and meteorological data came from MétéoFrance, the national weather forecaster. The study period was April, 1st till October, 31st, from 2011 till 2013. Prospective validation cohort data and forecasts up to three days were collected from the same sources, for the same months in 2015 and 2016. We used a logistic regression and a zero-inflated Poisson model to quantify drowning risk. Variables selection was done on the retrospective cohort, and we assigned for each model a threshold to stratify the risk of drowning (“low” and “high”). We finally tested the prediction model by comparing prediction and lifeguard assessment of the drowning risk for each day during the summer 2017. As a pilot study, only one lifeguard post, from Le Porge, participated. We calculated Cohen’s Kappa initially with the binary model then with a 5-stage scale using the zero-inflated model.

**Results** The retrospective sample included 117 days with at least one drowning event (272 events reported), within a total of 546 days without unavailable data. Air and water temperatures, wave factor, wave direction, nebbulosity and holidays were positively associated with drowning probability. Prospective validation was performed on 405 days without missing data, covering 181 drowning reported during 80 different days. The regression logistic model had an area under the ROC curve (AUC) of 0.83 ([0.79 − 0.87]). With 22 events missed in 13 days, the predictive positive value (PPV) was 40%, and the negative predictive value (NPV) 94%. The zero-inflated Poisson model had an AUC of 0.85 ([0.83 − 0.91], PPV: 37%, NPV: 97%) and missed 14 drowning events in 7 days. Within those 14 events, 5 occurred during extreme wave conditions, 1 was consecutive to seizure, 1 was a 4-year-old and 1 was a body-boarder. The model missed a day with 5 people rescued in the same rip current, without any injury. There were no statistical differences between the 1-, 2- and 3-day forecasts. The test phase has lasted 86 days, with 62 (72%) without missing data. The binary model was tested during 48 days, with a Cohen’s kappa at 0.57 (moderate agreement). It was found inappropriate by lifeguards as they
needed intermediate risk stage. The 5-stage scale was then tested during the last 14 days, with a Cohen’s kappa at 0.77 (strong agreement).

Conclusion Our models show that environmental conditions are good predictors of drowning risk along the Gironde’s oceanic coast. They could help prevent drowning by broadcasting warning messages up to three days before a day at risk. Lifeguards confirmed the relevance of the models at a local scale, and we introduced a 5-stage risk scale. Further study is needed to collect significant data. A more detailed study is conducted to predict the risk depending on the hours of the days and the tide level, which could be more informative for beach patrols.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.259

P4-13
Descriptive epidemiological analysis of mass psychogenic illness managed by “Santé publique France” 2010–2014. Identification of key factors for evaluation
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Introduction “Santé publique France”, the French institute for public health surveillance, and its regional intervention units (Cire) are frequently asked to investigate outbreaks of acute and benign symptoms occurring in communities and presenting a dimension of crisis through their unexplained nature, making their evaluation complex. A methodological investigation guide was published in 2010 to recommend a multidisciplinary assessment of these situations. In order to review prior knowledge acquired, a systematic review of the investigations conducted by the metropolitan Cire was carried out. The review aimed at establishing a more precise typology of these multifactorial outbreaks, in order to identify the aspects of these phenomena still insufficiently described, and which must be characterized to improve their management.

Method Each investigation conducted by a metropolitan Cire between 1 January 2010 and 31 December 2014 was examined retrospectively to document 38 indicators of interest. All of the episodes subject to a written response from the Cire in the form of a note or a report were selected.

Results Between 2010 and 2014, 46 situations were investigated. In most of them, the indicators described in the literature corresponding to sick building syndromes were found, including:

–mild symptoms (including headaches in 82% of cases), various nonspecific symptoms (98%), which disappear when leaving the incriminated premises;

–a higher incidence among women or in certain subcategories of people (83%);

–a suspected environmental exposure (63%);

–the concomitant presence of environmental nuisances (56%);

–the existence of an anxiogenic context (43%);

–the existence of a triggering event (37%).

Given the data available at the end of the investigations, it was possible to classify these outbreaks into three categories:

–those that could be managed only through the improvement of indoor air quality and the reduction of environmental pollution (6 situations);

–those that could not be managed without implementing a concerted action between all the stakeholders, and managing aggravating factors such as the amplification of symptoms due to panic, rumors, or great anxiety (7 situations having all affected children), factors of psychological or social vulnerability (2 situations), or lack of confidence in managers, suspicions of organizational problems (12 situations including 11 in the workplace);

–those for which the investigations were unable to identify clearly the origin of the facts (7 situations).

Conclusion Overall, outbreaks are heterogeneous and involve factors on air quality, crisis management, reactivity, organization of expertise, communication, consultation, redistribution of chronic symptoms or recognition of lived experiences, all in a non-hierarchical way. Their fine description through human and social sciences is a key factor in their management.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.260

P4-14
Ability to swim among 15–75 years in mainland France and overseas departments: Results of the national survey “Baromètre Santé”
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Introduction In France, drownings are responsible for about 500 accidental deaths every summer. The majority takes place during bathing, making the ability to swim a key element of drowning prevention. Little is known about the ability to swim in French population, the purpose of this work is to provide estimations and to study the factors on this topic.

Methods Respondents of the Baromètre santé 2010, 2014 [in overseas departments (OD): Guadeloupe and Martinique Islands in Caribbean, Reunion Island in Indian Ocean and French Guyana and Northeast Coast of Brazil] and 2016, were interviewed on their ability to swim. The proportion of people knowing how to swim is expressed in weighted percentages (standardized cross-race structure sex, age), completed with 95% confidence intervals. The sociodemographic, economic, and health factors associated with the ability to swim have been studied by logistic regression models.

Results In 2010, 81.3% of respondents reported being able to swim (12.8% about 10 meters, 68.5% 50 meters or more). In 2016, they were 83.7% (14.7% about 10 meters, 69.0% 50 meters or more). The OD inhabitants declared being able to swim: 72.2% in Martinique, 69.3% in Guadeloupe, 68.6% in French Guiana, 75.0% in Reunion. Men were more able to swim than women overall (87.8% versus 75.2% in 2010 and 89.2% vs. 78.3% in 2016 in mainland France), and at all ages. Young respondents were more often able to swim than their elders (in 2016, 94.8% among 15–24 years versus 64.7% among 65–75 years in mainland France). Other factors were significantly associated with ability to swim: high-school level, higher socio-professional category, good financial situation, not living alone, normal weight, good mental health and French regions.

Conclusions This work shows that more than one French out of seven do not know how to swim. The younger the people are, the higher is the proportion of people knowing how to swim. Those results are very rare in international literature. Learn to swim program launched in 60’s, particularly in the school environment, is most likely responsible for considerable improvement of the ability to swim of the population, particularly among women. However, still a lot of French older than 55 years cannot swim, and it is precisely this age group, which is particularly affected by drowning. It is important to remember that the learning of swimming can be done at any age to prevent the occurrence of drowning.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.261
P4-15
French home and leisure injury permanent survey: What contribution to epidemiological surveillance?
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Introduction The literature and knowledge regarding home and leisure injuries (HLI) are far wider than they used to be a couple of decades ago. Each year in France (65 million of inhabitants), 14 million of admissions are registered in the 730 emergency departments (ED), of which 5 million are HLI. Different types of epidemiological surveillance have been carried out: cross-sectional, population, cohort studies. Nevertheless, little is known about the detailed circumstances of those injuries. The French home and leisure injury permanent survey (“Enquête permanente sur les accidents de la vie courante” - EPAC) provides detailed circumstances of HLI.

Methods The French HLI permanent survey started in France in 1986 in a dozen of hospital emergency services and is fully standardized since 2004. All patients admitted for HLI are included. When patients arrive at an ED for HLI, they are informed by medical staff that they will be part of this survey, at this point they can refuse to participate (which happens very rarely). After consenting, patients are included and detailed information is collected: where, when, how, who, what product is involved as well as the chronology of the injury and the care given. Data collected in a fixed format in each hospital are centralized each month at national level.

Results In France, like in other countries, several systems provide epidemiological indicators to describe HLI: incidence in population, consumption of health care services, and people at risk. However, when a specific injury needs to be more documented, the only system able to provide solid answers in France is the HLI permanent survey, which records around 120,000 annual injuries. EPAC database allowed providing many results on HLI: button battery ingestion, trampoline injuries, wasp stings, barbecue burns, traumatic sport injuries, elderly falls, traumatic brain injuries, ingestion of cannabis, etc. The strength of the survey is the robustness guaranteed by the annual quality analysis and evaluations making the figures reliable and allowing time series analysis. Incidence rates can be estimated thanks to different methods, including sophisticated models.

Conclusion EPAC survey provides details regarding circumstances and products that cannot be found anywhere else in France. Ancillary studies can be run to deepen specific topics: dog bites, outcome of mild traumatic brain injured patients, sequelae of falls among elderly, etc. The possible link with hospitalization databases allows analyzing the most severe HLI. For prevention purposes, there are increasing demands about HLI from the Ministry of Health, organizations, and associations. The EPAC survey is a key tool to improve knowledge about incidence, severity, preventability, and contributes to the diminution of those injuries through specific prevention initiatives and regulations.

Disclosure of interest The authors declare that they have no competing interest.
https://doi.org/10.1016/j.respe.2018.05.262

P4-17
Sports-related traumatic deaths in mainland France in 2016
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Introduction Although it is recognized that physical exercise is beneficial for health, by increasing the quality of life, by preventing the occurrence of chronic diseases and improving mental health, sport, can also be responsible for serious injuries which some may lead to death. A first estimation of these sports-related traumatic deaths was led in 2010: 246 deaths; the purpose of this work is to update it.

Methods The sources for data collection were: media data sources (Internet, regional daily press), websites of sport federations or association and public agencies involved in sport, collection of firefighter’s public institution and the ministry of Sports. The death had to be caused by an injury during sport practice from the 1st of January up to the 31st of December 2016 in mainland France. Occupational injuries were not included, cycling, walking and bathing-related deaths were not included unless the notion of sport practice was clearly mentioned. Sports were categorized in seven groups: aircraft motorized sports, aircraft non-motorized sports, hunting, watersports, mechanical sports, mountain sports, other sports.

Results In total, 277 sports-related deaths were identified for the year 2016, which represents nearly 5 deaths per week in mainland France. They were
mostly men with 87% of deaths (sex ratio M/F of 6.5). They were mostly adults between 30 and 70 years old (66%). 52% of deaths occurred during summertime (June–September), 34% occurred on weekends (Saturday and Sunday). Deaths mostly occurred during mountain sports (45%), water sports (16%), aircraft non-motorized sports (11%), aircraft motorized sports (9%), mechanical sports (8%), hunting (4%) and other sports (6%).

Conclusions This work has provided an estimate of the number sports-related traumatic deaths in mainland France. Within the limits of the collection method, this number was 277 in 2016. The sports leading to the greatest number of deaths were middle and high mountain sports and water sports. Some cases may have not been collected because of technical difficulties of access to information media, but also when the victims died later after hospitalization, the fate of the victim is not always reported in the media. Similar work was conducted in prospective for the year 2017, in order to access the information media in real time. It will allow minimizing bias of disappearance of online information. Data collection on the circumstances of the accident which led to the death, the risk factors of the person and his environment, his/her level and his/her practice, etc. could provide information to elaborate prevention programs.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.264

P4-18
What are the leading causes of hospitalized traumatic brain injuries according to age? Results of the French home and leisure injuries study in 2016
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Introduction Traumatic brain injury (TBI) is most often an acute event similar to other injuries. However, consequences of TBI can be very serious and affect all aspects of lives, including mental abilities and the personality of the victim. The impact on a person and his or her family can be devastating. The number of people suffering from TBI is difficult to assess accurately but can be approximate by the French medicalized information system program (“Programme de médicalisation des systèmes d’information” - PMSI): 130,000 patients are hospitalized for TBI each year in France. However, this database does not provide the causes of TBI yet, which is crucial for prevention purposes. The main objective of this work is to describe the causes of TBI induced by home and leisure injury (HLI) available in the “Enquête permanente sur les accidents de la vie courante” (EPAC) study.

Methods The French HLI permanent survey, EPAC, started in France in 1986 in a dozen of hospital emergency departments (ED). All patients admitted in ED for HLI are included. After consenting, patients are included and detailed information is collected: where, when, how, who, what product is involved as well as the chronology of the injury and the care given. In this study, TBI was defined as: a brain commotion, a head contusion, a skull fracture or other brain injuries. All patients recorded in 2016, responding to TBI criteria and hospitalized at least one day were selected. The individual causes of TBI described in the free text were analyzed and recoded. Since causes of TBI are very different according to age, they were described separately for: < 1, 1–5, 6–10, 11–14, 15–44, 45–64 and 65 years old and over.

Results In 2016, among the 119,260 patients victim of HLI, recorded in EPAC database, 2918 were hospitalized following the TBI (2.4%). They were mostly frequent among toddlers (7.3%) and elderly (8.6%) and less frequent among teenagers (0.7%) or young adults (0.8%). Among toddlers (< 1 year), all TBI were caused by falls: 19% from adult arms, 17% out of a bed, 16% out of a changing table, 14% out of a sofa, 9% out of a baby bouncer. Among young children (1–5 years), 10% were head impact and 90% falls: 19% were falls down stairs, 17% out of a bed, 10% out of a chair, 6% out of a bicycle, and 4% out of a sofa. Among 6–10 years, 19% were head impact and 81% falls: 11% out of a bicycle, 6% out of scooters, 5% were falls down stairs. Among 11–14 years, 18% were head impact and 82% falls: 16% out of bicycle, 13% out of scooters, 9% out of a horse. Among 15–44 years: 15% were head impact and 85% falls: 37% under the influence of alcohol, 14% in a pathologic context, 12% out of a bicycle, 8% out of a horse. Among 45–64 years, 2% were head impact and 98% falls: 43% under the influence of alcohol, 15% in a pathologic context, 8% were falls down stairs. Among 65 years and over 3% were head impact and 97% falls, causes are various and a lot of them are not well specified.

Conclusions TBI is a frequent reason of admission in ED, more particularly for young children and elderly. This study allows describing the causes of TBI, for which patients need hospitalization. Those causes are very different according to the age and need to be further explored to help building targeted prevention campaigns, more particularly for 65 years and over since causes are various and sometimes not well known.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.265

P4-19
Effect of climate change on vector-borne diseases: Emerging and increasing incidence of zoonotic cutaneous leishmaniasis in Central Tunisia
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Background Tunisia is one of the most exposed countries to climate change. The increase in temperature and degree of moisture is a favorable condition for the development of vectors of several diseases. Thus, the zoonotic cutaneous leishmaniasis (ZCL), vector-borne disease highly sensitive to climatic conditions, has seen a dramatic resurgence in parts of the country as Sidi Bouzid, taking advantage of the warming in recent decades. The present work aims to assess the vulnerability of the region of Sidi Bouzid to climate change and to analyze the relationship between disease incidence and the bioclimatic variables.

Methods This work refers to statistics recorded cases of ZCL in the governorate of Sidi Bouzid and daily observations of the indicators recorded in bioclimatic in the same area (ambient air temperature, rainfall, relative humidity and wind speed) during the period 1963–2016. Generalized additive model was used to investigate the effect of climate on the emergence and the incidence trend of this disease.

Results Annual cumulative rainfall showed a slight downward trend in Sidi Bouzid during the period 1963–2016. This trend was more pronounced during the period 1970–2016. The maximum and minimum annual average of temperatures showed a clear tendency to increase over the period 1963–2016. The annual average minimum temperature increased of 5.8 °C between 1963 (10.8 °C) and 2016 (16.6 °C). The increase in the average of daily maximum temperature was estimated at 0.04°C/year. Monthly ZCL incidence was linked to mean temperature and relative humidity both lagged for 4 months ago and cumulative rainfall quantity for the last month.

Conclusion Emerging ZCL in Tunisia since the beginning of the 1980 decade is related to the increasing of temperature, to high humidity level and rainfall. Adaptation to climate change should consider this relationship to address ZCL mainly early warning system and over.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.266
P4-20
The fraction of lung cancer incidence attributable to fine particulate air pollution in France: Impact of spatial resolution of air pollution models and of information on population density

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Introduction Outdoor air pollution is a leading environmental cause of death and cancer incidence in humans. We aimed to estimate the fraction of lung cancer incidence attributable to fine particulate matter (PM2.5) exposure in France, and secondarily to illustrate the impact of the spatial resolution of information on air pollution levels and on population density on this estimate.

Methods The population attributable fraction (PAF) was estimated using a nationwide spatially refined chemistry-transport model with a 2-km spatial resolution, neighbourhood-scale population density data, and a relative risk from a published meta-analysis. We used the WHO guideline value for PM2.5 exposure (10 μg/m³) as reference and assumed a 10-year time lag between PM2.5 exposure and lung cancer incidence. Lung cancer incidence in adults over 30 years in 2015 was estimated from the cancer registries data. Several sensitivity analyses were conducted which consisted in attributing the nationwide median exposure to all areas, to disregarding population density and to using the 5th percentile of PM2.5 exposure in France.

Results Population-weighted median exposure to PM2.5 in France in 2005 was 13.8 μg/m³ and 87% of the population was exposed to a level higher than WHO guideline value. In France in 2015, 1466 (or 3.6% of all lung cancer cases) new lung cancer cases were attributable to PM2.5 exposure. The sensitivity analyses demonstrated that disregarding spatial contrasts in PM2.5 exposure or population density would have led to an underestimation of the PAF by up to 7% and 72%, respectively. When the PM2.5 reference level was replaced by the 5th percentile of country-scale exposure (4.9 μg/m³), PAF increased to 7.6%.

Conclusions Air pollution plays an important role in the burden of lung cancer in France. Improvements in exposure assessment methods are crucial for the investigation of future health impacts. Policy action to reduce the exposure to PM2.5 such as for instance pollution permits, regulations or subsidies of alternative energy sources may have substantial benefits to reduce the burden of lung cancer in France.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.267

P4-21
Distinctive chronic health risks in the context of disaster exposure: Findings from a nationally representative population survey

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Introduction Exposure to natural and man-made disasters has the potential to lead to a range of acute adverse impacts on human health and well-being and may also exacerbate pre-existing health conditions. Yet, little is known about the impact of such potentially traumatic events on the risk of chronic physical health conditions. This study therefore sought to examine the full spectrum of chronic physical health risks associated with natural and man-made disaster exposure.

Methods Data from a nationally representative, cross-sectional Australian population survey (n = 8841) were analysed through multivariate logistic regression analysis. Key survey measures were based on the chronic conditions module of the World Health Organization World Mental Health Composite International Diagnostic Interview (WMH-CIDI). Key outcomes examined included a wide spectrum of lifetime chronic physical health conditions, including national health priority conditions (asthma; cancer; stroke; gout/rheumatism/arthritis; diabetes/high blood sugar levels; heart/circulatory conditions) and other health conditions of six or more months in duration (hay fever; sinusitis; emphysema; bronchitis; anaemia; epilepsy; oedema; hernias; kidney problems; migraine; psoriasis; stomach/gastrointestinal ulcer; thyroid/goiter; tuberculosis; back or neck conditions). Multivariate analyses controlled for sociodemographic variables (age, gender, country of birth, marital status, qualification, labour force status, household location, relative socioeconomic disadvantage), exposure to natural and man-made disasters, and exposure to any other type of potentially traumatic event.

Results Natural disaster exposure was primarily associated with an increased lifetime risk of stroke (AOR: 2.06, 95% CI [1.54, 2.74], P < 0.001). Man-made disaster exposure was linked to an increased lifetime risk of stomach ulcer (AOR: 2.21, 95% CI [1.14, 4.31], P < 0.05), migraine (AOR: 1.61, 95% CI [1.02, 2.56], P < 0.05), and heart/circulatory conditions (AOR: 2.01, 95% CI [1.07, 3.75], P < 0.05). Multiple exposure to (two or more) man-made disasters increased the lifetime risk of migraine (AOR: 2.98, 95% CI [1.28, 6.92], P < 0.05) and chronic back or neck conditions (AOR: 1.63, 95% CI [1.02, 2.62], P < 0.05), while multiple natural disaster exposure further increased the lifetime risk of stroke (AOR: 3.28, 95% CI [1.90, 5.67], P < 0.001). No other chronic health risks were elevated in the context of disaster exposure. Despite the relatively greater chronic health risks associated with man-made disasters, natural disasters were associated with overall more cases of chronic health conditions, likely due to the frequency with which these events occur in Australia.

Conclusion Notwithstanding limits to causal attribution in cross-sectional survey data, the analysis of nationally representative population data provides a consistent method to explore the national spectrum of chronic physical health risks in the context of disaster exposure. Distinctive patterns of chronic health risks associated with varying types of disaster exposure warrant further investigation. Despite the relatively greater chronic health risks associated with man-made disaster, the national burden of chronic health conditions in Australian natural disaster contexts is particularly high.

Disclosure of interest The author declares that he has no competing interest.

https://doi.org/10.1016/j.respe.2018.05.270

P4-24
Home and leisure injuries in mainland France based on the health care and insurance survey, 2012

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Introduction Home and leisure injuries (HLI) are defined as unintentional injuries excluding road traffic accidents and occupational injuries. HLI are a major public health issue. Each year in France, they lead to more than 21,000 deaths and several hundred thousand hospitalizations. HLI’s data from the Health, Health Care and Insurance Survey (ESPS) were analyzed in a dual objective:—measuring the incidence rates of injured persons in mainland France in 2012;—identifying factors associated with HLI.

Methods Data concerning the ESPS Survey was collected in a randomized representative sample of the general population in mainland France in 2012. Data was first collected by face to face or phone interviews, and secondly by health care and insurance survey, 2012.

Results—measuring the incidence rates of injured persons in mainland France in 2012;—identifying factors associated with HLI.

Methods Data concerning the ESPS Survey was collected in a randomized representative sample of the general population in mainland France in 2012. Data was first collected by face to face or phone interviews, and secondly by health care and insurance survey, 2012.

Results—measuring the incidence rates of injured persons in mainland France in 2012;—identifying factors associated with HLI.
Results Incidence rates of injured persons in mainland France in 2012 were estimated: 4.8% of the respondents were victim of HLI in the past three months whatever the age. Age distribution shows that 20.9% of HLI’s victims were younger than 15 and 20.7% were older than 65. HLI were mainly domestic injuries (50.7% of HLI’s victims) and sport or leisure related injuries (26.5%). The main type of injury recorded was sprains and dislocations (30.5%), lower limbs were most often affected (38.8%) and about half of victims has needed hospital care (emergency or hospitalization) (48.9%). A large majority of HLI’s victims (81.9%) reported a limitation in the 48 hours following injury. Several factors were associated with HLI among people aged 15 and older: to enjoy taking risks, to be young, to have an upper than secondary education level, and to have a poor health.

Conclusions According to our results, incidence of HLI remained stable between 2004 and 2012. The factors associated with the occurrence of HLI are often similar to those established in the literature. Moreover, multivariate analyses also contributed to identify some associations seldom found in the literature on HLI. Generally, risk-taking would increase the likelihood of having an HLI particularly a sport or leisure accident; to practice sport on a regular basis would be associated with an increased risk of sport and leisure accident. These results have to be confirmed and detailed to improve primary prevention.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.271

P4-25
Causes of burn based on hospitals reports in mainland France in 2014
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Introduction Burns are defined as an injury to the skin or other organic tissue primarily caused by thermal or other acute trauma. Every year in France, burns are responsible for several hundreds of deaths and about 11,500 hospitalizations. Furthermore, burns often result in heavy physical, psychological or social sequelae. They are one of the most expensive traumatic injuries due to costly wound treatment and very long care (hospitalization and rehabilitation). Prevention of burns is therefore a necessity. In order to prevent burns, knowledge about their causes is essential. There is a lack of large-scale results about causes of burns in France. Therefore, the aim of this work it to analyze causes of burns in mainland France in 2014, using data from the hospital nationwide database - “Programme de Médicalisation des Systèmes d’Information” (PMSI). Coding of causes is expected to present high-quality because three French agencies “Agence technique de l’information sur l’hospitalisation” - (ATIH), “Société française de brûlologie” (SFB) [formerly “Société française d’étude et de traitement des brûlures” (SFETB)] and “Santé publique France” [formerly “Institut de veille sanitaire” (InVS)] implemented in 2011 a thersaurus of burns causes in order to facilitate and harmonize the coding in the PMSI and make it mandatory in 2013.

Methods Analyses were performed on first hospital stays in a burn center, in 2014 in mainland France, registered in the PMSI database with a principal or associated diagnosis of burn, coded from T20 to T32 in the International Classification of Diseases, 10th revision (ICD10), and at least one associated diagnosis mentioning a cause of burn. Data collected for patients whatever the age included: demographics, circumstances (accident, assault, suicide attempt), etiology (scald, contact, fire and flames, radiation, electrical, chemical).

Results In 2014 in mainland France, 2712 patients were hospitalized in a burn center and presented information regarding the cause of burn. 61.5% were men, mean/median age of 31/28 years. Burns occurred mostly in accidental circumstances (93.7% of patients) and are more rarely due to suicide attempt (4.9%) or assault (1.4%). Half of accidental burns were scald (50.8%), 27.2% fire and flame burns, 8% contact burns, 4.5% chemical burns, other etiologies are scarcer. Causes of burns varied according to age and sex. Scald was the first cause of burns for children (83.8% for boys and 88.2% for girls among 0–4 years) and for women whatever the age. Fire and flames burns were the first cause of burns for men after 15 (42.6% among 15–59 years, 56% among 60 years and older).

Conclusions For the first time in France, this study provides results about causes of burns at a large-scale. In spite of numerous prevention measures, burns and in particular scald, are very frequent in France. Further research aiming at improving knowledge about causes of burns could be useful to better target prevention measures. Moreover, a precise evaluation of prevention measures already implemented could be useful.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.272

P4-26
Epidemiology of traumatic brain injuries based on hospital reports in mainland France
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Introduction Traumatic brain injuries (TBI) are defined as an alteration in brain function or other evidence of brain pathology caused by an external force. Every year in mainland France, TBI are responsible for several hundreds of deaths and several thousands are treated at emergency departments. Among them, between 25% and 40% result in physical, psychological or social sequelae according to different estimations. TBI occur, most often, after a home and leisure injury or a traffic accident, which could have been avoided by appropriate prevention measures. Few epidemiological data on TBI at a large-scale exist in France. Thus, these analyses aim at gaining new insights into TBI epidemiology in France using data from the hospital nationwide database - “Programme de Médicalisation des Systèmes d’Information” (PMSI).

Methods The analysis was performed on all the first hospital stays in 2013 in mainland France registered in the PMSI database with a principal or associated diagnosis of TBI, coded in S06 in the International Classification of Diseases, 10th revision (ICD10). S06 codes are the only one specific to TBI in the ICD10. Data collected for patients whatever the age included: demographics, type of injury (concussion, edema, hemorrhage, etc.), vital status at the end of hospitalization. The evolution of two indicators (Incidence rate and lethality rate) was studied over the period 2011–2013.

Results In 2013, 135,081 patients were hospitalized after the occurrence of TBI, mostly men (57% of patients) with a mean/median age of 49/53, presenting mostly mild TBI (77%). Incidence rate was 206 per 100,000 inhabitants, more elevated among men than among women (242 per 100,000 versus 172 per 100,000). TBI were more frequent among young and the elderly. Incidence rates varied according to the regions but remained stable over the period 2011–2013. 5,723 patients died during their hospitalization. The lethality rate was 4% (4.2% for men versus 3.7% for women). Lethality rate increased with age for men and women and remained stable over the period 2011–2013.

Conclusions For the first time in France, this study provides results about TBI at a large-scale. Incidence rate measure in France is in the range of incidence rates calculated in studies based on hospital discharge. These results contribute to improve TBI epidemiological monitoring in France. Other sources of data, like emergency data, will be necessary in order to measure more accurately the number of victims of TBI and in particular of mild TBI. Furthermore, research aiming at improving knowledge about precise causes of TBI could be useful in order to expand effective TBI prevention measures.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.273
P4-30 Incidence and risk factors of pressure ulcers in a Tunisian University Hospital

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Introduction Pressure ulcers impose a significant burden not only on the patient but on the entire health care system. Knowledge of factors contributing to their pathogenesis allows the identification of risk factors such that preventive measures may then be targeted. This study aimed to estimate the incidence of pressure ulcers in Sahloul University Hospital and to identify the risk factors.

Methods We carried out a longitudinal study in the departments of Anaesthesia-Resuscitation, Internal Medicine, and Burn Surgery department of Sahloul University Hospital during 3 months from October the 1st until December 31st, 2015.

Results Overall, 150 patients were eligible. The mean age was 46.1 ± 20.2 years. The sex ratio was 1.94. Twenty-nine patients had pressure ulcers. The incidence was 19.3% (95% CI: [13.25.3]). In addition, 56 episodes of pressure ulcers were observed in these patients (37%, 95% CI: [29.3–44.7]). The most frequent locations were the heels and buttocks. Polytrauma (P = 0.048) and Coma (P ≤ 10–3) were the independent risk factors for pressure ulcer occurrence. Regarding the assessment of different pressure screening scores, Braden had the best sensitivity and specificity.

Conclusion Our results highlight the problem of pressure ulcers in our hospital. The prevention of this complication requires a management of patients with trauma and coma.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.277

P4-32 Seasonal variations of exposure to agricultural pesticides in residents proximate to vineyards: SIGEXPOSOME study

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Introduction The impact of environmental exposure to pesticides from agricultural drift on human health is a major public health concern. The International Agency for Research on Cancer (IARC) has classified several pesticides as carcinogenic or probable carcinogenic to humans. Residential proximity to treated farmland is a source of environmental pesticide exposure and has been associated with increased concentrations of pesticides in residential dust and urine samples. Little is known on the seasonal variations of pesticide concentrations. The SIG-EXPOSOME project aims to investigate seasonal variations of the exposure to multiple agricultural pesticides of residents proximate to vineyards and of pesticide applicators in the Beaujolais area of the Auvergne-Rhône-Alpes Region, France. The study is based on a longitudinal study involving overall 185 subjects, with repeated sampling of multiple matrices (residential dust, urine, blood and hair). We report here preliminary results on 19 residents.

Methods We sampled morning urine and household dust in 19 non-smoking men, aged 18 to 65 years, without professional pesticides use, residing in the study area. Sampling was performed in July and October 2015. House dust: We used the Quick, Easy, Cheap, Effective, Rugged, and Safe (QuEChERS) method for extraction and analytical multi-residue methods based on gas chromatography coupled to mass spectrometry (GC–MS) and liquid chromatography coupled to tandem mass spectrometry (LC–MS/MS). After analyses of the efficiency and repeatability of the analytical methods for 62 compounds, 53 pesticides were retained for analyses [recovery rate 70–120%; relative standard error (RSD) < 20%; LOQ 20 ng/g to 1000 ng/g dust]. Urine samples: In order to screen presence of pesticides and their metabolites in urine samples, a database containing 59 pesticides and their 519 associated metabolites with their exact monoisotopic mass was set up. After solid phase extraction, the concentrated extracts of urine samples were analyzed in full scan mode by liquid chromatography coupled to high-resolution mass spectrometry (LC-HRMS).

Results House dust: 40 pesticides out of 53 were quantified, including 11 compounds of high public health priority. Among pesticides with a detection frequency > 70% for at least one of the two sampling periods, we observed significant seasonal variations in prevalence for 10 pesticides (out of 18) and significant differences in concentrations for 14 pesticides: Chlorpyriphos, Cyprodinil, Difenconazole, Dimethomorph, DimethomorphII, Fludioxonil, Indoxacarbe, Kresoxin-methyl, Myclobutanil, Spiroxaminil, SpiroxamineII, Tebuconazole, Trifloxystrobin and Zoxamide with an average concentration higher in July than in October. Urine samples: The LC-HRMS analyses showed the presence of three pesticides metabolites: 3,5,6-trichloro-2-pyridinol (TCPy), a specific metabolite of the organophosphate insectsicide chlorpyrifos and chlorpyriphos-methyl; 3-phenoxbenzoic acid (3-PBA), a nonspecific metabolite of the pyrethroid insectsicide permethrin, cypermethrin or cyhalothrin; hydroxy- and carboxy- metabolites of tebuconazole. The identity of TCPy and 3-PBA was confirmed by comparison with authentic standards.

Conclusion This study, analyzing the seasonal variations of multiple pesticides, is unique in France. House dust of non-professional residents proximate to vineyards showed seasonal variations with higher prevalence and concentrations of agricultural pesticides during the application period. Also, results show the capacity of our screening approach based on LC-HRMS to detect agricultural compounds present at low concentrations in urine. Correlation between residential dust and urine contamination will be further explored as well as association between concentrations of pesticides in house dust and urine, and proximity to treated vineyards, a surrogate for pesticides drift.

Funding Auvergne-Rhône-Alpes Region; Métropole Lyon; Cancéropole CLARA.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.279

P4-33 The impact of different e-cigarette types on indoor fine and ultrafine particulate matter concentrations at close distances

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Introduction E-cigarettes are increasing in popularity, yet few studies have investigated how they impact indoor concentrations of fine particulate matter (PM2.5; aerodynamic diameter ≤ 2.5 μm), and ultrafine particles (UFPs, aerodynamic diameter < 0.1 μm). Short-term elevations of PM2.5 and UFP concentrations have been shown to adversely impact cardio-respiratory health. To investigate how e-cigarettes’ influence indoor air, our study estimated PM2.5 and UFP concentrations at two close-proximity distances from an e-cigarette user, and evaluated whether these concentrations varied across different types of e-cigarettes.

Methods One e-cigarette user tested three types of e-cigarettes with the identical fruit-flavoured nicotine solution on three separate occasions. PM2.5 and UFP concentrations were measured at distances of 0.5 and 1 meter in a 14 m2 office. An adjustable voltage, 1st generation, and pen-style tank e-cigarette were tested.
One-second concentrations were measured for 22-minutes divided into: baseline (5.5 minutes), exposure (7 puffs in 6.5 minutes), and post-exposure (10 minutes) periods. The mean concentrations across replicates for each period were calculated. Concentrations between e-cigarettes were compared using analysis of variance.

**Results** At 0.5 meters from an e-cigarette user, the mean PM2.5 concentrations across replicates during the exposure periods were 364 (adjustable voltage), 709 (1st generation), and 1117 (pen-style tank) μg/m³. At 1 meter, the corresponding means were 235, 168, and 1193 μg/m³. The baseline PM2.5 concentrations ranged from 2–3 μg/m³ and the post-exposure concentrations ranged from 2–31 μg/m³. The differences between PM2.5 concentrations among e-cigarettes were statistically significant (P < 0.03). At 0.5 meters, the UFP mean counts were 8060 (adjustable voltage), 11,106 (1st generation), and 14,541 (pen-style tank) count/cm³, and at 1 meter the means were 9699, 10,366, and 26,424 count/cm³, respectively. The baseline UFPs ranged from 922–4522 count/cm³ and post-exposure from 4353–9990 count/cm³. Counts of UFPs were different between e-cigarette types (P < 0.001). UFP counts did not return to baseline 10-minutes after the last e-cigarette puff.

**Conclusions** At close distances, one e-cigarette notably increased PM2.5 concentrations and UFP counts in the indoor air, but there was high variability between replicates.

**Disclosure of interest** The authors declare that they have no competing interest.
were obtained for the association between temperature and ILI count. Instead, there was no significant association between ILI count and longer lagged values (2- or 3-week) of absolute humidity and temperature. The model accurately predicted the weekly ILI incidence in each season (although it tended to underestimate it around the seasonal peak) and the changing trend of season average ILI incidence rate during the study period.

Conclusions Changes in absolute humidity and temperature were able to satisfactorily explain the long-term trends of ILI incidence rate in the Netherlands during 1970–2016. Temperate countries should monitor climate-related change in infectious diseases epidemiology so that measures to mitigate their impact can be planned and implemented.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.282

P4-37 Determinants affecting prenatal exposure to mercury in the Republic of Karelia, Russia
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Introduction Health is determined by a complex interaction between individual characteristics, lifestyle and the physical, social and economic environment. Determinants affecting prenatal exposure to mercury (Hg) have influence on health of mother during pregnancy, newborns, and population at all. In our biomonitoring study, we tried to detect possible determinants of high Hg level in prenatal period. WHO Registration project 2016/623629-0 “Development of a Plan for Global Monitoring of Human Exposure to and Environmental Concentrations of Mercury”. Executing organizations: United Nations Environment Program, World Health Organization, WHO Regional Office for Europe, CNR-Institute of Atmospheric Pollution. Financing organizations: Global Environment Facility.

Methods A human biomonitoring survey of 252 women in birth from five maternity hospitals of Republic of Karelia was carried out in 2016 using the WHO standard methodology (informed consent, woman’s questionnaire, mercury (Hg) measurement in maternal hair and umbilical cord blood). All data were analyzed through appropriate descriptive statistics and statistical tests with level of significance: Xi-square, Mann–Whitney, Kruskal–Wallis. For detection of determinants affecting prenatal exposure to high Hg level the linear regression analysis was carried out.

Results Prenatal exposure to Hg was characterized by high levels: the Geometric Mean (HgHair) was 0.534 µg/g (min 0.033 µg/g–max 8.000 µg/g), Hg concentrations exceeded referral level 1.0 µg/g in 23% of cases (58/252); the geometric Mean (HgCordBlood) was 2.29 µg/L (min 0.13 µg/L–max 36.23 µg/L), Hg concentrations exceeded referral level 5.0 µg/L in 22.6% cases (57/252). The linear regression analysis defined positive and significant association with prenatal exposure to HgHair with women’s age > 29.8 and living in Medvezhyegorsk region (B = 2.826, 95% CI: −0.087 to −0.004, P = 0.032; R² = 0.076, P = 0.003).

Conclusions Detected determinants have significant effect on prenatal exposure to HgHair and HgCordBlood level in women of Republic of Karelia. Some detected negative and significant determinants (broken thermometers in the nearest past; rare consumption of local water fish) have needed to be more explored because of possible confounders. Finally, these findings will help to understand more clearly the situation with Hg exposure and to develop program for declining Hg exposure of population in Republic of Karelia.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.284

Session 5 – Epidemiology and human and social sciences

PS-1 Productive activities, mental functioning and well-being in disability: Exploring the role enhancement and the role strain hypotheses
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Background Engagement in productive activities is an important determinant of mental functioning and well-being. Persons with physical disabilities are often confronted with constraints to engage in productive activities and it remains largely unknown whether persons who nevertheless manage to be productive experience beneficial effects for mental functioning and well-being. This is the first study to analyse different productive activities (paid work, volunteering, education, housework) and its gender-specific associations with mental functioning and well-being in the disability setting, testing two contrasting hypotheses of Role Theory, the role strain and the role enhancement hypotheses.

Methods We used data from a representative sample of 1157 men and women of employable age who sustained a severe physical disability (spinal cord injury). Load of engagement in paid work, volunteering, education, and housework was classified into three groups (none; moderate; high). To assess the total productivity load, a score over the four items was calculated. Diversity of engagement in productive activities was assessed with variables on the number and combination of activities. Tobit regressions were applied to evaluate associations of load and diversity of engagement in productive activities with mental functioning (Mental Health Inventory, SF-36) and well-being (WHOQoL-BREF items).

Results We found that the total productivity load and the load of paid work were positively related to mental functioning and well-being in men. Individuals with moderate engagement in volunteering reported better mental functioning and well-being in men. Individuals with moderate engagement in volunteering reported better mental functioning and well-being in men. Individuals with moderate engagement in volunteering reported better mental functioning and well-being in men. Individuals with moderate engagement in volunteering reported better mental functioning and well-being in men.

Conclusion This study in the disability setting provided clear support for the role enhancement hypothesis. Future research on the mechanisms behind the observed associations is warranted to develop interventions and policies that strengthen resources important for engagement in productive activities as well as for mental functioning and well-being in persons with physical disabilities.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.285
Environmental determinants of participation restriction after stroke: A systematic review of observational and qualitative studies

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Introduction
The International Classification of Functioning, Disability and Health (ICF) was published in 2001 by the World Health Organization (WHO) who defined participation restriction as the difficulty to achieve activities in daily life. The ICF allows to consider an individual in its global functioning then, participation restriction is the combined consequence of disability, activity limitation and contextual factors both personal and environmental. Participation is a major determinant of quality of life and life satisfaction in stroke patients, then for a given deficiency and activity limitation, consequences on participation may be very different depending on these contextual factors. However, there is limited evidence existing. The ICF defined two levels of environmental factors: “individual, direct environment” (interaction between an individual and his direct environment: physical environment, social and familial relationships) and “societal, global environment” (interaction with social, health services, laws and national policies). The aim of this systematic literature review is to better understand the role of environment in stroke patients’ functioning and precisely to identify which environmental determinants could be associated with participation restriction in stroke patients.

Methods
Searches were conducted in MEDLINE, PsycINFO, and Web of Science. The search algorithms were: for MEDLINE, (‘Stroke’[Mesh]) AND (‘Social Participation’[Mesh]); for PsycINFO and Web of Science: ‘stroke and participation restriction’; ‘stroke and social participation’. The quality of observational studies was based on 4 criteria adapted from the STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) checklist and quality of qualitative studies was based on four criteria adapted from the COREQ (Consolidated criteria for reporting qualitative research) checklist.

Results
Forty-one studies were retained for entire reading, full-text assessment of eligibility and quality. We eventually selected 16 articles, among them, 11 were quantitative studies and 5 were qualitative studies. The first level “individual, direct environment” was widely more studied in articles selected than the second level “societal, global environment”. Direct environment conceptualized as social support, attitudes towards the patient and physical environment were the mainly environmental determinant of participation restriction identified and appeared to be a major facilitator of participation. Global environment (access to health services and health policies) was only investigated in one study in the review and showed a significant association with participation, then appeared to be a facilitator of participation.

Conclusion
This is to our knowledge the first review which gathered evidence regarding environmental determinants of stroke patients’ participation, 16 studies were included. This review shows that two levels of environment: “individual, direct environment” and “societal, global environment” are facilitators of participation and should be considered in clinical practice, in rehabilitation programs and constitute issues for future intervention research.

Disclosure of interest
The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.286

The Norwegian Armed Forces Health Registry and use of military screening data to evaluate changes in IQ scores over time

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Introduction
Up to the year 2009, all young Norwegian men were obliged to attend military medical examinations to assess their suitability for military service. Since 2010, both sexes have been required to complete a health-assessment questionnaire for the Norwegian conscription board when they turn eighteen. Based on the responses, a portion is called for comprehensive medical examinations. These examinations include tests of physical fitness and intellectual performance, review of any documented disease or disability, general clinical examinations and interviews, tests of visual acuity and colour vision, and audiometry. The data are stored in the Norwegian Armed Forces Health Registry (NAFHR) in accordance with the Act on Health Registers and Health Information. The register is maintained for the purpose of monitoring the health of the Armed Forces Personnel and identifying risk factors associated with military service. Currently, the NAFHR contains health data on 1.2 million men and 63,500 women born between 1926 and 1998. The annual coverage varies as military screening is constantly changing in line with the Armed Forces’ need for personnel. The NAFHR includes data on 90–95% of the annual male birth cohorts born between 1950 and 1991. The data collected at the military medical examinations has been applied in public health research since 1996. This is made possible by linking the NAFHR data with national registries on health, education, work and social benefits. The research has provided insight into i.e. how factors related to neonatal life/birth and family affects the adult body and cognitive performance and has helped to understand how mental and physical health in adolescence is associated with important public health problems in adulthood. Similar data are available in several European countries, enabling large multinational studies and comparisons between countries. In light of the recent debate on possibly decreasing trends in intelligence scores in the Scandinavian countries, we examined secular trends of intellectual performance in Norway.

Methods
The military’s tests for intellectual performance include problems related to number-series (calculation), verbal analogues and geometric figures. A combined score for the three tests is given as a single-digit standard nine (“stanine”) scale ranging from 1 (lowest) to 9. The scores are normally distributed with a mean of 5.0 and SD = 2.00. A stanine score of 5 corresponds to 100 points on the intelligence quotient (IQ) scale (WAIS), with an increment/decrement of 7.5 IQ points for each stanine unit deviating from 5. Our study included 493,615 men tested for intellectual performance at a conscription board between 1980 and 2009 at the age of 18. We divided the study period into six five-year periods and used one-way between-group analysis (Welch) with Tukey post hoc tests to examine differences in mean stanine score of intellectual performance across the periods. P-value < 0.05 was regarded as statistically significant.

Results
Mean stanine scores of intellectual performances were statistically significant different between the periods. The score increased from 4.93 (SD = 1.8) in 1980–84 to 5.12 (SD = 1.8) in 1985–89 and peaked at 5.29 (SD = 1.9) in 1990–94. Thereafter, the mean stanine score fell to 5.13 (SD = 1.8) in the period 2000–04 and to 4.97 (SD = 1.7) in 2005–09. When referenced to the IQ scale, our results show that men tested in 1990–94 scored on average 2.7 points higher than those tested in 1980–84. Men tested in 2005–09 scored on average 2.4 IQ-points lower than those of the peak period (1990–94), but still 0.3 IQ-points higher than those who were tested in the first period.

Conclusion
We observed a significant gain in intellectual performance among 18-year-old men between 1980 and 1994, thereafter a similar and significant loss until 2009.

Disclosure of interest
The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.287
Being alone together: A longitudinal dyadic analysis on the impact of loneliness and relationship quality on well-being in couples coping with disability

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Abstract

Loneliness and poor relationship quality have been found to elicit a stress response, which is detrimental for psychosomatic health and well-being. To date, little is known about how the perceptions of loneliness and relationship quality within couples coping with a disability affect well-being, furthermore the directionality of effect is not well understood.

Methods

In this study, we investigate the actor and partner effects, and the reciprocal effects of loneliness and relationship quality on well-being. The analyses are based on longitudinal dyadic data from the pro-WELL study (n = 246), a Swiss community survey of persons with spinal cord injury (SCI) and their partners. Data was collected over a 12-month period using telephone interviews and questionnaires. We employed mixed effects modelling to explore actor and partner effects and used cross-lagged path analysis to explore reciprocal effects. Both of these analyses were stratified by role, i.e. persons with SCI and caregiving partners.

Results

We found loneliness to be more prevalent in persons with SCI compared to their caregiving partners. In caregiving partners, we found significant actor effects of loneliness (β = -0.20; CI: -0.31, -0.10) and relationship quality (β = 0.15; CI: 0.04, 0.26) on well-being, and significant partner effects of relationship quality on well-being (β = 0.21; CI: 0.10, 0.32). In persons with SCI, only the actor effect of loneliness was significant (β = -0.30; CI: -0.41, -0.18). Over time, loneliness demonstrated reciprocal associations with well-being, as did relationship quality in caregiving partners, indicating a possible cycle of positive development between reducing loneliness, improving relationship quality and enhancing well-being.

Conclusions

The findings of our study highlight the high prevalence of loneliness in persons with SCI and the importance of reducing loneliness and strengthening relationship quality in order to improve well-being in partnerships of persons coping with disability. It may also inform the trial and evaluation of targeted interventions, which promote qualitative aspects of social relationships in order to enhance well-being.

Disclosure of interest

The authors declare that they have no competing interest.

Smoking and school absenteeism among 15–16-years-old adolescents: A cross-section analysis on 36 countries

J. Perelman

Introduction

Prevention of youth smoking is a cornerstone of tobacco control policies, where schools have a crucial role to play. However, the well-known long-term consequences of adolescent smoking may be insufficient to convince education stakeholders to implement tobacco control policies at school level. Although they may be individually aware of public health issues, they may hardly devote much time to efforts for which they will not be rewarded. In this paper, we investigate the link between smoking behaviors and school attendance.

Methods

We performed logistic regressions on the risk of more than three missed school days, by cause, as function of daily smoking, adjusting for age, sex, socioeconomic status, academic performance, parental involvement, and other risk behaviours. Then, generalized linear models were estimated on the number of missed days, by cause, as function of regular smoking, adjusting for the same covariates. The consistency of results was assessed by replicating the analyses for each sex and age group.
**Results** Daily smoking was significantly linked to school absenteeism, with a 43% excess risk of more than three missed school days per month due to illness (OR = 1.43, 95% CI: 1.37–1.49), and a 86% excess risk due to skipping (OR = 1.86; 95% CI: 1.78–1.95). Daily smoking was also linked to a 26% excess number of monthly missed days due to illness (beta = 0.26; 95% CI: 0.24–0.29), and to a 66% excess number of monthly missed days due to skipping (beta = 0.66; 95% CI: 0.64–0.69). These findings were consistent across age and sex groups.

**Discussion** By showing the link between daily smoking and absenteeism, we argue that smoking may also be upholding school performance, and thus bringing short-term damaging effects to the adolescents.

**Disclosure of interest** The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.291

**PS-9**

**Socioeconomic inequalities in cardiovascular risks among mid-aged and older Chinese: A nationally representative longitudinal study**

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**Background** China is the fastest ageing nation and will become the world’s most ageing society by 2030. Cardiovascular disease (CVD) remains the leading cause of mortality in China and ageing further complicates the picture of CVD profile in China. This study aims to examine socioeconomic disparities in cardiovascular risks among mid-aged and older Chinese.

**Methods** Data were from 2011 baseline survey of China Health and Retirement Survey (CHALRS), which is a nationally representative longitudinal study of persons in China 45-years-older and their spouses. A sample of 12749 ≥ 45 years (male: n = 5968, mean age = 58.85; female: n = 6791, mean age = 58.35) were included in this paper. This paper concerns four CVD risk factors: systolic blood pressure, diastolic blood pressure, BMI and waist circumference. Hypertension was defined as a systolic blood pressure (SBP) ≥ 140mmHg, and/or diastolic blood pressure (DBP) ≥ 90mmHg. Overweight (and obesity) was defined as a BMI ≥ 24. Abdominal obesity was defined as a waist circumference ≥ 90 cm for men and ≥ 80 for women. Main socioeconomic predictors include socio-residential status based on hukou (household registration) and residence of living (urban hukou living in urban areas—urban residents, rural hukou living in urban areas—migrants, and rural hukou living in rural areas—rural residents); labour market status (agricultural work, non-agricultural work, retirement and other), quintiles of household wealth/assets (long-term household socioeconomic status) and household per capita consumption (short-term household socioeconomic status). Logistic regression was performed for women and men separately. Adjusted odds ratios with 95% confidence intervals following logistic regression to account for confounding variables were presented.

**Results** The results show substantial socioeconomic disparities in CVD risks among middle-aged and older people in China. For men, migrants (OR: 0.79, 95% CI: 0.64, 0.98) and rural residents (OR: 0.40, 95% CI: 0.49, 0.72) are less likely to be overweight (and obesity) compared to urban residents. The OR for rural men developing abdominal obesity is 0.59 (95% CI: 0.47, 0.73). Labour market status is closely associated with the odds of developing overweight (and obese) and abdominal obesity for men and women. Compared to people who work in agricultural sector, those who work in non-agricultural sectors (OR: 1.64, 95% CI: 1.39, 1.92 for men; OR: 1.51, 95% CI: 1.25, 1.83 for women) and those who already retired (OR: 1.75, 95% CI: 1.46, 2.09 for men; OR: 1.81, 95% CI: 1.55, 2.10 for women) are more likely to be overweight. For abdominal obesity, the ORs are 1.63 (95% CI: 1.36, 1.97) for men with non-agricultural work and 1.66 (95% CI: 1.35, 2.05) for retired men. The corresponding ORs for women are 1.15 (95% CI: 0.91, 1.45) and 1.68 (95% CI: 1.39, 2.03), respectively. Being married/partnered appears to significantly increase the odds of being overweight (and obese) and decrease the odds of hypertension for both men and women. Short-term household economic status shows a modest and graded association with the odds of all CVD risk including overweight (and obesity), abdominal obesity and hypertension at higher quintiles compared to bottom quintile.

**Conclusions** There are substantial socioeconomic inequalities in CVD risks among Chinese middle-aged and older people, which can be further enhanced by China’s rapid urbanisation and ageing. Since China’s urbanisation is strongly driven by state. There is, therefore, a possibility that socioeconomic inequalities among older people might be ‘broken’ provided appropriate policy interventions are put in place. The findings will aid an understanding of identifying modifiable risk factors that can prevent avoidable health inequalities, and developing evidence-based policies to tackle health inequalities among older people in China.

**Disclosure of interest** The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.293
P6-1
Substitution of sugar-sweetened beverages for other beverages and the risk of developing coronary heart disease: Results from the Harvard pooling project of diet and coronary disease
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Introduction
Sugar-sweetened beverage (SSB) intake is associated with metabolic disorders. The reduction of SSB intake has been promoted to prevent death and disability from chronic diseases. However, a lower SSB intake requires substitution by other fluids to maintain hydration. We investigated the association between SSB intake and the risk of coronary events and death, and assessed if substitution of coffee, tea, milk, fruit juice and artificially-sweetened beverages (ASB) for SSBs is associated with a reduced risk of coronary events and death.

Methods
This was a follow-up study in which data from six cohort studies were pooled.

Results
During the mean 5–10 years follow-up, 4248 coronary events and 1630 coronary death occurred among 284,345 individuals; 355 mL daily increase of SSB intake was associated with an increased risk of coronary events (HR: 1.08; 95% CI: 1.02, 1.14) and possibly coronary death (HR: 1.05; 95% CI: 0.96, 1.16). Substitution analyses suggested that replacing SSBs with coffee (HR: 0.93; 95% CI: 0.87, 1.00) or ASB (HR: 0.89; 95% CI: 0.83, 0.97), but not with tea (HR: 0.94; 95% CI: 0.87, 1.01), low-fat milk (HR: 0.96; 95% CI: 0.90, 1.03), whole fat milk (HR: 0.95; 95% CI: 0.87, 1.04) or fruit juice (HR: 0.97; 95% CI: 0.85, 1.07) was associated with a lower risk of developing coronary events. No associations were found for coronary death.

Conclusion
We found that SSB intake is associated with an increased risk of coronary events and possibly coronary death. Our findings also suggest that substituting ASBs or coffee for SSBs lowers the risk of developing CHD events.

Disclosure of interest
The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.297

P6-2
Are dietary patterns at breakfast associated with abdominal obesity in a population-based survey?
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Introduction
Abdominal obesity is a strong predictor of cardio-metabolic abnormalities. There is limited evidence about the most favorable breakfast composition. We explored the association between data-driven breakfast dietary patterns and abdominal obesity in regular breakfast eaters coming from a national population-based sample.

Methods
The cross-sectional nutrition survey menuCH assessed diet using two 24-hour dietary recalls (24HDR) in a representative sample of Swiss adults aged 18 to 75 years. Regular breakfast eaters were defined as people breakfasting in both 24HDR and reporting eating breakfast at least 5 days in a usual week. Among them, we derived dietary patterns using principal component analysis based on the intake of 22 breakfast-specific food groups. All regular breakfast eaters were predicted an individual score for each identified pattern, and then classified into tertiles (T1, T2, T3). We defined abdominal obesity as waist-to-hip ratio (WHR) ≥ 0.9 in men and ≥ 0.85 in women. Logistic models were adjusted for sex, age, physical activity, total energy intake, diet quality outside breakfast, alcohol intake, education, food literacy, smoking, nationality, household status, season, and linguistic region.

Results
Of the 2019 survey participants 1351 (67%) were regular breakfast eaters (42% of men). Among them, we identified 3 patterns:

– traditional breakfast - white bread, butter, sweet spread;
– prudent breakfast - fruit, natural cereal flakes, nuts/seeds, yogurt;
– western breakfast - sweetened breakfast cereals, milk.

After adjustment for potential confounders, the prudent breakfast pattern was negatively associated with abdominal obesity (OR: 0.65 T3 vs. T1, 95% CI: 0.43 to 0.97, P for trend = 0.03). People taking a prudent breakfast (in T3) had 1.4% lower WHR compared to people taking a breakfast distant from prudent (in T1). We found no association for traditional and western breakfast patterns (T3 vs. T1: OR: 1.00, 95% CI: 0.67 to 1.50 and OR: 1.20, 95% CI: 0.82 to 1.76, respectively). Findings were similar when defining abdominal obesity with other anthropometric parameters, such as waist-to-height ratio.

Conclusions
Consuming regularly a prudent breakfast, i.e., rich in fruit, natural cereal flakes, nuts/seeds and yogurt, was associated with less abdominal obesity in a population-based sample of Swiss adults. Further longitudinal and long-term experimental research is needed to provide recommendations on the optimal breakfast.

Disclosure of interest
The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.298
Association between dietary inflammatory index and high-sensitive C-reactive protein levels in cancer screening in Japanese

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Introduction Inflammation is related to the development of many cancers. Diet plays an important role in the regulation of inflammation. The dietary inflammatory index (DII) is a literature-derived dietary index designed to assess the impact of diet on individual inflammation status. However, most validation studies of DII conducted to date have been done in Western countries, indicating the need for evaluation in Asian populations. The aim of this study was to validate DII scores derived from a food frequency questionnaire (FFQ) with high-sensitive C-reactive protein (hs-CRP) levels in participants undergoing cancer screening in Japan.

Methods In cancer screenings conducted from 2009 to 2013 in the National Cancer Center in Japan, 7919 participants aged 40–70 years answered the FFQ and received blood analysis for hs-CRP. Of these, we excluded participants with a body mass index (BMI) of < 14 kg/m² or > 40 kg/m² (n = 13); missing data on smoking status (n = 1) or metabolic equivalents (Mets, n = 1); history of cancer, stroke, or myocardial infarction (n = 877); extreme energy intake (upper and lower 2.5 percentiles, n = 349); missing data on alcohol consumption (n = 120); and missing data of hs-CRP, or hs-CRP > 1.0 mg/dL (n = 84). Finally, 6474 participants (3825 for men and 2649 for women) were included in this analysis. DII was calculated from crude intake from the FFQ and adjusted for energy using the density method. Adjusted geometric mean levels of hs-CRP were calculated using a multivariable linear regression model by quartiles of DII score. P for trend across quartiles of DII score were calculated using DII quartiles as continuous variables. Further, logistic regression analysis was also applied to estimate odds ratio (OR) [95% confidence interval (95% CI)] of hs-CRP > 0.3 mg/dL across quartiles of DII score. These statistical models were adjusted by age, body mass index (BMI), smoking status, and metabolic equivalents.

Results Mean (standard deviation, SD) energy-adjusted DII for men and women was 0.62 (1.93) and –1.01 (2.25), respectively. Mean (SD) hs-CRP levels for men and women was 0.09 (0.11) mg/dL and 0.07 (0.10) mg/dL, respectively. We found a significant positive association between DII scores and geometric means of hs-CRP levels in men (P < 0.01), but not in women (P = 0.46). As well, OR (95% CI) of hs-CRP > 0.3 mg/dL across quartiles of DII score. These statistical models were adjusted by age, body mass index (BMI), smoking status, and metabolic equivalents.

Conclusions DII assessed by FFQ was correlated with hs-CRP level in Japanese men, but not in Japanese women.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.299

Factors associated with moderate acute malnutrition among 6–59 months children in the Lake Chad region: A case-control study

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Introduction In Lake Chad, a region located on the Sahelian strip, malnutrition is recurrent and constitute a real public health problem. Of children aged 6 to 59 months, 14.7% suffered of global acute malnutrition and 12.6% (95% CI: 10.7%–14.8%) of moderate acute malnutrition (MAM) with a mortality rate of 0.98/10,000 children per day (Smart, 2014). Government, international and non-governmental organizations, adopt policies, deploy resources to fight against malnutrition in Chad and especially in this region, but the crisis persists [1]. Studies have documented the factors of malnutrition and recognized inadequate nutrition and diseases as immediate causes. Added to this are the underlying causes such as situations of food insecurity, inadequate dietary practices, etc. [2]. However, all these factors occur alone or in aggregate according to specific contexts [Food and Agriculture Organization–World Health Organization (WHO), 1992]. Apart from general descriptive surveys such as Multiple Indicator Cluster Survey (Mics), Food Security Assessment (Ensai), few studies have studied and/or documented specific factors of malnutrition in this region. Therefore, this study aimed to study the factors associated with MAM in children from 6–59 months in the Lake Chad region.

Methods This study was conducted from March to April 2015 in six Nutritional Units of Sanitary Districts of Bol and Ngouri, in the Lake Chad Region. This was a matched case-control study for sex and age with a sample of 252 pairs of children aged 6 to 59 months. Anthropometric data of the children were measured. “Cases” were defined for any child, girl or boy whose weight-for-height was between −3 and −2 Z-scores, and without edema (WHO standard included in the 2014 version of the National Management Protocol of Malnutrition in Chad). “Controls” were diagnosed unharmed of malnutrition (acute malnutrition, stunting, overweight or obesity). They live in the social environment as close as possible to the cases (same neighborhood or village). In this work, we studied sociodemographic factors, obstetric factors, dietary and health factors (breastfeeding, dietary diversity score according to the seven food groups - WHO standard, morbidity of the child, nutritional status of the mother), the factors related to the health system, water, hygiene and sanitation. A conditional logistic regression model was used to calculate association measures (adjusted odds ratios: ORa) and their 95% confidence intervals.

Results This results focused on the 252 pairs of children included in the study. Our analyzes showed that the odds of malnutrition were four times higher when children’s diets were not diversified (consumed food belonging to less than four of the seven food groups) than when it was (ORa = 4.03 [1.86–8.73], P < 0.001). Children with recent diarrhea had about ten times the odds of moderate acute malnutrition (ORa = 9.62 [5.05–18.33], P < 0.001) than children without diarrhea. The odds of moderate acute malnutrition was approximately three times higher in children whose mothers had a MUAC less than 210 mm (a sign of moderate or severe acute malnutrition) than in those whose mothers had normal nutritional status, were overweight or obese (ORa = 2.91 [1.15–7.33], P = 0.02).

Conclusion This work allowed us to explore and identify the factors associated with MAM in the Lake Chad Region. The results confirm some of our specific hypotheses that, children whose diet was not diversified, those with recent diarrhea and children whose mothers had a Muac less than 210 mm were the most affected by moderate acute malnutrition.

Disclosure of interest The authors declare that they have no competing interest.
Biomarker patterns of fatty acids and other fat-soluble biocompounds in blood to indicate nuts intake in the European Prospective Investigation into Cancer and Nutrition (EPIC) study

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Introduction Nuts are nutrient dense foods, rich in unsaturated fatty acids and other fat-soluble biocompounds. Epidemiological and intervention studies have shown that a high intake of nuts is associated with a reduced risk of coronary heart disease; however, inaccurate estimation of nut intake using self-reported methods might limit detection of other health benefits such as reduced risk of cancer, where potential strengths of associations are likely smaller. This study aimed to identify biomarker patterns including fatty acids (FAs) and other fat-soluble compounds (carotenoids and tocopherols) in blood to indicate nut intake by applying a statistical algorithm combining dimension reduction and variable selection methods. 

Methods The study included 2324 subjects (44% men) aged 35–70 years from 8 European countries in EPIC cross-sectional study. Recent and habitual nut intakes were assessed with 24-h dietary recalls (24-HDR) and dietary questionnaire (DQ), respectively. Potential biomarkers related to nut intake included 22 plasma FAs and serum fat-soluble compounds (7 carotenoids and 2 tocopherols). They were measured by gas chromatography and high-performance liquid chromatography, respectively. In order to identify patterns of these biomarkers, maximizing the explained variability in nut intake, reduced rank regression (RRR) models were used with optimal subsets of biomarkers selected by two different variable selection methods; RRR-based variable importance in projection (RRR-VIP) and least absolute shrinkage and selection operator (LASSO). Prior to the main analysis, nut intake and biomarker levels were log-transformed and adjusted for energy intake (nut intake only) and country taking residuals in linear models. The performance of RRR models was evaluated by Pearson correlation coefficients of biomarker pattern scores with recent and habitual nut intakes through internal two-fold cross-validation.

Results Higher performance was observed in biomarker patterns on habitual nut intake reported in the DQ. The selected subsets of biomarkers slightly differed depending on which selection method was used, but arachidic acid, linoleic acid and tocopherols, known as abundant compounds in nuts, were commonly selected as biomarkers to explain habitual nut intake in both methods. Pearson correlation coefficients of biomarker pattern scores with habitual nut intake (r = 0.27) were two to three times stronger than those of single biomarkers (linoleic acid r = 0.08; arachidic acid r = 0.11). Neither biomarker patterns nor single biomarkers performed well in explaining recent nut intake reported in the 24-HDR.

Conclusions Biomarker patterns consisting of fatty acids or fat-soluble biocompounds better indicated nut intakes compared to any of these single biomarkers evaluated, especially for habitual nut intake. Whether these identified biomarker patterns improve assessment of nut intake in diet-disease studies needs to be evaluated in future studies.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.301
The eating habits of mothers and their pre-school children in Japan

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Disclosure of interest

The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.303

P6-8
The eating habits of mothers and their pre-school children in Japan

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Background

The eating habits of mothers and children in infancy are important. It is not only impact their own present health, but may effect children’s health of lifelong, since early childhood is a crucial moment to formulate basic lifestyle habits. The mothers raise children in infancy can implement healthy lifestyle prevent lifestyle related diseases of children in future. The aim of this study is to describe eating habits of mothers and their children in Japan.

Method

A self-administered questionnaire was distributed to women who have children whose age were 3 to 6-years-old at three nursing schools in a regional town, Japan. The questionnaire was about their demographics, lifestyle, and eating habits of mothers and their children.

Results

In total, 113 women were answered. We excluded the women’s data with missing variables. As a result of the exclusion, 95 mothers and their children were the analysis subjects for this research. There were no mothers and children who were on a dietetic treatment. The mean age of women was 36.4 ± 5.3-years-old. The mean age of their children was 4.5 ± 1.0-years-old. The mean body mass index (BMI) of mothers was 21.8 ± 3.4. The mean Kaup index of children was 15.5 ± 1.8. There were 13 (13.7%) women who were overweight (BMI is below 18.5), 68 (71.6%) women were normal weight status (BMI is 18.5 to 24.9), and 14 (14.7%) women who were in overweight status (BMI is more than 25.0). There were 34 (35.8%) children who were underweight (Kaup index is below 15.0), and 68 children who were in normal weight status (Kaup index is 15.0 to 17.9). The number of children who were in overweight status (Kaup index is more than 18.0) was 14 (14.7%). In this study, many mothers and their children had good eating habits. For example, most of the mothers (80.0%) and their children (91.6%) were eating breakfast every day. There was no association between mothers’ and children’s good eating habits. While, there were 73 (76.8%) children and 70 (73.7%) mothers who do something at meals, as an example, they were in the habit of watching television while eating. The agreement of this habitual practice between mothers and children was substantial by kappa statistics (κ = 0.633).

In regards to dietary supplements use, four children (4.2%) were using dietary supplements including calcium, minerals, or multivitamins, and one child used it before. On the other hand, 47 (49.7%) mothers used to have dietary supplement, and 11 (11.7%) mothers were using some supplements.

Discussion

The rate of dietary supplements use among Japanese children is lower than children in the United States, Australia and China. We, however, suppose that Japanese children using dietary supplements increase thought the effectiveness is not clear yet. A previous study showed that Japanese mothers who were supplement user tended to use dietary supplements for their children. The number of women who have experience of dietary use is increasing in Japan. There, therefore, is possibility of using supplement for children will increase in Japan. Health education including dietary supplements use is a pressing public health issue to develop healthy dietary habits for mothers and children.

Disclosure of interest

The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.304

P6-11
Dietary determinants of obesity among Mexican women

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Introduction

Lifestyle and dietary habits in the Mexican population have dramatically changed in the last 20 years, reflected in an increased prevalence of overweight and obesity in both urban and rural adult populations. The prevalence of overweight and obesity in Mexican adults is 38.8% and 32.4%, respectively. In adults, abdominal obesity is more prevalent among women than men (82.8% versus 64.5%, respectively). In women over 60 years of age, overweight and obesity rates are even greater—nearly 40% are overweight and 35.5% obese. A healthy diet has been shown to prevent weight gain. It is therefore important to investigate dietary factors that are most strongly associated with obesity in this highly obese population group. Dietary patterns are used to assess the overall diet. One approach to evaluate dietary patterns is to use a priori patterns which are based on dietary recommendations. The objective of this study was to evaluate the associations between the consumption of food groups and a priori defined dietary patterns and anthropometric measures in women from the CAMA study.

Methods

Our study population is based on 1062 women (35 to 69-years-old) from the control group of the CAMA study, which is a multi-centre population-based case-control study on breast cancer conducted in Mexico. Each woman was interviewed via personal interview during which dietary intakes were assessed using a semi-quantitative Food Frequency Questionnaire. The indices used in the study are the Dietary Approaches to Stop Hypertension (DASH) score, the Healthy Eating Index (HEI) score, the Mediterranean Diet Score (MDS) and the Diet Quality Index (DQI) score. To estimate associations of food groups and dietary patterns with anthropometric measures, generalized linear regression models were used and adjusted for potential confounders, such as age, centre and educational level.

Results

Mean age, body mass index (BMI), waist circumference (WC), hip circumference (HC) and waist-to-hip ratio (WHR) among the participants were 51.1 (years), 30.5 (kg/m²), 99.4 (cm), 109.3 (cm) and 0.91, respectively. When individual food groups were examined, a higher consumption of legumes was associated with lower WC. We did not observe any significant association between the consumption of individual food groups and dietary patterns with anthropometric measures, generalized linear regression models were used and adjusted for potential confounders, such as age, centre and educational level.

Conclusions

In this population of Mexican women, most of the a priori dietary scores appeared to be of limited value in predicting the association between diet and anthropometric measures. However, higher adherence to the Mediterranean diet was associated with lower WC. We did not observe any significant association between other food groups or a priori dietary patterns and anthropometric measures in models adjusted for confounders.

Disclosure of interest

The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.307
P6-12
Prevalence and factors associated with overweight and obesity among children from primary schools in urban areas of Lome, Togo

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Introduction Overweight and obesity in childhood are serious public health issues, both in developing and developed countries. The present study aimed to ascertain overweight and obesity prevalence rates among Togolese schoolchildren in Lome, Togo, and their correlation with physical activity, socioeconomic conditions and eating habits.

Methods In December 2015, cross-sectional survey was conducted among a representative sample of 634 children (288 boys, 346 girls), aged 8–17 years, who were studying in primary schools in Lome, Togo. Overweight and obesity were defined using age- and sex-specific BMI cut-off points of the International Obesity Task Force. Physical activity, socioeconomic conditions and eating habits were assessed with a standardized questionnaire. Specially trained medical students interviewed children and collected the data. After bivariate regression analyses, factors associated with overweight/obesity were identified by multivariate logistic regression. Statistical significance was two-sided P < 0.05.

Results Overweight and obesity respectively affected 5.2 and 1.9% of children surveyed. Watching television (> 4 h) on weekends (OR: 95% CI: 3.8; 1.2, 12.0, P = 0.02) and medium dietary diversity score (3.0; 1.1, 8.1, P = 0.03) were independently associated with overweight/obesity in a multivariate regression model. Eating breakfast in the school cafeteria (0.2; 0.1, 0.8, P = 0.03) and eating fruits (0.4; 0.1, 0.9, P = 0.03) significantly reduced the risk of overweight/obesity.

Conclusions Overweight and obesity prevalence were linked with sedentary behaviour and non-optimal food diversity. Promoting physical activity and fruit consumption should be explored as interventions to reduce and prevent overweight and obesity in Lome schoolchildren. In addition, preventive approaches in the social environment of children should be considered.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.jrespe.2018.05.308

P6-13
Validity and reproducibility of isothiocyanate intake assessments by food frequency questionnaire in the JPHC-next validation study: Comparison with 12-day weighed food records


Introduction Isothiocyanate (ITC) found in cruciferous vegetables are known for their chemopreventive properties that inhibits phase-I enzyme and activates phase-II enzymes. In epidemiologic studies, dietary ITC has been indicated in prevention of various types of cancer, such as lungs and bladder. Food frequency questionnaire (FFQ) is commonly used to assess ITC intake, which combines with laboratory data on the ITC content of specific cruciferous vegetables. Although availability of ITC depends on the contribution of plant myrosinase in the hydrolysis of glucosinolates, ITC content is measured on the basis of raw cruciferous vegetables in general. To our knowledge, no prospective studies have considered the effect of cooking. Using such databases could limit the study outcome of dietary ITC and disease relationships due to overestimation of ITC intake. Here, we aim to evaluate the validity of FFQ in the estimation of isothiocyanate using 12-day weighed food record (WFR) as the reference method by taking cooking methods into account.

Methods Two hundred and forty participants (98 men and 142 women) aged 40–74 years from five areas in the JPHC-NEXT validation study were asked to respond to the 172-item FFQ and provide 12-day WFR as reference. Dietary ITC was calculated by combining the newly developed ITC database after consideration of popular cooking methods used in Japan. As we calculated the percentage of both raw and cooked cruciferous vegetable intake from WFR, cooked ITC intake was estimated from FFQ by weighing the average percentage of raw and cooked cruciferous vegetable on the ITC value. Spearman’s correlation coefficients between estimates from FFQ and WFR were calculated and corrected for intra-individual variation of the WFR. Reproducibility of ITC intake was also assessed between 2 FFQs administered at an interval of 1-year.

Results The mean intake of isothiocyanate according to FFQ was slightly lower than intake by WFR in men and higher in women. Percentage of difference of ITC were −3% for men and +19% in women. Deattenuated Spearman’s correlation coefficient for ITC was 0.36 for men and 0.60 for women. Results were virtually unchanged when we applied the sex-unique percentage of raw and cooked cruciferous vegetable intake from WFR to derive correlation coefficients.

Conclusions In conclusion, the validity of FFQ in estimating ITC was moderate. The reason for slightly poor correlation of ITC in men, is probably due to larger variance as a results of smaller sample size than in women. Additional confirmation may be warranted by using urinary isothiocyanate, which reflects the true intake of ITC.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.jrespe.2018.05.309
Methods A cross-sectional survey in the Greater Tunis (Tunisia) in 2009/2010 used a stratified two stage random cluster sampling of households with 20–49 y. women: we analysed the 437 child–mother pairs of 6–59 mo. children living with their mothers. For children, low height-for-age (stunting) and low weight-for-height (wasting) were defined according to WHO and anaemia was HB ≥ 110 g/L. For mothers, BMI (kg/m²) ≥ 25 defined overweight and BMI ≥ 30 obesity. The association between child anaemia × mother excess adiposity in 4 categories, and lifestyle and sociodemographic factors were estimated by multinomial regression. Also, this modelling framework enabled to assess the synergetic, antagonistic or independent coexistence of the two types of malnutrition, by deriving estimates of the ratios of the probability of the double burden over the product of the probabilities of each type of malnutrition (either overall or by categories of lifestyle or sociodemographic factors). All analyses (first type error rate = 0.05) took into account sampling design.

Results Among mothers, overweight (77.1% [72.1–81.4]) and obesity (41.4% [35.6–47.3]) were highly prevalent. Among children stunting (5.4% [3.6–8.1]) and wasting (1.6% [0.7–4.0]) were residual, while a third were anaemic (32.8% [28.3–37.7]). The most prevalent intra-household double burden of malnutrition in child-mother pairs was by far the anaemic child and overweight mother (24.4% [20.1, 29.3]). A significant proportion of pairs were anaemic child and obese mothers (14.4% [11.0, 18.5]). The co-occurrence of anaemia in child and excess adiposity in mother was neither synergistic nor antagonistic (P = 0.59 and 0.40 for anaemia-overweight and obesity, respectively) and this did not vary according to categories of the covariates. Adjusted associations showed that this double burden of anaemic child-overweight mother was more frequent among pairs with younger children (P < 0.0001), with mothers of higher parity (P = 0.01) and higher energy intake (P = 0.001). These factors were essentially those associated with each type of malnutrition separately so that there were no lifestyle or sociodemographic factors specifically associated with the studied double burden at household-level. Results were similar for the anaemic child-obese mother type of double burden.

Conclusion In a nutrition transition context in the MENA region where excess adiposity is highly prevalent among women, there was a high prevalence of intra-household anaemic child-overweight or obese mother. This highlights a paradoxical situation among child-mother pairs sharing the same available resources and living environment, but which may have different negative impacts on children and women. We did not demonstrate a higher risk of child anaemia when the mother is overweight, nor vice versa, nor a very marked specific sociodemographic patterning of this double burden. Nevertheless, we showed that their co-occurrence was very prevalent and thus requires special attention, e.g. through prevention programs which simultaneously target anaemia in children together with excess adiposity among mothers.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.310

P6-15
Gender inequalities in diet quality and their socioeconomic patterning in a nutrition transition context in North Africa

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Introduction The Middle East and North Africa region features marked gender excess adiposity inequalities detrimental to women in a context of nutrition transition with major shifts in lifestyle and diet. Hypotheses have been put forward regarding these factors as possible mediators of gender excess adiposity inequalities, in link with unequal gender roles. The objective of the study was then to assess gender inequalities in dietary intake from different perspectives such as food groups, nutrients with a specific focus on diet quality. Sociodemographic patterning of these gender dietary inequalities was also explored.

Methods A cross-sectional study was carried out in the Greater Tunis region including the Tunisian capital city in 2009–2010. We analysed the sub-sample of 20–49 y old adults of both genders (women n = 1689, men n = 930) from a stratified, two-stage cluster sample of households. Dietary intake was assessed using a 3-day food record. Food items were regrouped into 20 food groups based on Tunisian food habits and a Mediterranean diet pyramid. We assessed diet quality by the Diet Quality Index-International (DQI-I)/100 and sub-components (variety/20, adequacy/40, moderation/30, balance/10); DQI-I > 60 defined good diet quality. Gender inequalities measures were women vs. men differences of means for interval variables (e.g. food groups in g/1000 kcal, nutrients, DQI-I and its 4 components) and odds ratios (OR) for DQI-I > 60. Their variation with sociodemographic characteristics were estimated by models featuring gender × covariate interactions. The type I error risk was set at 0.05 and 0.20 for interactions.

Results Mean energy intake in kcal was 2300±15 for women vs. 2859±32 for men. By 1000 kcal/day women consumed more fruits and sweets (90.1±3.9 g vs. 78.6±4.5 g, P = 0.0074 and 17.5±0.5 vs. 14.6±0.6, P < 0.0001, respectively) but less red meat and soft drinks than men (10.1±0.5 g vs. 12.8±0.9 g, P = 0.0009 and 37.6±2.2 vs. 51.4±3.5, P < 0.0001, respectively). Mean DQI-I was quite lower among women vs. men (58.6±0.3 vs. 60.4±0.3, diff = −1.8[−2.6; −1.0], P < 0.0001) as well as proportion of DQI-I > 60 (45.2% vs. 55.7%, OR = 0.7[0.5; 0.8], P < 0.0001). Nevertheless, gender differences varied with the 4 sub-components: women vs. men had lower mean variety (10.1±0.1 vs. 12.1±0.2, diff = −2.0[−2.3; −1.6], P < 0.0001) and adequacy scores (30.8±0.1 vs. 32.5±0.1, diff = −1.7[−2.0; −1.5], P < 0.0001) (for the latter they scored a little better than men for the fruit item, but had much lower scores than men for iron and also somewhat calcium). On the contrary, women scored better than men on the moderation score (14.2±0.2 vs. 12.3±0.2, diff = +1.8[1.4; 2.2], P < 0.0001), mostly due to their better score on the cholesterol and sodium items. There was no difference for the balance subcomponent. Gender inequalities in DQI-I (adjusted for covariates) decreased with age (P = 0.10). They were higher in larger households of ≥ 5 members vs. others (P = 0.066). They were also higher in the extreme categories of education i.e. no-schooling and university vs. the middle categories (P = 0.11). Similar trends were observed for DQI-I > 60.

Conclusions Overall diet quality was average in our population as only half of the subjects featured a “good quality” diet according to the DQI-I. For both genders, we observed rather high scores for “healthy items” (as in the adequacy component) while the components pertaining mostly to “unhealthy items” scored lower (such as moderation and balance). Diet quality was lower for women, though mildly, in this context of high gender excess adiposity detrimental to women. But measurement issues typical of dietary intake assessment such as higher rates of under-reporting among overweight subjects and/or social desirability issues may have biased the difference towards the null. On the other hand women featured a better moderation score. There was a mild socioeconomic patterning of the observed diet quality gender inequalities.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.311

S351
Prevalence and predictors of subclinical micronutrient deficiency in German older adults: Results from the population-based KORA-Age study

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Introduction Subclinical micronutrient deficiency in older adults is associated with chronic age-related diseases and adverse functional outcomes. In Germany, the older population is at-risk of insufficient micronutrient intake, but representative studies on micronutrient status in old and very old adults are scarce. This study’s objectives were to estimate the prevalence of subclinical vitamin D, folate, vitamin B12 and iron deficiencies among older adults, aged 65 to 93, from the KORA-Age study in Augsburg, Germany (n = 1079), and to examine associated predictors.

Methods Serum concentrations of 25-hydroxyvitamin D (25OHD), folate, vitamin B12, and iron were analyzed and compared to selected cut-offs for subclinical micronutrient deficiency. Associated predictors were investigated using multiple logistic regression analysis.

Results The prevalence of subclinical vitamin D and vitamin B12 deficiencies were high, with 52.0% and 27.3% of individuals having low 25OHD (< 50 nmol/L) and low vitamin B12 concentrations (< 221 pmol/L), respectively. Furthermore, 11.9% had low iron (men < 11.6 μmol/L, women < 9.0 μmol/L) and 8.7% had low folate levels (< 13.6 nmol/L). Common predictors associated with subclinical micronutrient deficiency included very old age, physical inactivity, frailty and no/irregular use of supplements.

Conclusion Subclinical micronutrient deficiency is a public health concern among KORA-Age participants, especially for vitamins D and B12. The predictors identified provide further rationale for screening high-risk subgroups and developing targeted public health interventions to tackle prevailing micronutrient inadequacies among older adults.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.313

Skipping breakfast and risk of type 2 diabetes: A systematic review and meta-analysis of prospective studies

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Introduction Epidemiological studies have indicated that breakfast skipping is associated with increased risk of type 2 diabetes. Findings are not conclusive and the shape of the dose-response association and the potential impact of adiposity has not been investigated in systematic reviews and meta-analysis. To summarize evidence on this topic, a systematic review and meta-analysis was conducted.

Methods PubMed and Web of Science were searched up to August 2017 by two researchers. Prospective cohort studies on breakfast skipping and type 2 diabetes were included. Summary relative risks (RRs) and 95% confidence intervals (95% CIs) were estimated using a random effects model. Meta-analysis on ever vs. never skipping breakfast (without and with adjustment for body mass index), as well as linear and nonlinear dose-response relations between breakfast skipping and risk of type 2 diabetes were conducted.

Results We identified six studies including 4935 cases with type 2 diabetes among 96,175 participants. The summary RR (95% CI) for type 2 diabetes comparing ever versus never breakfast skipping was 1.33 (95% CI: 1.22–1.46, n = 6 studies), and 1.22 (95% CI: 1.12–1.34, n = 4 studies) after adjustment for body mass index. The summary RR (95% CI) of breakfast skipping per one day per week was 1.06 (95% CI: 1.03–1.09, n = 3 studies). The nonlinear dose-response meta-analysis showed that the curve was steeper at the beginning and highest risk was observed for 4–5 days of breakfast skipping per week [summary RR: 95% CI: 1.53 (1.26–1.86)]; with no further increase afterwards (P for nonlinearity = 0.08).

Conclusions This meta-analysis provides evidence that breakfast skipping is associated with an increased risk of type 2 diabetes, and the association were still significant after adjustment for adiposity. Healthy daily breakfast eating may help lower risk of type 2 diabetes.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.316

Reference ranges for lipid profiles in Chinese pregnant women

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Background Pregnancy is a critical time of altered metabolic function and changed lipid profiles. Maternal hyperlipidemia has been shown to be associated with maternal and offspring adverse outcomes, yet no consistence reference values for lipids exist in pregnancy period, and there are no recommended lipid levels for Chinese pregnant women. The object of this study was to describe lipid levels during pregnancy and establish the reference ranges of lipids in Chinese pregnant women.

Methods In total, 14,739 pregnant females and 183,787 non-pregnant females who underwent measurement of serum lipids were taken as parent dataset. For controlling confounding from age and BMI, a 1:1 matched pair analysis was used to compare the difference in lipid levels between pregnant and non-pregnant females. Pairs were matched by BMI (≥ 1 kg/m²) and age (± 1 year). Multinomial method was used to determine reference ranges in healthy pregnant women with normal pre-pregnancy BMI.

Results Concentrations of total cholesterol (TC), triglycerides (TG), low-density lipoprotein cholesterol (LDL-C) and high-density lipoprotein cholesterol (HDL-C) were higher in pregnant women compared to non-pregnant women. With pregnancy development, TC, TG, and HDL-C increased from 1st trimester to 2nd and 3rd trimesters, and LDL-C decreased in the third trimester. The reference ranges were recommended as the levels of TC no greater than 9.02 mmol/L, TG no greater than 5.88 mmol/L, HDL-C no less than 1.03 mmol/L and LDL-C no greater than 5.65 mmol/L.

Conclusions Obvious higher lipid concentrations were observed during pregnancy compared to non-pregnant females. Hence, reference ranges of lipid profiles from the general population are not appropriate for pregnant women. Furthermore, this study provided reference ranges of lipid profiles for Chinese pregnant women.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.316
Targeting vulnerable households in rural Mali: Effectiveness of a community-based methodology, with or without addition of a proxy-mean test, 2016

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Introduction In 2016, in four municipalities of the Gao district in rural Mali, two similar nutrition-sensitive programmes were conducted simultaneously. Both programmes aimed to target vulnerable households (HH) but used two different methodologies:

– a community-based method: the household economy approach (HEA);
– a community-based method combined with a proxy-mean test (PMT).

This offered a unique opportunity to compare the effectiveness of both methods. Methods A cross-sectional survey was conducted among randomly selected HH from the four municipalities: 545 HH targeted by the first method (group 1), 513 HH targeted by the second method (group 2), 526 HH that were not targeted by any of the two methods (group 3). Socioeconomic and demographic characteristics, expenditure, dietary diversity and food security data were collected through a standardized questionnaire. Characteristics of HH from groups 1 and 2 were compared using linear models. Performances of both targeting methods were assessed against a gold-standard measure of vulnerability, namely the household’s monthly food expenditures (HMFE) per adult-equivalents living in the HH. Cut-off points for HMFE targeting were set at the level corresponding to the actual targeting rate observed in each municipality. The targeting effectiveness was assessed using the leakage rate and undercoverage rates. Sensitivity (Se) and specificity (Sp) were computed as well as the targeting differential [Se - (1 - Sp)].

Results HH from groups 1 and 2 had the same mean size (7.0 and 7.2 - P = 0.32); same youth ratio (1.0 and 1.0 - P = 0.64) and same dependency ratio (1.6 and 1.5 - P = 0.47). They were mainly headed by a male (75.1% and 72.3% - P = 0.33). In both groups 27% of the heads of HH were literate (P = 0.87). Groups 1 and 2 had approximately the same HMFE (2810 CFA francs and 2361 CFA francs, per adult-equivalent - P = 0.22) and the same dietary diversity score (2.9 and 3.0 food groups, out of 12 - P = 0.37), however, group 1 had a lower proportion of food secure HH (6.4% vs. 7.5% - P = 0.02) according to the Food Insecurity Experience Scale. Forty-one percents of HH were miss-targeted by the first method and 43% by the second one. The leakage rates were 60% and 64% and the undercoverage rates 31% and 33% for methods one and two, respectively. Sensitivities were respectively 40% and 34% and specificities 69% and 68%, leading to targeting differentials equal to 8% and 3%.

Conclusions Community-based method and community-based method combined with a PMT exhibited similar targeting performances, the former being slightly better.

Keywords Targeting effectiveness; Proxy-mean targeting; Community-based targeting; Vulnerability; Rural Mali

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.317

Prediction of circulating adipokine levels by body fat compartments and adipose tissue gene expression

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Introduction Over the past years, adipose tissue (AT) has been recognized as a metabolically active tissue and a number of AT-derived circulating biomarkers called adipokines have been proposed as mediators for the association of obesity with chronic disease risk. However, the mechanisms are not yet understood and it is even unclear to what extent the amount of subcutaneous (SAT) and visceral adipose tissue (VAT) and gene expression levels in AT predict adipokine concentrations.

Methods In the present study, we aimed to assess to what extent adiposity as objectively measured by the amount of SAT and VAT using magnetic resonance imaging, and gene expression levels in SAT, collected by biopsy, determine plasma adipokine concentrations. We investigated the adipokines adiponectin, leptin, soluble leptin receptor, resistin, interleukin 6 and fatty acid binding protein 4 (FABP4) in a cross-sectional analysis of 200 participants from the population-based EPIC Potsdam cohort study. Our hypothesis was that direct quantification of SAT and VAT as well as gene expression in AT can explain a substantial amount of the variance in adipokine levels, and we calculated the explained variance of plasma adipokines from multivariable regression models. In secondary analyses, we investigated additional predictors (other anthropometric measures, personal characteristics, other gene expression and plasma concentration measures) and also obtained partial correlation coefficients adjusted for age, sex, physical activity and occupational training for a more detailed assessment and comparison of the associations.

Results For leptin, 81%, and for FABP4, 45% of the variance in plasma concentrations was explained by SAT and VAT mass, and gene expression in SAT. For the remaining adipokines, AT mass and gene expression explained less than 16% of their variance. Gene expression in SAT explained a smaller proportion of the variance in comparison to AT mass. Regarding the AT compartments, leptin was more strongly correlated with VAT mass (partial correlation r = 0.81, 95% CI [0.75; 0.86]) than with VAT mass (r = 0.58, 95% CI [0.46; 0.67]). For the remaining adipokines, no substantial differences in their correlation with SAT versus VAT mass were observed. The additionally investigated predictors added only little explained variance for some adipokines.

Conclusions Our data suggest that except for leptin and FABP4, adiposity as objectively measured by SAT and VAT mass, and gene expression in SAT predict plasma adipokine concentrations only to a small extent. While our findings do not contradict a potential role of adipokines in disease development, the circulating concentrations of all investigated adipokines except leptin and FABP4 are unlikely to mediate the association between adiposity and disease risk observed in epidemiological studies to a large extent.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.318
Dietary inflammatory potential and differentiated thyroid carcinoma: A population-based case-control study in New Caledonia

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Introduction The incidence of differentiated thyroid carcinoma (DTC) varies considerably across the world, with particularly high incidence rates in Melanesians of New Caledonia. Despite research efforts, current knowledge on the etiology of thyroid carcinoma remains limited. Exposure to ionizing radiations during childhood is a well-established environmental risk factor. Tall height and large body size have consistently been associated with DTC. The increased risk of thyroid cancer in patients with autoimmune thyroid diseases also suggests a role of chronic inflammation in disease occurrence. To explore the role of dietary components with pro- or anti-inflammatory effects, we examined the association between DTC and the Dietary Inflammatory Index (DII) - a novel diet-based score estimating diet-induced inflammation.

Methods We conducted a countrywide population-based case-control study in the multiethnic population of New Caledonia during 1993–1999. The study included 324 cases with histologically confirmed papillary or follicular carcinoma and 402 population controls. Based on a food frequency questionnaire that included 117 items, we calculated a DII score for each individual. The DII score was analyzed both as a continuous and as a categorical variable (quartiles) based on the sex-specific DII distribution among controls. Odds ratios (OR) and corresponding 95% CIs were calculated using unconditional logistic regression models adjusted for age, sex, ethnic community (Melanesian, European, other), province of residence (South, North, Loyalty Islands) and body mass index.

Results An increased OR of thyroid cancer was observed in subjects in the highest quartile of DII score (pro-inflammatory diet) vs. the lowest quartile (anti-inflammatory diet) (OR: 2.20; 95% CI: 1.33, 3.63; P-trend = 0.002). Higher ORs were observed among residents of the Southern province (OR: 2.67; 95% CI: 1.40, 5.08; P-trend = 0.003), among ever smokers (OR: 2.99; 95% CI: 1.34, 6.69; P-trend = 0.005), and among obese participants (OR: 3.34; 95% CI: 1.28, 8.68; P-trend = 0.006). These findings suggest that a pro-inflammatory diet is associated with increased risk of differentiated thyroid carcinoma.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.319

Session 7 - Epidemiology and public health and social disparities

P7-1


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Background Persistent infection with high-risk Human Papillomavirus (HPV) genotypes may, without treatment, progress to invasive cervical cancer, the second gynecological cancer in Tunisia. This study aims to determine the prevalence of HPV infections, to identify risk factors and main circulating genotypes.

Methods National point prevalence survey, between December 2012 and December 2014. Were eligible for inclusion, women aged 18 to 65 years, sexually active, who sought medical attention at their primary health care centre or clinic, on the day of the survey, and who gave written consent. Women having an abnormal genital bleeding or a visible lesion in the cervix were not included. A standardized questionnaire on sociodemographic and behavioral factors was orally administered. A liquid-based Pap smear sample was obtained from included women using a cervical brush. If betaglobin positive, samples were analyzed for HPV detection and typing. Multiple logistic regression modeling was done using SPSS 20.

Results Out of 1518 women included in the survey with mean age 40.4±0.9 years, 1229 were betaglobin positive. The national prevalence of HPV infection was 7.8% (95% CI [3.4–14.4%]). In multivariate analysis, factors associated to HPV infection were having multiple sexual partners (ORa = 5.2; 95% CI [2.2–11.6]), smoking (ORa = 4.7; 95% CI [2.2–9.8]) and medical history of sexually transmitted infection (ORa = 1.9; 95% CI [1.2–3.1]). Twenty different genotypes of HPV were identified, the most common were HPV6 (25.4%; 95% CI [16.9–36.9%]) and HPV16 (14.1%; 95% CI [16.9–36.9%]).

Conclusions This first national prevalence survey of HPV infection in Tunisia provides important insight into associated factors and main circulating genotypes to improve cervical screening. Next step is a cost-effectiveness analysis of a national HPV immunization programme.

Keywords Human Papillomavirus; Prevalence; Genotypes; Risk factors; Tunisia

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.321

P7-2

Socioeconomic inequalities in health during early childhood: Evidence from a birth cohort

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Introduction Biological and social capital is essentially acquired in early childhood, so measuring socioeconomic inequalities in health this early is of huge relevance. On this topic there are important scientific gaps: scarcity of studies from Southern Europe, reliance on single indicators of socioeconomic position (SEP) and on self-reported data. We aimed to measure socioeconomic inequalities in health during early childhood and address the following research questions:

- do socioeconomic inequality measures depend on the SEP indicators that were used?
- are children’s health outcomes socially patterned, and if so, in which direction?
- do some health outcomes manifest wider socioeconomic inequalities?

Methods Data on early childhood (4 years of age) health was obtained from Generation XXI birth cohort (n = 8647). A total of 27 health outcomes and 13 SEP indicators at the individual and neighbourhood level were used to calculate relative risks of inequality (RRI) and corresponding 95% confidence intervals.

Results Twenty-one out of 27 health outcomes evaluated, showed significant socioeconomic inequalities. Using the highest education level of the mother as reference, we observed that seizures (RRI = 8.64), obesity (2.94), abdominal obesity (2.66), urinary tract infection (2.26), language/speech developmental problems (2.24), hypertension (2.08) and insulin resistance (1.33) were heavily socially patterned, much more common in low SEP children. Several outcomes followed reverse patterns, namely eczema (0.26), rhinitis (0.26). Most infections, accidents, and some blood parameters showed less clear and narrower inequalities. Education, occupation and household income captured more often inequalities, as compared with neighbourhood deprivation or parental employment status, which were barely associated with children’s health.
Conclusions  Socioeconomic inequalities were evident in almost every health outcome, although with varying magnitude according to the SEP indicator and health outcome. Reverse socioeconomic gradients were identified too. Our results reinforce the importance of tackling health inequalities early in life and suggest that actions should be designed to target all societal groups, the most but also the least disadvantaged.

Disclosure of interest  The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.322

P7-3
Contributions of female and male authors to medical research: A cross-sectional study
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Introduction  The proportion of women engaged in clinical research has increased over time, but it is unclear if women and men contribute to the same extent during the conduct of research. Our objective were:
–to describe the prevalence of women authors of original articles published in 2000 and 2015;
–to compare the research contributions and author positions according to gender.

Methods  We conducted a repeated cross-sectional study among all original articles published in the Annals of Internal Medicine in 2000 and 2015. Participants were all authors listed on the byline of the original articles. The primary outcomes were 10 contributions listed at the end of the paper and included in the criteria of the International Committee of Medical Journal Editors (ICJME). Secondary outcomes were the author position on the byline (first, second, next-to-last and last compared to middle rank). The main exposures were the author gender and the year of publication (2000 or 2015). Other variables were the academic degrees mentioned by the author on the byline, the home institution, the country of affiliation, and the type of funding. We assessed the association and its evolution over time of the 10 specific contributions to research paper by using mixed effect logistic regression models (one per contribution) where the contribution was the dependent variable, the article was the random factor and the gender was the main fixed factor. In each model, we included the year and an interaction term between gender and year to assess change over time. We reassessed these associations after adjusting for academic degrees. To identify if gender was associated with a specific position on the article byline, we performed four conditional logistic regression models where each article defined a cluster, with author position (e.g. first vs. middle rank) as the dependent variable and gender the main predictor. We included year and an interaction term between year and gender to assess if there was a change over time of the associations between gender and author position. Then we adjusted the models for the 10 authors’ contributions to research. We built four models, comparing the first, second, next-to-last and last position to middle position. In these models, articles with four or less authors were excluded from the analyses.

Results  The proportion of women authors increased from 31.5% to 41.2% between 2000 and 2015 (P = 0.004). In 2000, women authors were less frequently involved than men in the conception and design (55.1% vs. 61.2%, P = 0.026), critical revision (70.4% vs. 80.7%, P = 0.001), final approval (80.7% vs. 85.8%, P = 0.038), and obtaining of funding (16.1% vs. 21.6%, P = 0.024). Women tended to be more involved than men in administration and logistics (35.0% vs. 26.6%, P = 0.019) and data collection (49.8% vs. 45.8%, P = 0.053), but they were similarly involved in the analysis and interpretation of data, drafting of the manuscript, provision of materials/patients, and statistical expertise. Women were less often last authors than men (9.0% vs. 15.5%, P = 0.016). These gender differences persisted in 2015.

Conclusions  The representation of women among authors of medical articles has increased notably between 2000 and 2015 but remained below 50%. Women’s roles differed from those of men with no change over time. The study has some limitations with the use of a single journal and self-reported contributions. These differences may be due to justifiable reasons such as seniority, specific training and skills in research, or role preferences of the researchers. However, the possibility also exists that the academic research milieu perpetuates sexist attitudes and unequal treatment of researchers based solely on their gender. This requires further exploration, and justifies the continuation of local initiatives that promote women’s involvement in research and ensure fair career opportunities, regardless of gender.

Disclosure of interest  The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.323

P7-4
The composition of nonbeverage alcohols consumed in Russia in 2015–2017
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Introduction  From previous research it is known that nonbeverage alcohols (NAs) were consumed by significant proportions of Russian population for drinking (e.g. 7% of working age males). In illegal NAs spirits other than ethanol may be used for their manufacturing. Such cases of illegal production from time to time manifest in outbreaks of deadly alcohol poisonings. The most recent such outbreak occurred in December 17–26 2016 in the Siberian city of Irkutsk, where 123 people, who drunk spiritual bath additive “Hawthorn” containing admixture of methanol, were poisoned, of whom 76 died. In a previous study conducted in 2005 NAs typically contained rectified highly concentrated ethanol. However, the study was conducted more than a decade ago and on a relatively small number of samples purchased only in one region of Russian Federation. To provide most up to date information on the problem we conducted a study of composition of NAs, which were available in retail in cities across the vast geography of Russia.

Methods  For analysis of composition we selected 92 samples of NAs, which were purchased in a survey of NAs availability in 50 Russian cities between 2015 and 2017. Consumption for drinking of selected types of NAs has been confirmed in simultaneous survey of subjects with substance use disorders recruited in narcology clinic in Kazan, Russia in 2015–2017. Gas chromatography and mass spectrometry (GC-MS) on a Hewlett-Packard 7820A gas chromatograph were used to determine NAs composition. For detection of extractable organic components we employed a method of micro extraction in a vial. For this purpose nonbeverage alcohol, internal standard and extragent were aliquoted to a standard vial for auto injector. After extraction of organic compounds inside the vial in a vibro shaker and separation of organic layer the later was taken for GC-MS analysis. The literature on toxicity of identified admixtures was reviewed.

Results  The majority of NAs contained 60 vol.% or more ethanol and represented either pure solutions of ethanol without other admixtures, or contained specific active ingredients. The following substances were identified in significant amounts in some of the analysed samples:
–eau-de-colognes and some lotions consumed for drinking (e.g. Troyoni, Shipr, Ogurechniy, Hawthorn): propylene glycol and polypropylene glycols (e.g. dypropylene glycol), phenylethyl alcohol, linyl anthranilate, ethyl salicylate, diphenyl ether; butylated hydroxytoluene, 3-phenyl-2-butanol, benzemethanol, cyclamal, lilyal, and other substances;
–cosmetic lotions: diethyl phthalate;
–antiseptics: formic acid;
–medicinal tinctures: compounds of plant extracts.
Some medicinal tinctures sold in 100 ml bottles and cosmetic lotions didn’t contain active substances (e.g. capsaicin, flavouring agents, plant extracts).

**Conclusions** On some identified compounds (e.g. 3,3'-oxybis-2-butanol; 2,5-lilial, etc.) limited or no human toxicity data is available, especially when ingested. Propylene glycols, although classed as substances with low toxicity, when ingested in large amounts may cause metabolic acidosis, cardiac arrhythmias and even cardiac arrest. Antiseptic containing 1.4% solution of formic acid in 70% ethanol when swallowed may cause multiple toxic effects of various severities, depending on amount consumed. These include gastrointestinal mucous burns, ulcerations, and bleeding; circulatory collapse, renal failure, ischemic lesions in liver and heart; late oesophageal, gastric and pyloric stenosis; asphyxial death due to glottic oedema, or due to toxic shock among others. Absence of active substances in some NAs suggests their illegal nature. Control of NAs production and consumption in Russia must be a priority as toxicity of some of them is determined not only by cheap concentrated ethanol, but also by other toxic admixtures. More toxicological research is needed on interaction of various compounds of NAs with ethanol and its metabolites.

**Disclosure of interest** The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.324

**P7-5**

**Availability of nonbeverage alcohols in 50 Russian cities in 2015–2017**

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**Introduction** Nonbeverage alcohols (NAs) in Russia are manufactured alcoholic containing liquids not intended for consumption instead of alcoholic beverages, not classed as alcoholic drinks, and not subject for legal regulation as alcoholic beverages, but which may be consumed for drinking. It has been found in a case-control study conducted in Urals in 2003–2005, that their consumption by working age Russian males was associated with a seven-fold increase in odds of death adjusted for smoking, education, and amount of ethanol consumed from alcoholic beverages. Legally produced NAs usually contain highly rectified concentrated ethanol (up to 95% by volume). In 2006 and later Russia implemented a range of legislative measures aimed at reduction of availability of illegal and nonbeverage alcohols. The most recent regulations were put in force at the end of December 2016 and in 2017 in response to deadly outbreak of mass alcohol poisoning with NA, containing methanol, which occurred in Siberian city of Irkutsk in December 2016 resulting in 76 deaths. Since 2007, no research was carried out to investigate the effectiveness of implemented regulations or to assess availability of NAs across the vast geography of Russia.

**Methods** The availability survey was aimed:

– to determine if NAs were still available in legal retail sale in cities of the Russian Federation in 2015–2017;

– to provide characteristics of different types of NAs that were sold.

Between July 2015 and December 2017 six field workers purchased samples of NAs in 50 Russian cities. NAs were defined as containing at least 60% ethanol by volume (as indicated on the label) and generally cost less than 40 rubles for oral or body hygiene, and (8) spirituous food flavour enhancers. Ethanol concentration in the vast majority of purchased NAs was above 60% by volume (min: 25%; max: 95%; median: 70%). Unit cost of ethanol in most samples was lower than in standard Russian vodka. The majority of purchased samples of NAs were of sorts, which were reported to be consumed for drinking in our simultaneously conducted in 2015–2017 survey of alcohol consumption among patients of narcology clinic in Kazan, Russia. In 2015 and 2016 we were able to purchase all types of nonbeverage alcohols specified above. However, in 2017 a range of NAs was no longer available in retail. This included specific types of perfumery and cosmetics spirituous liquids, such as cheap spirituous lotions, aftershaves and tonics; spirituous bath additives; and spirituous liquids for oral and body hygiene. However, medicinal tinctures in 25 mL, 40 mL, and 100 mL bottles, medicinal antiseptics, and cheap eau-de-colognes (e.g. Troynoy, Shipr) were still readily available in 2017.

**Conclusions** The wide spectrum of nonbeverage alcohols, which were targeted by 2006 alcohol control regulations were readily available in 2015 and 2016. Regulations implemented at the end of 2016 and in 2017 in response to mass alcohol poisoning with NA were also not comprehensive, since they haven’t prevented production and sale of cheap sources of ethanol in the form of medicinal tinctures, antiseptics and not denatured eau-de-colognes. While these latest regulations banning sale of some sorts of NAs may indeed result in reduction of alcohol-attributable mortality in Russia in 2017, the stronger action is still required to prevent consumption of specific sorts of medicinal and perfumery nonbeverage alcohols, which are still available and affordable for those who may want to drink them.

**Disclosure of interest** The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.325

**P7-6**

**Factors associated to repeated influenza vaccination in the Portuguese adults with chronic conditions**

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**Introduction** In Portugal, annual vaccination against seasonal influenza is recommended to the elderly, people with underlying conditions, pregnant women, health professionals and caregivers. Notwithstanding, the vaccine coverage in these groups is still low, namely in people with chronic conditions, where the coverage has been below 35%. In addition, the proportion of chronically ill individuals that are vaccinated against influenza in consecutive seasons is unknown. This study aimed to identify the factors associated to influenza vaccination uptake in consecutive seasons in adults with chronic conditions.

**Methods** We used data from the first Portuguese National Health Examination Survey (INSEF 2015), a cross-sectional study conducted on probapstic sample (n=4911) of individuals aged from 25 to 74 years. The target population was restricted to individuals who self-reported at least one of the following chronic conditions: respiratory (asthma; chronic obstructive pulmonary disease); diabetes; cardiovascular (stroke, myocardial infarction and arrhythmia); liver and kidney disease. Self-reported vaccination status in 4 consecutive seasons was categorized in 3 levels: unvaccinated (unvaccinated in all 4 seasons), occasional vaccination (vaccinated 1–3 times over 4 seasons) and regularly vaccinated (vaccinated in all 4 seasons). A multinomial logistic regression was applied to estimate odds ratio (OR) of influenza vaccination according to sociodemographic factors, health care use, health status and type of chronic condition. Results A total of 802 individuals of the INSEF sample reported having at least one of chronic condition diagnosed before 2011. For this group, the vaccine coverage (VC) in 2014/15 season was 33.8% (95% CI: 29.8% to 38.1%). Of the target group, the regularly vaccinated (all 4 seasons) encompassed 26.7% (95% CI: 22.4% > 31.5), but the majority to have never been vaccinated (53.5%; 95% CI: 48.8% > 58.2%). Being male (OR = 2.10: 95% CI: 1.32 to 3.33); belonging to the 65 to 74 age group (OR = 4.24: 95% CI: 1.97 to 9.10); having an appointment in the 12 months previous to the interview with a general practitioner (GP) (OR = 2.84: 95% CI: 1.00 to 8.05) or other specialized physician (OR = 3.89: 95% CI: 2.48 to 6.08); with no smoking habits (OR = 2.55: 95% CI: 1.11 to 5.89) and reporting diabetes (OR = 2.25: 95% CI: 1.03–4.89) increased the probability of being regularly vaccinated when compared to never vaccinated. The use of
health care, GP or specialized medical appointment, increased the likelihood of being occasionally vaccinated (OR = 2.96 and 1.93, respectively). Finally, having a self-reported cardiovascular condition decreased the likelihood of being either occasionally (OR = 0.55; 95% CI: 0.32 to 0.95) or regularly (OR = 0.77; 95% CI: 0.46 to 1.31) vaccinated against influenza. These results revealed specific subgroups among the chronically ill Portuguese adults that are more likely of non-compliance to the recommendation for vaccine uptake, namely, younger individuals, females, and those with a cardiovascular condition. On the other hand, the role of the health professionals in either occasional or regular vaccine uptake was highlighted in our findings by these results. As such, for future vaccination programmes special focus should be addressed for the previous identified population subgroups. Also, the medical recommendation of the influenza vaccine uptake should continue and be reinforced particularly in individuals with a cardiovascular underlying condition.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016j.respe.2018.05.326

P7-10
Screening of viral hepatitis and HIV among migrants from Southeast Asia
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Introduction Viral hepatitis B and C display high morbidity and mortality among migrants born in Southeast Asia and living in France whereas prevalence in French general population is low (0.3–0.8%). Moreover, access to screening tests for HIV and viral hepatitis B and C remain unknown in this population. Methods This prospective, multicenter and observational study was conducted at a free clinic (“Association DHEVA-KH”, Lyon, France) among Southeast Asian community associations. The study period has started in April 2016 and inclusions remain ongoing in February 2018. Participants were screened during each community event where people were able to be tested for HIV, HBV, and HCV by point-of-care rapid testing. The main study endpoints were the proportion of participants who were infected by HIV, HBV, and HCV status and who were linked to care when testing positive. This study was approved by local Committee on Ethics as usual practices.

Results A total of 199 individuals, representing Southeast Asian immigrants, were included and all participants performed a blood draw for viral hepatitis B and C and 186 for HIV (93.4%). Mean age was 55.6 ± 14 years-old. One hundred twenty-four were women (62.3%). All patients retrieved their tests results; 170 of 199 (85.4%) patients tested preferred point-of-care rapid testing rather than classical serology tests. Only 20 people among 199 were previously tested for HIV or viral hepatitis B or C. Nine of the 199 (4.5%) participants testing positive [HIV, n = 0; HBV, n = 6 (3.0%); HCV, n = 3 (1.5%)]. Mean age was 60.8 ± 12.6 years-old. Seven infected people were women. Six were pensioners. Only one infected patient was covered by usual social security system. All infected patients were born in Southeast Asia. Seven of 9 testing positive participants have been able to consult medical staff later at hospital to be followed for their viral hepatitis.

Conclusion In a Southeast Asian highly at-risk population for chronic viral infections, the simultaneous use of HIV, HBV, and HCV point-of-care tests clearly improves the screening and the access to care for HBV and HCV positive patients. Migrants from Southeast Asia display a higher prevalence for viral hepatitis rather than French general population. Nonetheless, the prevalence of people living with HIV remains low even null in our sample population among Southeast Asian community living in Lyon city.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016j.respe.2018.05.330
P7-11
The role of subjective social status in socioeconomic inequalities in mortality: Evidence from the English longitudinal study of ageing (ELSA)

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Objectives To study whether subjective social status (SSS) was associated with mortality and its role in the associations between objective socioeconomic position (SEP) measures and mortality.

Methods Cox regression was used to model the associations between SSS (measured using a 10-point continuous scale), objective SEP measures and mortality in a sample of 9972 people aged ≥ 50 years from the English Longitudinal Study of Ageing over a 10-year follow-up (2002–2013).

Results SSS was associated with all-cause, cardiovascular, cancer and other mortality. Adjustment for covariates fully explained the association between SSS and cancer mortality, and partially the remaining associations. In people aged 50–64 years, SSS mediated to a varying extent the associations between objective SEP measures and all-cause mortality. In people aged ≥ 65 years, SSS did not mediate much these associations, and to some extent was associated with mortality independent of objective SEP measures. In both age groups, wealth partially explained the association between SSS and mortality.

Conclusions SSS is a strong predictor of mortality at older ages. Its role in the association between objective SEP and mortality appears to be complex.

Keywords Socioeconomic position; Health inequalities; Mortality

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.iesres.2018.05.331

P7-12
Influenza vaccination coverage and its influencing factors among older people in Shanghai, China: A cross-sectional study

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Introduction Older people have the highest risk of mortality from influenza, and vaccination is the most effective prevention measure. As one of the most developed cities worldwide, Shanghai faces a rapid increase in proportion of older people. However, in Shanghai and most cities of China, the influenza vaccine has not been covered by the national Expanded Program of Immunization, and little is known regarding influenza vaccine usage among older individuals. This study aimed to assess the influenza vaccination coverage rate (VCR) among older people in Shanghai during the 2016–17 influenza season and to determine the reasons for vaccination or non-vaccination. The findings of this study are intended to provide scientific evidence for the implementation of appropriate strategies and programs targeting older people.

Methods A retrospective cross-sectional survey was conducted in September 2017 in 24 randomly selected communities from 46 ones in this district. In total, 4417 participants were selected from community-dwelling people aged 60 and older using quota sampling in each community. Influenza vaccination status in 2016–17 season and the related reasons for receiving or not receiving the influenza vaccine were investigated via face-to-face interview. Vaccination coverage rate was calculated and adjusted by gender and age. Logistic regression was used to assess the influencing factors of vaccination status.

Results In total, 253 respondents received an influenza vaccine during the 2016–17 influenza epidemic season, yielding an adjusted vaccination rate of 5.16% (95% confidence interval, 4.48–5.84). The coverage rate was not associated with gender, age, education, household income or underlying chronic diseases. The likelihood of receiving the vaccine was higher for older people living with family/friends than those living alone (P < 0.05). Among the unvaccinated respondents, lack of awareness of the influenza vaccine was the most common reason for not being vaccinated (48.32%, 2012/4164).

Conclusions Influenza vaccination coverage is very low among older people in Shanghai, and public awareness of the influenza vaccine needs to be enhanced. Our results highlight the need for an appropriate influenza vaccination strategy and program targeting the older population.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.iesres.2018.05.332

P7-13
Tobacco use during pregnancy among native and migrant women in Portugal. Results from the Bambino study

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Introduction Tobacco use is a major modifiable risk factor of adverse maternal and fetal health outcomes. Being a migrant has been associated with lower risk of smoking during pregnancy. However, it remains a matter of debate whether such association could be explained by other sociodemographic characteristics or whether such effect remains or increases according to the length of stay in the host country. This study examined the differences in maternal smoking prevalence between native, long-term and recent migrant women in Portugal.

Methods This study was derived from baMBINO, a national project grounded on 32 public maternity units in mainland Portugal aiming to investigate the differences in perinatal healthcare and outcomes among migrant and native women. Recruitment took place during admission for delivery, inviting both native and foreign-born women. Participants included in this analysis (n = 1107) were classified according to their country of birth and length of stay in Portugal into: native (Portuguese-born), recent migrant (foreign-born women who spent 10 years or less in Portugal), and long-term migrants (foreign-born women who spent more than 10 years in Portugal). Logistic regression model was fitted to estimate the association between the aforementioned migration statuses and having or not smoked tobacco during pregnancy, taking into account women’s age, parity, marital status, level of education, family income, country of origin of women’s parents and gestational age at the first prenatal care visit. Adjusted odds ratio (OR) and respective 95% confidence interval (95% CI) were obtained.

Results A little over half of the study participants were foreign-born and almost 60% of those were recent migrants. Tobacco smoking during pregnancy was evidently more prevalent among native women than among long-term or recent migrant women (14% vs. 8% and 4% respectively; P < 0.001). Compared to native women, both long-term and recent migrant women were more likely to be unmarried, have a family income lower than 1000€, and have their first prenatal visit after 12 weeks of gestation. Long-term migrants were more likely to have Portuguese-born parents than recent migrants (26.0% vs. 2.5%; P < 0.001). According to the multivariate regression model, having a higher educational level was significantly associated with not smoking during pregnancy (secondary school: OR = 0.38; 95% CI: 0.23–0.62; postgraduate education: OR = 0.18; 95% CI: 0.09–0.35), opposed to women who have 9 or less years of education. However no association was observed between smoking during pregnancy and maternal age (OR = 1.10; 95% CI: 0.60–2.01 and OR = 0.95; 95% CI: 0.57–1.58 for women aged less than 25 and 35 or more years, respectively, in comparison with women aged 25–34 years), family income (OR = 1.30; 95% CI: 0.77–2.18 for women with higher income), parity (OR = 0.68; 95% CI: 0.43–1.09 for multiparous in comparison with primiparous women), gestational age at first prenatal visit (OR = 1.12, 95% CI: 0.59–2.11 for women having their first prenatal visit after 12 weeks), having a foreign-born parent (yes vs. no: OR = 0.83; 95% CI: 0.43–1.63) and marital status (single vs. married women: OR = 0.76; 95% CI: 0.46–1.24). Smoking during pregnancy was significantly less frequent in recent
P7-14
Associated factors with the water pipe smoking and use of other tobacco products among students, Brazil, 2015

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Introduction The causes of preventable or reducible deaths are defined as those that can be totally or partially prevented by effective actions of the health services. Studies have indicated a significant reduction in deaths due to preventable causes in Brazil and have reinforced the importance of advancing in analyzes of the differentials of mortality rates due to preventable causes according to age groups, regions and municipalities.

Conclusion There was a decline in the mortality rate in the Brazilian population aged 5–69 due to preventable causes (1.6% per year) and non-preventable (1.4% per year). We also found a decrease in all groups of causes of preventable deaths in 2000–2013 period. The study draws attention to the increase in deaths from specific causes, such as pneumonia (1.9% per year) and transport accidents (0.6% per year), and to the stability in deaths due to aggressions and intentional self-harm. Deaths due to non-communicable diseases fell by 2.2% per year and was highest in the age group 60–69 in 2013.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.335

P7-15
Preventable deaths by actions of the Public Health System in Brazilian population (2000–2013)

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Introduction The causes of preventable or reducible deaths are defined as those that can be totally or partially prevented by effective actions of the health services. Studies have indicated a significant reduction in deaths due to preventable causes in Brazil and have reinforced the importance of advancing in analyzes of the differentials of mortality rates due to preventable causes according to age groups, regions and municipalities. Objectives To analyze the mortality trend in the Brazilian population from 5 to 69 years, in Brazil and regions, using the “Brazilian List of Causes of Preventable Deaths”.

Methods This is an ecological study of time series of the standardized mortality rate for preventable and non-preventable causes in the period between 2000 and 2013, with corrections for ill-defined causes and under-reporting of deaths.

Results There was a decline in the mortality rate in the Brazilian population aged 5–69 due to preventable causes (1.6% per year) and non-preventable (1.4% per year). We also found a decrease in all groups of causes of preventable deaths in 2000–2013 period. The study draws attention to the increase in deaths from specific causes, such as pneumonia (1.9% per year) and transport accidents (0.6% per year), and to the stability in deaths due to aggressions and intentional self-harm. Deaths due to non-communicable diseases fell by 2.2% per year and was highest in the age group 60–69 in 2013.

Conclusion Rates of preventable deaths are still high, especially for non-communicable diseases and external causes. These causes of death are sensitive to health promotion interventions and, therefore, this study reinforces the need to focus on these causes of illness and death and their risk factors.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.335
Methods We used data from an observational cohort representative of AML patients of at least 60y treated in MP. This represented 697 patients with an AML diagnosed between 1st January 2009 to 31st December 2014, excluding AML 3 - promyelocytic - subtypes. We built a theoretical model of clinical decision process in which we distinguished 2 steps: access to chemotherapy (first step), and access to an alternative to best supportive care among patients who were not eligible for intensive chemotherapy (second step). Logistic models were used to test, independently for each step, the effect of PSE on treatment received, first without adjustment, and then, after successive adjustment for confounders identified with bivariate analyses (α = 0.2). We measured PSE by the French version of the European Deprivation Index (EDI), an ecological deprivation index already used in several studies addressing social inequalities in cancer management and outcome.

Results Analyses on complete data (n = 593 - 85% of included patients) show that, in the first step, disadvantaged patients had a lower probability to be treated by intensive chemotherapy compared to most advantaged patients. However, this association did not persist after adjusting for ‘initial status’, i.e. whether it was an AML de novo or a post-affection AML. No statistically significant association was found between SEP and treatment choice in the second step among patients who was not eligible to intensive chemotherapy. Consistent results were found in sensitivity analyses using alternative coding of EDI and after dealing with missing data using multiple imputation.

Conclusion No direct influence of PSE on treatment choice was found in our study among a sample representative of patients of at least 60y treated for AML in the Midi-Pyrénées region. These results might be seen as an evidence of the efficacy of the regional organization in care network to provide homogeneous quality of care in the territory. Nevertheless, further studies are needed to explore the influence of SEP on the initial status, i.e. AML de novo or AML post-affection.

Disclosure of interest The authors declare that they have no competing interest.

Acknowledgments This work was supported by the IRESP, the French Institute for Public Health Research [Grant number: SSC201504].

https://doi.org/10.1016/j.respe.2018.05.336

P7-17 Socioeconomic inequalities in breast and thyroid cancer screening in Korea: A nationwide cross-sectional study

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Introduction Breast and thyroid cancers have imposed a significant burden to women’s health worldwide. According to the latest cancer statistics in Korea, thyroid cancer is the most commonly diagnosed cancer among Korean women, followed by breast cancer, and both are accounting for 67.9% of new cases. A number of studies have established effectiveness of early detection with mammography. However, there is no proven method for effective secondary prevention for thyroid cancer. In 2002, Korea began a nationwide breast cancer screening service as a part of the National Cancer Screening Program (NCSP) to provide mammography for women aged 40 years or over, in the price of free or 10% copayment. Thyroid cancer is not included in the NCSP, and the Korean national cancer screening guidelines specify the insufficient evidence in performing thyroid cancer screening among asymptomatic persons. However, providers frequently offer opportunistic screening with ultrasonography as an add-on for other cancer screening services. The current study aimed to assess the latest screening utilization, and to examine socioeconomic inequalities in breast and thyroid cancer screening in 2016. Subgroup analyses were conducted to explore the effect of inequalities according to age groups.

Methods Data from the 2016 Korean Study of Women’s Health Issues (K-Stori), a nationwide cross-sectional survey, were utilized. A total of 6500 women aged 40–79 were included for analysis. Screening status was defined as ‘screened’ for women who underwent mammography or ultrasonography within 2 years for breast and thyroid cancer, respectively. Absolute and relative inequalities in breast and thyroid cancer screening rates by socioeconomic factors (household income, education, urbanization, health literacy and social support) were estimated by inequality-specialized and regression-based indicators, Slope Index of Inequality (SII) and Relative Index of Inequality (RII).

Results A total of 70.1% and 50.6% of Korean women were shown to undergo in breast and thyroid cancer screening, respectively. The SII, an absolute inequality, and RII, a relative inequality, indicated substantial socioeconomic inequalities in 2016. Korean women with higher social supports were significantly more likely to undergo breast cancer screening [SII: 15.1 (95% CI: 11.1 to 19.1), RII: 2.2 (95% CI: 1.8 to 2.6)]. Inequalities in mammographic screening by health literacy levels were also significant, favored women with higher literacy [SII: 10.2 (95% CI: 6.2 to14.3), RII: 1.7 (95% CI: 1.4 to 2.1)]. In contrast, women living in the metropolitan area were less likely to undergo breast cancer screening [SII: −9.4 (95% CI: −13.5 to −5.3), RII: 0.6 (95% CI: 0.5 to 0.7)]. Inequalities by education or household income were not observed for breast cancer screening. Socioeconomic inequalities in thyroid cancer screening were similar to those found in breast cancers screening, except household income levels. Inequalities by income levels were observed significant only in thyroid cancer screening, favored women in higher income levels [SII: 10.2 (95% CI: 5.4 to 15.0), RII: 1.5 (95% CI: 1.2 to 1.8)]. The patterns of inequalities were also differed by subgroup analyses according to age groups. Women aged 40–49 showed inequalities by household income levels for both breast and thyroid cancer screening. For women aged 50s, income inequalities were found only for thyroid cancer screening, but not breast cancer. Socioeconomic factors of social support and health literacy were significant among older women aged 60–79, favored women in higher support and literacy in both cancer screening.

Conclusions Different socioeconomic inequalities were found according to age groups in Korean women, which should be approached by specialized policies. More importantly, thyroid cancer screening is not currently recommended, and has intensified socioeconomic inequalities among Korean women.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.337

P7-19 Evaluation of potential impact of benzodiazepine consumption reduction on future of dementia burden

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Introduction Primarily indicated for treating the symptoms of anxiety and sleep disorders over short periods, benzodiazepines are widely prescribed in developed countries. In France, 30% of people aged 65 years and over use benzodiazepines [1]. Some studies found an increased risk of dementia or cognitive impairment in benzodiazepines users [2]. Moreover, the aging of the population should lead to a sharp rise of the number of demented subjects. To reduce the burden of dementia, interventions targeting dementia risk factors could be proposed, but the association between most of these risk factors and mortality makes it difficult to anticipate the potential impact of such interventions. Assuming a causal effect of benzodiazepines on dementia risk, the main objective of this work is to evaluate consequences of benzodiazepine consumption reduction on various measures of dementia burden.

Methods A three-state model called illness-death model was used to estimate the dementia incidence rate and the over-risk of death for demented subjects [3].

National demographic projections provided general mortality rates and population at 65 years. We assumed that a subject who used benzodiazepines for more than 6 months continuously after age 65 remained at higher risk of dementia.
Outbreak of leptospirosis during a canyoning weekend, France, 2017

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Introduction On 27 September 2017, a local hospital reported to the Regional Health Agency (RHA) Auvergne-Rhône-Alpes, 5 suspected cases of leptospirosis. These cases (5 young men) took part in a canyoning weekend with a group of 26 persons in the Grenant River (Savoie, 73) during the second weekend of September. Four of them were hospitalized with fever, myalgia, arthralgia, thrombocytopenia and kidney, liver or neurological disorders. A multidisciplinary investigation team was set up in order to describe the outbreak, identify the likely source of infection and implement the necessary control measures.

Methods The RHA asked canyoning clubs, laboratories, hospitals and general practitioners around the Grenant River to report possible cases to ensure all of them were identified. A possible case was a person of the group with symptoms compatible with leptospirosis between 9 September and 15 October 2017, and a confirmed case was a possible case with laboratory evidence (a biological test was proposed to each possible case). Each positive case was confirmed by the national reference center for leptospirosis (Institut Pasteur). A standardized questionnaire was used to interview each member of the group and collect demographic characteristics, clinical and biological information, recreational exposures during the whole weekend and information on individual protective measures used against leptospirosis. In the same time, environmental investigation was performed to explore potential infectious reservoirs and environmental conditions near to the canyoning site.

Results Twenty-three participants of the group answered to the questionnaire. Three were unreachable. Five confirmed cases of leptospirosis were identified, either by PCR or serology. For two cases, the species L. kishneri was identified by sequencing and Microscopic Agglutination Test (MAT) analysis detected the serogroup grippotyphosa. The only environmental risk exposure identified was canyoning in the Grenant river water. During the activity, all the participants wore a full body wetsuit. Only the absence of gloves could be notice. Two cases reported some skin lesions, but no significant wounds. Several members mentioned the presence of cows on the riverside, which are a possible reservoir of leptospira. No wild animals were seen around the canyoning site or near the camping where the participants were staying during the weekend. However, the river surroundings are known as hunting areas where hunters eviscerate wild animals. A significant flow with muddy water was also described by all of them. Moreover, this weekend has been preceded by heavy rainfall after a long dry period and environmental investigation pointed out the spreading of manure on the edge of the river.

Conclusion According to the results, the most appropriate hypothesis is a contamination by contact of water with mucous membranes during canyoning activity. We observed many favorable environmental conditions including significant rainfall, presence of cows and manure spreading near to the canyoning site. The formal identification of the contamination source was not possible, but it was reported that in this region, Grippotyphosa is the third serogroup responsible for bovine leptospirosis. The RHA immediately suspended the canyoning activities in the Grenant until the end of the season. This request has also been related by social and professional networks. In addition, health professionals and all canyoning sites were informed about the outbreak, leptospirosis risk and individual prevention measures. We recommend to check compliance with the regulations on manure spreading, improve the application of preventive measures to practice fresh water sport, raise awareness about importance and benefit of a rapid medical consultation in case of symptoms, and recommend to health professionals in the region an active surveillance of cases to rapidly identify areas of transmission.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.340

Decomposing income inequalities in breast and cervical cancer screening non-adherence in France: The CONSTANCES cohort survey

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Background Socioeconomic inequalities are observed in breast cancer screening (BCS) and cervical cancer screening (CCS) in France. A large range of determinants is associated with BCS and CCS. Most of these determinants are socially stratified and are likely to contribute to socioeconomic inequalities in BCS and CCS. Various factors associated with BCS and CCS non-adherence have been identified in many studies. However, limited evidence exists on their contributions to socioeconomic inequalities. This study quantified the contributions of these determinants to BCS and CCS income inequalities in France.

Methods The study utilised the 2012–2014 baseline data in the CONSTANCES survey conducted in France (10,260 women for BCS and 18,761 for CCS). Screening non-adherence was defined by having last BCS for more than 2 years and last CCS for more than 3 years. The standard concentration index (Ch) was computed to measure the income inequalities in BCS and CCS non-adherence. Decomposition analyses quantified the contributions of
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middle-aged adults

alcohol consumption on serum GGT in Irish

Double trouble: The effect of obesity and alcohol consumption on serum GGT in Irish middle-aged adults

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Background Obesity and excessive alcohol consumption are increasingly pervasive public health issues due to their profound health impacts and high prevalence throughout the world. Both obesity and alcohol consumption induce liver injury, as reflected by raised GGT levels. However, these can be overlapping phenomena, potentially placing obese individuals who consume alcohol at higher risk of liver damage.

Aim The aim of this research was to investigate the association between obesity and alcohol consumption, and the subsequent impact on serum GGT levels in Irish middle-aged adults.

Methods This research involved secondary analysis of the baseline wave of data from the Mitchelstown Cohort Study, a large community-based prospective cohort study of 2047 men and women aged 50–69 years.

Results In total, 30.24% of females and 16.90% of males had raised GGT levels. Most of these individuals (~87%) were overweight or obese and were moderate or heavy drinkers. Multivariate logistic regression analysis was carried out for females with high serum GGT with BMI, alcohol, physical activity and education as predictor variables. The results showed that as BMI increased females were almost twice as likely to have high serum GGT (OR: 1.9, 95% CI: 1.564–2.333). Likewise, as alcohol consumption increased females were almost twice as likely to have high serum GGT (OR: 1.9, 95% CI: 1.511–2.429). For males, as BMI increased, males were 1.5 times as likely to have raised serum GGT (OR: 1.5, 95% CI: 1.197–1.920). Similarly, as alcohol consumption increased, males were 2.3 times as likely to have raised serum GGT (OR: 2.3, 95% CI: 1.790–3.166). Physical activity and education were not statistically significant predictors of GGT activity in a multivariate model. There was evidence of an interaction effect for obese individuals with heavy alcohol intake (P=0.003, Coeff: 3.168, 95% CI: 1.091–5.245). In addition, there was evidence of effect modification by gender. The association between GGT, BMI and alcohol was strongest in males with heavy alcohol intake, i.e. >14 units of alcohol per week (P<0.001, Coeff: 31.87, 95% CI: 20.25–45.50).

Conclusion There is evidence of interaction between obesity, alcohol and gender. Obese males with heavy alcohol intake are a high-risk group for liver injury. Targeted health promotion campaigns aimed at increasing awareness of the dangers of combining these modifiable risk factors are required.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.341

P7-23

Double trouble: The effect of obesity and alcohol consumption on serum GGT in Irish middle-aged adults

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Introduction Nasopharyngeal carriage studies provide insights into the local prevalence of circulating pneumococcal serotypes. These data are critical to vaccination monitoring, as they allow for the prediction and assessment of impact. Very little data are available on the carriage of pneumococcal serotypes in Morocco. The aim of the study was to describe the prevalence of Strepococcus pneumoniae carriage and serotype distribution among healthy and sick pediatric patients with ages ranging from 2 to 59 months.

Methods We included, patients admitted for severe clinical pneumonia according to WHO definition during a one-year survey from November 2010 to December 2011 and healthy children visiting primary health care centers for routine vaccination in the province of Rabat. These sites were selected randomly, and the sample size for the community study (n=200) was calculated based on the preliminary estimation of carriage rates. Nasopharyngeal samples were obtained from consent children using a mini culturette extra-thin flexible wire swab. Nasal samples were cultured using conventional methods Molecular. Capsular typing of pneumococcal strains was performed using sequential multiplex real-time PCR targeting 24 common serotypes (1, 3, 4, 5, 6A, 6B, 7F/A, 8, 9 V/A/N/I, 14, 15B/C, 18C/B, 19A, 19F/B/C, 23A and 23F) [8]. Data analysis Study variables were analyzed and summarized in frequency tables. Quantitative variables are expressed as the means with their corresponding standard deviations. Qualitative variables are presented as percentages with 95% confidence intervals.

The proportion of infants less than one year of age was 30.6% (214/700) for the admitted patients and 70.7% (138/195) for the children from the community. Carriage rates were 40.5% (79/195) for healthy children and 22.8% (159/697) for sick children. Vaccine coverage for the circulating serotypes was 55.9% (66/118) among hospitalized children and 52.1% (24/46) for healthy children. Among admitted patients, the monthly distribution of carriage was significantly different (P<0.001), and carriage was significantly more frequent during the spring and summer (31–32%) than during the autumn and winter (19–20%) (P=0.003). Carriage rates also varied, albeit not significantly, according to the number of pneumococcal vaccine doses received. The most commonly observed circulating serotypes included 6A, 6B and 19F, all of which are included in the current 13-valent anti-pneumococcal conjugate vaccine that was recently introduced in Morocco. The proportion of the carriage among healthy children was two to eight times higher than in children less than 12 months of age, while the distribution of 19F/B/C was two-fold higher among
children who had received at least one dose of the 13-valent pneumococcal conjugate vaccine.

**Conclusion** Monitoring of circulating serotypes remains necessary after vaccine introduction to assess whether serotype replacement is occurring.

**Disclosure of interest** The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.344

**P7-25**

**Why took it so long? The reason behind tuberculosis treatment delay**

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**Introduction** Tuberculosis (TB) is a major public health problem and one of the ten main causes of death worldwide. Portugal stands out in the western European context for having one of the highest TB rates, being one of the seven countries that has an intermediate rate of TB notifications (17.8 per 100,000 inhabitants, in 2016). Several authors have demonstrated that the delay in TB diagnosis is a major obstacle to epidemiologic control. Demographic, socioeconomic and clinical factors seem to influence the delay in the diagnosis and initiation of treatment. Although there are several studies on TB diagnosis and treatment delay, the majority was conducted in low-income countries, where the TB epidemic and the socioeconomic and healthcare systems are of a different nature. Studies from high-income countries are rare, and the majority focus on clinical and demographic factors. In Portugal, specifically, more studies are needed to understand the factors that influence TB treatment delay to make TB control programs more effective. Given the previous gaps, we aimed to determine the patient and healthcare system delay in TB patients, and to identify associated factors at individual and contextual level in Portugal.

**Methods** We conducted a cross-sectional study. All TB cases notified in Portugal between 2010 and 2014 were analysed using data from the national surveillance system. Patient, healthcare system and treatment delay were computed, log-transformed, and used as outcomes. Patient delay denotes the time interval between the onset of symptoms and the first contact with healthcare system services; healthcare system delay the time interval from the first contact with healthcare services to the beginning of treatment; treatment delay is the sum of the two. Between 2010 and 2014, 12,334 TB cases were notified, 5496 were excluded due to treatment delay missing data: 35% due to missing in patient delay, 24% in healthcare system delay and 41% due to both. Univariable and multivariable linear models were fitted to identify sociodemographic, contextual and clinical predictors. Results Among the 6838 patients included in this study, median patient delay, healthcare system and treatment delay were 33 (IQR = 51), 17 (IQR = 40) and 68 (IQR = 72) days, respectively. On the multivariable analysis, we observed: higher patient delay occurred in foreign patients (exponentiated beta: 1.165, 95% CI: 1.081–1.255) and in those addicted to alcohol (1.168, 1.076–1.266); higher healthcare system delay was observed in older patients (1.011, 1.009–1.013), patients with extra-pulmonary TB (2.061, 1.879–2.259), lung cancer (2.387, 1.654–3.449), sarcoidosis (3.245, 1.342–7.852) and COPD (1.297, 1.061–1.586), and in residents living further distance from healthcare services (1.011, 1.009–1.013). Higher total treatment delay was observed in older patients (1.004, 1.003–1.005), patients with extra-pulmonary TB (1.343, 1.275–1.413) and lung cancer (1.343, 1.101–1.639). Excluded participants had greater delays (patient delay or healthcare system delay) (P = 0.01), were younger (P = 0.01), lived in more disadvantaged areas (P = 0.008), at a further distance from healthcare services (P = 0.006), were more likely to have HIV (P < 0.001), extra-pulmonary TB (P < 0.001), alcohol or drug addiction (P < 0.001), to be in prison (P < 0.001) and to be homeless (P < 0.001).

**Conclusion** Although the median delay in diagnosis and in the initiation of treatment in Portugal matches what has been reported in other developed countries, there is still room for improvement, especially in certain sociodemo-graphic and clinical groups. It is fundamental to increase the awareness towards TB not only among the general population, so that they become more aware of the TB signs and symptoms, but also among health professionals to increase their clinical suspicion of TB. The results from this study may contribute to a new analysis on the TB transmission dynamics, and to reformulate prevention and control strategies.

**Disclosure of interest** The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.345

**P7-26**

**Impact of 13-valent pneumococcal conjugate vaccination introduction in children on pneumonia hospitalizations among adults aged 65 or more in Portugal**

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In Portugal between 2010 and 2014 were analysed using data from the national control programs more effective. Given the previous gaps, we aimed to determine the patient and healthcare system delay in TB patients, and to identify associated factors at individual and contextual level in Portugal.

**Methods** We conducted a cross-sectional study. All TB cases notified in Portugal between 2010 and 2014 were analysed using data from the national surveillance system. Patient, healthcare system and treatment delay were computed, log-transformed, and used as outcomes. Patient delay denotes the time interval between the onset of symptoms and the first contact with healthcare system services; healthcare system delay the time interval from the first contact with healthcare services to the beginning of treatment; treatment delay is the sum of the two. Between 2010 and 2014, 12,334 TB cases were notified, 5496 were excluded due to treatment delay missing data: 35% due to missing in patient delay, 24% in healthcare system delay and 41% due to both. Univariable and multivariable linear models were fitted to identify sociodemographic, contextual and clinical predictors. Results Among the 6838 patients included in this study, median patient delay, healthcare system and treatment delay were 33 (IQR = 51), 17 (IQR = 40) and 68 (IQR = 72) days, respectively. On the multivariable analysis, we observed: higher patient delay occurred in foreign patients (exponentiated beta: 1.165, 95% CI: 1.081–1.255) and in those addicted to alcohol (1.168, 1.076–1.266); higher healthcare system delay was observed in older patients (1.011, 1.009–1.013), patients with extra-pulmonary TB (2.061, 1.879–2.259), lung cancer (2.387, 1.654–3.449), sarcoidosis (3.245, 1.342–7.852) and COPD (1.297, 1.061–1.586), and in residents living further distance from healthcare services (1.011, 1.009–1.013). Higher total treatment delay was observed in older patients (1.004, 1.003–1.005), patients with extra-pulmonary TB (1.343, 1.275–1.413) and lung cancer (1.343, 1.101–1.639). Excluded participants had greater delays (patient delay or healthcare system delay) (P = 0.01), were younger (P = 0.01), lived in more disadvantaged areas (P = 0.008), at a further distance from healthcare services (P = 0.006), were more likely to have HIV (P < 0.001), extra-pulmonary TB (P < 0.001), alcohol or drug addiction (P < 0.001), to be in prison (P < 0.001) and to be homeless (P < 0.001).

**Conclusion** Although the median delay in diagnosis and in the initiation of treatment in Portugal matches what has been reported in other developed countries, there is still room for improvement, especially in certain sociodemographic and clinical groups. It is fundamental to increase the awareness towards TB not only among the general population, so that they become more aware of the TB signs and symptoms, but also among health professionals to increase their clinical suspicion of TB. The results from this study may contribute to a new analysis on the TB transmission dynamics, and to reformulate prevention and control strategies.

**Disclosure of interest** The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.345
was observed for Bacterial pneumonia after 2010 (IRR = 0.915; 95% CI: 0.913 to 0.937).

**Conclusions** Using population-based nationwide registry data, we found considerable decrease in hospitalizations’ rates for PP in adults aged 65 or more years following infant PCV13 introduction in Portugal. Given the ecological design, we cannot exclude the effect of factors other than vaccination, namely changes in diagnosis and coding practices or the reduction of other pneumonia risk factors as tobacco, since decreasing trend was also observed for bacterial pneumonia after 2010.

**Disclosure of interest** The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.346

**P7-27**

**The social patterning of measurement errors in self-reports: Impact on socioeconomic inequalities estimates**

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**Introduction** Reduction of unfair differences in health between socioeconomic groups and countries constitutes an important public health challenge in the 21st century. To monitor progress on this goal, health inequalities are most frequently estimated based on self-reported data from population surveys. However, it has been shown that self-reported data on cardiovascular disease risk factors is prompt to reporting error. If errors occur more often in specific socioeconomic groups (due to under-diagnosis or lower literacy) they are likely to seriously bias health inequality estimates. This study aims at comparing measurement errors between socioeconomic categories in self-reported hypertension, and their consequences on health inequality estimates.

**Methods** We used data from the Portuguese National Health Examination Survey (INSEF), a cross-sectional nationwide study conducted in 2015 on a probabilistic sample (n = 4911) of community-dwelling individuals aged between 25 and 74-years-old. INSEF combines measured biochemical parameters and blood pressure with self-reported data. Self-reported hypertension was defined based on the question: “Do you have any of the following diseases or conditions: hypertension? [Yes/No]”. Examination-based hypertension was defined as having systolic blood pressure of at least 140 mmHg, or diastolic blood pressure of at least 90 mmHg, or using prescribed antihypertensive medication. Participants’ socioeconomic status was measured through the education level (no education/1st cycle of basic education, 2nd cycle of basic education, 3rd cycle of basic education, secondary education and higher education). Inequalities in hypertension between the highest and lowest socioeconomic status groups were measured using relative indexes of inequality (RII) and respective confidence intervals (95% CI), estimated by Poisson regression. Estimates of inequalities were stratified by age and sex, using four population groups (males 25–49-years-old, female 25–49-years-old, male 50–75-years-old, female 50–75-years-old). Results Hypertension was reported by 25.7% [95% CI: 24.0 to 27.4] of participants, while 35.9% [95% CI: 34.2 to 37.5] were considered to have hypertension according to examination-based data. The difference between examination-based and self-reported prevalence was 12.7pp for those with no education/1st cycle of basic education and 4.6pp for those with higher education. Similar educational gradients were observed for both self-reported (RII = 1.87; 95% CI: 1.45 to 2.42) and examination-base (RII = 1.91; 95% CI: 1.60 to 2.28) hypertension, with lowest prevalence of disease among the highly educated. Age- and sex-specific results showed considerable discrepancies in inequality indicators between self-reported and examination-based data. Namely, differences in estimated gradients were more pronounced among 25–49-years-old males, with RII = 0.67 (95% CI: 0.29 to 1.54) for self-reported and RII = 1.90 (95% CI: 1.22 to 2.96) for examination-based hypertension. In 25–49-years-old females inequalities in self-reported hypertension were not statistically significant (RII = 3.18; 95% CI: 0.94 to 10.73), while females with the lowest education were 4.35 (95% CI: 2.60 to 7.27) times more likely to have examination-based hypertension then compared to the most educated. In 50–75 age group educational inequalities in self-reported hypertension were larger than in examination-based for both, male (RII = 1.82; 95% CI: 1.25 to 2.69 vs. RII = 1.40; 95% CI: 1.04 to 1.89) and female (RII = 1.77; 95% CI 1.30 to 2.41 vs. RII = 1.58; 95% CI: 1.22 to 2.04).

**Conclusions** Our results illustrated the significant effect of measurement error in self-reported hypertension on estimates of socioeconomic inequalities. Use of self-reported data led to underestimation of educational inequalities among young and middle-aged individuals and overestimation in older age groups. Inequality indicators derived from self-report should be interpreted with caution.

**Disclosure of interest** The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.347

**P7-28**

**Association between exposure to heavy metals and chronic kidney disease of unknown etiology in Mexico**


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**Introduction** In the west of the State of Mexico, half of the hospital admissions for chronic kidney diseases (CKD) are people under 40 years of age, not associated with diabetes mellitus or hypertension. Objective To evaluate the association between heavy metals and kidney disease of unknown etiology in a Mexican population.

**Materials and methods** A matched study by age and sex of 100 cases and 100 controls was performed. A questionnaire was applied to know alcohol and tobacco addiction, and exposures (food, occupational, and drug). In 50 samples and 50 controls the concentration of the metals As, Cd, Hg and Pb were determined in hair samples. Finally, a map was constructed with the housing position of the 100 patients.

**Results and conclusions** From a bivariate logistic regression it was determined that there is a statistically significant association between CKD and smoking, occupational exposure to construction and blacksmithing, and exposure to arsenic. A larger sample is required to check occupational exposure to the paper industry, to the consumption of acetaminophen, naproxen, and cadmium. The values obtained in this work for these variables are only informative. The cases studied are located in the Rio Lerma basin, one of the most contaminated in the country. The IRCd present in the State of Mexico seems to be very similar to that of Sri Lanka and that of the Central American Pacific; therefore larger scale studies are required.

**Disclosure of interest** The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.348
P7-29  
Association between socially disadvantaged groups and metabolics syndrome in European children. Results from the IDEFICS study  
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Introduction  
The metabolic syndrome (MetS) is an important cluster of cardiovascular disease risk factors. MetS is diagnosed if at least three of the four components, namely visceral obesity, dyslipidemia, hyperglycemia, and hypertension, exceed certain cut-off values, where the cut-offs vary depending on sex, age and the proposed definition. Social disadvantages in early life are hypothesized to have negative implications for health through potentially modifiable lifestyle (such as diet, physical activity and sedentary behaviours). Classical socioeconomic status (SES) indicators such as parental education or income have been found to be associated with MetS in adults. The extent to which the accumulation of these disadvantages and other social disadvantages can affect children’s MetS risk is still unknown.  
Methods  
In the IDEFICS study, 16,228 children aged 2.0–9.9 years from eight European countries were examined at baseline and after 2 years of follow-up and 2,401 of these children were eligible for this analysis. Sociodemographic variables, children’s well-being score and lifestyle factors were reported by parents via questionnaires. Six socially disadvantaged groups were defined, including two low socioeconomic status groups (children whose parents had a low education and who had low-income) and four social vulnerable groups (children whose parents were migrants, children whose parents lack a social network, children from non-traditional families and children with unemployed parents). MetS risk was assessed through z-score standardization of the four components assessed using the following variables: waist circumference, blood pressure (mean of systolic and diastolic), blood lipids (mean of triglycerides and inverse HDL levels) and insulin resistance (homeostasis model assessment, HOMA-IR). Linear mixed effects models were used to study the association between:  
– social disadvantages and children’s total MetS score at baseline and follow-up;  
– patterns of social disadvantages over time and children’s total MetS score at baseline and follow-up;  
– accumulation of social disadvantages and children’s total MetS score at baseline and follow-up.  
Models were adjusted for sex, age, and education and income for social vulnerable groups. In a second step, models were additionally adjusted for children’s well-being score and lifestyle factors (fruit and vegetables consumption, physical activity, screen time) to assess whether social disadvantages have an effect independent of lifestyle factors on the metabolic risk.  
Results  
Children from low-income families at both time points (0.20 [0.03; 0.37]; P estimate and 99% confidence interval), children from non-traditional families at both time points (0.14 [0.02; 0.26]), children whose parents were unemployed at baseline and follow-up (0.31 [0.05; 0.57]) and children who accumulated more than 3 vulnerabilities (0.21 [0.04; 0.37]) showed a significantly higher MetS score compared to non-vulnerable groups.  
Conclusions  
Social disadvantages in children have been found to be related with a higher metabolic risk independently of diet, physical activity, sedentary behaviours and well-being. Interventions that focus on these socially disadvantaged groups should be developed to tackle health disparities.  
Disclosure of interest  
The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.349

P7-30  
How to explain gender-specific differences in the motivation to retire early in older employees in Germany? Results from the LIDA-Cohort study  
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Introduction  
Early retirement is still common in Germany, as in other European countries. Yet, its meaning for the nation’s welfare has a higher relevance in terms of ageing and shrinking workforces due to the demographic change. Therefore, the investigation of factors with influence on early work exits like the motivation to retire early is important. This motivation might differ between older female and male employees in Germany as well, as it has been shown for other countries. Knowledge about gender-specific differences in the motivation to retire early could be helpful in retaining the workforce. Therefore, we investigated the difference in the motivation to retire early in older female and male employees in Germany and sociodemographic, work and non-work-related factors possibly associated with it.  
Methods  
A total of 3,961 employees born in 1959 or 1965, subject to social insurance, living throughout Germany and having participated in working life in both waves of the lidA-cohort study (2011 und 2014) were included. Motivation to retire early was parameterized by the employees’ wish to retire before the age of 65. Work-related variables were occupational position, manual occupation, working time, work-related stress (Effort-reward imbalance), influence on work, satisfaction with leadership, work-to-work conflict (Copenhagen Psychosocial Questionnaire) and physical work ability (Work Ability Index). Covariates were age, education, number of children at home, partner’s employment status, subjective health (12-Item Short Form Health Survey), depressive symptoms (Becks Depression Inventory) and financial possibility to retire early. After testing for gender-specific interactions female and male employees were analysed separately to explore different influences on motivation to retire early using multiple logistic regression analysis. Missing values were replaced by multiple imputations with the Fully Conditional Specification method.  
Results  
Female employees more often wanted to retire earlier than male (87.6% vs. 83.8%, P < 0.01). While the proportion of full- and part-time employed women was balanced, the majority of men was in full-time employment. Women had a higher proportion of marginal employment. Furthermore men worked more frequently in higher as well as in manual occupations and had more often high influence on their work. Women were more often satisfied with leadership. Good health-related outcomes and physical work ability were less frequent in female employees. Men had more often the financial resources to retire early and had on average a higher number of children at home. More often women had no partner. Both among men and women, low educational status, high work-related stress, low physical work ability and the financial possibility for early retirement were associated with a higher chance of the wish to retire early, whereas marginal employment and having no partner was associated with a lower chance. The associations of these factors with the motivation to retire early were not significantly different for women and men. In contrast, low influence on work was significantly associated with the wish to retire early in female employees, only. Furthermore, middle occupational status in relation to higher status was associated with a higher chance to be motivated to retire early and a higher average number of children at home with a lower chance in male employees, only.  
Conclusions  
Of course, not a single factor alone can explain the gender difference in the frequency of the motivation to retire early. Regarding our results, the gender-specific differences in the frequency of low physical work ability and in the association between influence on work and the wish to retire early, may partly explain this difference. To equalise gender-specific disparities in these work-related factors may contribute to lower differences in the motivation to retire early between older female and male employees.  
Disclosure of interest  
The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.350
P7-31
Repeat abortion and determinants of Chinese women: A systematic review and meta-analysis
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Background Repeat abortion is a public health problem globally and has adverse impacts on women’s reproductive health. Risk factors associated with repeat abortion have been well-established in many studies; however, studies documenting the prevalence of repeat abortions and associated risk factors in China are hard to access, due to the language barrier, as they are mostly published in Chinese. Meanwhile, the two-child policy in China may increase the risk of repeat abortions among women in China, hence, the need to review and document existing evidence on repeat abortions in China.
Methods For this systematic review, we searched through six electronic databases, including PubMed, EMBASE, Cochrane Library, China Academic Journal Network Publishing Database, China Science Period Database, and China Biology Medicine disc. The focus of the review was on original studies, with no restrictions on language or publication date. The last search was run on May 5, 2017. The studies, which presented data on repeat abortion and related risk factors of women in mainland China were selected for the review. Two reviewers reviewed all the articles and extracted relevant data from the selected full-text studies. Meta-analyses were performed using RevMan 5.3 and the odds ratios with 95% confidence intervals were calculated in fixed or random effects models based on the results of the Q test. The publication bias was quantitatively evaluated by Egger’s linear regression analysis using Stata 13.0. A narrative approach was used to analyze exposures, for which a meta-analysis was not possible. We used descriptive statistics to assess whether the percentage of repeat abortion varied significantly among women in different groups of each exposure.
Results Of 3015 records initially identified, 29 studies met our inclusion criteria, representing 36,879 individuals from China. Of 36,879 individuals in 28 cross-sectional studies, 43.0% (15854) had a repeat abortion. Of 48 exposures identified, 25 were significantly associated with repeat abortions of Chinese women. Meta-analyses indicated that women who were older (≥ 20 years), OR: 2.08, 95% CI: 1.72–2.50), multiparous (≥ 1 child, 4.49, 2.18–11.43), migrant (1.62, 1.34–1.96), unemployed (2.20, 1.65–2.93), tobacco/alcohol users (2.35, 1.66–3.32), with early sexual debut (< 18 years, 1.49, 1.15–1.93), cohabitating with the opposite sex (1.72, 1.53–1.93), having poor contraception knowledge (2.29, 1.71–3.05), having used contraceptive measures in prior six months (2.21, 1.61–3.03), coming from broken homes (1.44, 1.11–1.87), and having multiple sexual partners (≥ 2, 2.99, 2.11–4.23) were found to have high-risks of repeat abortions. The other 14 risk factors were analyzed and described using a narrative approach.
Conclusions Chinese women with a repeat abortion account for a large percentage of the total sample of women in the included studies. Despite significant heterogeneity of some risk factors, there is evidence that repeat abortions of women are associated with individual, sexual-partner’s, and parental risk factors. More targeted strategies should be developed to reduce the high-risks of repeat abortions of women.
Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.351

P7-32
Incidence, recurrence and prevalence of stroke in an ageing population
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Background Populations are ageing and survival from many diseases including stroke has improved substantially over the past decades. Even if stroke incidence is declining as well, at least in the population 65 years and above, there is concern that the burden of stroke will increase in the coming decades, when the population grow larger and older. However, few studies have explored how incidence, recurrence and prevalence have developed in parallel with population ageing. It needs to be further investigated whether or not the decline in incidence is large enough to compensate for the ageing of the population, and, how the incidence of recurrent stroke has developed when survival from the first stroke has improved, before we can make any clear statements of the future burden of stroke.
Aim and setting In this population-based study based on Swedish register data we explore how the rate of recurrent events of stroke has developed in relation to the rate of first events. Further, how the prevalence of stroke has developed when survival has improved and the population has become older, and, finally, how the absolute number of stroke events developed. Trends are estimated for the period 1994 to 2014. Based on the findings, we discuss the future disease burden of stroke.
Results We found clear declines in both incidence of first as well as recurrent stroke in Sweden between 1994 and 2014 for all ages between 60 and up to 90. For ages above 90 years the trends have remained stable. Despite improved survival of stroke the prevalence has not increased but decreased during the period, both as a proportion and as absolute number of events.
Conclusion Based on the development the past 15 years in Sweden in the population 65 and older we do not find support for an increasing burden of stroke, despite an ageing population.
Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.352

P7-33
Inequality, familial aggregation, and risk prediction of caries in Siblings. A nationwide study of Danish adolescents
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Introduction Sibling designs in assessing familial aggregation and risk prediction of dental caries have been largely unutilized. This large-scale investigation evaluated the robustness of parental socioeconomic position (SEP) as a cardinal determinant of caries experience by appraising it at the family level. Moreover, sibling-specific aggregation of caries within families and the discriminant ability of sibling caries in predicting co-sibling caries was ascertained.
Methods A nationwide, register-based cross-sectional study was conducted on Danish adolescent siblings (n = 23,847 sibling pairs; index siblings/probands; all 15-year-olds in 2003; co-siblings; biological siblings born to the same mother within ± 3 years). Clinical (caries) data for each study subject were acquired from the national dental database (Sundhedsstyrelsens Centrale Odontologiske
Register [SCOR]). Data on social variables, namely, parental SEP (parental education, income, and occupation), ethnicity, age/birth order, gender, and household type, were compiled from administrative registers at Statistics Denmark (e.g., the Danish population, education, labor market affiliation, and income and transfer payments registers). The social gradient in the magnitude of caries experience among the index- and co-siblings was estimated using negative binomial regression and generalized estimating equations taking into account family level clustering. Familial aggregation of caries was ascertained using probandwise concordance rates and adjusted pairwise odds ratios (PORs) from alternating logistic regressions. In order to determine the discriminant ability of proband caries and that of the other study covariates to effectively predict the absence or presence of caries in a sibling, a classification and regression tree (CART) analysis was undertaken. The predictive power of the CART models was evaluated using the area under the Receiver Operating Characteristic curve (AUROC) statistic.

Results The prevalence of dental caries experience in the overall study population was 73.6% (index siblings 74.3%, co-siblings 72.9%). Conspicuous social patterning of caries was observed in both the index- and co-sibling populations even after adjustment for all study covariates. Significant sibling-specific familial aggregation of caries was observed, which varied in a stepwise graded fashion across the social hierarchy. Overall, 70.6% of sibling pairs were concordant in terms of their caries experience (caries 58.9%, caries-free 11.7%). Co-siblings of affected probands had 3.9 times (95% CI: 3.65–4.18) higher (adjusted) odds of having caries compared to those with caries-free siblings. This sibling similarity was further amplified in those with relative socioeconomic disadvantage (e.g., the adjusted PORs varied from 3.39 [95% CI: 3.04–3.77] in the highest to 5.47 [95% CI: 4.36–6.86] in the lowest parental education category). AUROCs from the CART models ranged from 0.7–0.82, indicating useful to excellent overall predictive power of the models. These models revealed sibling (proband) caries experience to be the single-most important risk predictor of caries in individuals (co-siblings), with the results indicating that caries could be expected in ≥ 84% of siblings of adolescents with 3 or more caries-affected tooth surfaces.

Conclusions Graded clustering patterns of caries and socioeconomic disadvantage are encapsulated within families in Denmark, contributing to the engendering of health inequalities in society. With sibling caries being such a pertinent marker of increased caries risk, caries in a sibling should elicit preventive family-based approaches targeting co-siblings, particularly in socially disadvantaged households. Since siblings share common risk factors with other non-communicable diseases and conditions (such as diabetes and obesity), such policy constructs could reduce not only caries experience but also wider health inequalities in society.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.354

P7-35
Inadequate immunization coverage among children aged 12–23 months and associated factors in Togo in 2017

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Introduction Inadequate immunization coverage remains a public health problem in Africa. In Togo, only 62% of children under one year of age were fully immunized as assessed by the third Demographic and Health Survey conducted in 2013, hence not achieving the 90% or more immunization target for national coverage as set by the World Health Organization (WHO). In view of this, it appears necessary to carry out operational research to identify obstacles to complete immunization coverage in Togo.

Methods A cross-sectional survey was conducted from February 27th to March 5th 2017 in the six health regions of Togo. A modified WHO Epi Cluster sampling method was used for sample selection. Children aged 12 to 23 months who were living with one of the parents or guardians from selected households were interviewed. Children were classified as fully immunized if they had received the six doses of the three basic vaccines and had not missed any dose.

Results In Europe alcohol consumption is high. Heavy drinking is associated with adverse consequences on multiple levels and the socioeconomic costs are substantial. Also, alcohol plays a considerable role in the production of health inequalities. Despite a relatively even distribution of the overall alcohol consumption across socioeconomic positions in Denmark, the adverse consequences cluster among people of lower socioeconomic positions; from 2005–2009, alcohol accounted for 15% of socioeconomic differences in mortality among men and 7% among women. The literature refers to this phenomenon as the harm paradox of alcohol. Few have considered the social consequences of alcohol consumption related to labour market participation. In this study, we aim to test the hypothesis that heavy alcohol consumption and problem drinking is associated with a higher risk of unemployment as well as a lower chance of returning to work and whether this effect differs on different educational levels.

Methods A sample of 84,671 men and women aged 18–60 years from the Danish National Health Survey 2010 participated in the study. Alcohol consumption was measured by number of drinks per week and problem drinking was measured by six items from the CAGE-C questionnaire (Cut down, Annoyed, Guilty, Eye-opener - Copenhagen). The CAGE-C score was defined as the number of positive answers and problem drinking was defined as 4–6 positive answers. Information on educational level and labour market participation was obtained from national administrative registers. Data were analysed by use of Cox proportional hazards models and adjusted for age, gender, cohabitation status, geographic location, comorbidity, smoking habits and labour market attachment.

Results High weekly alcohol consumption and problem drinking (CAGE-C score of 4–6) were both associated with a higher risk of unemployment as well as a lower chance of returning to the labour market. For example, hazard ratios (HRs) of becoming unemployed and returning to work were 1.48 (95% CI: 1.37–1.60) and 0.85 (95% CI: 0.76–0.94) among individuals drinking 28+ drinks per week as compared to individuals drinking 1–6 drinks per week. Low educational level was associated with higher risks of unemployment and lower chances of returning to work compared to a high educational level. For example, the HR of becoming unemployed was 2.30 (95% CI: 2.20–2.40) among individuals with a low level of education in comparison to individuals with a high educational level. However, at all educational levels, heavy alcohol consumption and problem drinking was associated with a higher risk of unemployment and a lower chance of returning to work.

Conclusions Heavy drinking and alcohol problems have adverse consequences on labour market participation and were associated with a higher risk of unemployment and a lower chance of becoming employed. This was consistently observed at all educational levels, which indicates that alcohol problems are of importance for labour market participation across all socioeconomic positions.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.354

P7-34
Alcohol consumption, educational level and labour market participation: A prospective cohort study of transitions between work and unemployment


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Introduction In Europe alcohol consumption is high. Heavy drinking is associated with adverse consequences on multiple levels and the socioeconomic costs are substantial. Also, alcohol plays a considerable role in the production of health inequalities. Despite a relatively even distribution of the overall alcohol consumption across socioeconomic positions in Denmark, the adverse consequences cluster among people of lower socioeconomic positions; from 2005–2009, alcohol accounted for 15% of socioeconomic differences in mortality among men and 7% among women. The literature refers to this phenomenon as the harm paradox of alcohol. Few have considered the social consequences of alcohol consumption related to labour market participation. In this study, we aim to test the hypothesis that heavy alcohol consumption and problem drinking
Individual and neighbourhood socioeconomic disparities and high blood pressure in France: Results from a cross-sectional analysis of the CONSTANCES cohort

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Introduction
The influence of socioeconomic status (SES) on cardiovascular outcomes has already been well-established. Lower income, lower education or manual occupation are associated with a higher prevalence of cardiovascular risk factors such as high blood pressure (HBP) as well as with cardiovascular mortality. Neighborhood factors, such as the affluence of the area of residence have also been associated with cardiovascular diseases. However, few studies have been able to analyze jointly the influence of individual and neighborhood SES on the prevalence of HBP. We aimed to do so using a large sample of French adults.

Methods
Participants are randomly selected adults aged 18 to 69 recruited to the CONSTANCES cohort between 2012 and 2015. Information on lifestyle was collected by a self-administered questionnaire. Blood pressure (BP) was measured in 16 recruitment centers using a standardized protocol. HBP has been defined as BP over 140/90 mmHg and/or taking antihypertensive medication as indicated by matched records from the national database or reimbursements from the French health insurance. SES has been defined at an individual-level using education and at a neighborhood-level through an indicator of socioeconomic deprivation of the area of residence (FDep), divided in quintiles in this study. Analyses were stratified by gender. We first calculated prevalence of HBP according to individual and neighborhood variables separately. We then performed three-level logistic regressions (recruitment center, neighborhood, individual) to analyze jointly the influence of individual and neighborhood SES on the prevalence of HBP, taking into account the specific structure of the data.

Results
A total of 63,627 individuals (53% women) recruited between 2012 and 2015 were included in the analyses. Mean age in men and women was 48.8 ± 13.3 years and 47.2 ± 13.5 years, respectively. In this sample, 19,383 individuals were classified hypertensive, so the crude prevalence of HBP was 30.5%. Using 2016 French population as reference, standardized prevalence of HBP was 27.5% [95% CI: 27.1–27.8], higher among men (33.8% [95% CI: 33.2–34.5%]) than women (21.3% [95% CI: 20.8–21.8%]). Prevalence increased with age, from 9.5% in 18–34 years to 63.5% in people aged 65 years and more. Prevalence of HBP strongly differed according to the education level in all age groups in both gender. For instance in women with no diploma, prevalence of HBP increased from 10% among 18–34 years to 65% among 65–70 years compared with 4% to 46% in women with highest diploma. The corresponding age-adjusted odds ratios (OR) for prevalence of HBP comparing the lowest versus highest level of education were 2.22 [95% CI: 2.00–2.50] in women and 1.82 [95% CI: 1.67–2.00] in men. Regarding neighborhood, living in more deprived areas was associated with a higher prevalence of HBP in women and men. Age-adjusted ORs for prevalence of HBP comparing the most versus least deprived quintile of areas of residence were 1.61 [95% CI: 1.47–1.75] in women and 1.69 [95% CI: 1.56–1.85] in men. In models including both individual and neighborhood indicators, OR comparing the lowest versus highest level of education were 2.09 [95% CI: 1.87–2.34] in women and 1.70 [95% CI: 1.53–1.88] in men. OR for prevalence of HBP comparing the most versus least deprived quintile of areas of residence were 1.25 [95% CI: 1.11–1.41] in women and 1.15 [95% CI: 1.03–1.30] in men.

Conclusions
In this cross-sectional analysis of a large sample of adults, we found marked socioeconomic gradients of HBP in all age groups and among both men and women. Individual and contextual indicators of SES were independently associated with the prevalence of HBP.

Disclosure of interest
The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.355

P7-38
Researcher/local health professionals’ collaborations for community health promotion and mortality among older adults in Japan: JAGES community intervention study

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Introduction
Health promoting interventions for long-term care prevention among older adults should target community social environment. However, in local government, many health sector staffs face challenges in essential activities including community diagnosis (risk and resource assessments) and intersectoral partnerships. Supporting municipality staffs for those actions, under the close researcher/municipality collaborations, may benefit them. However, the effectiveness of such support/collaborations has remained unclear. We evaluated that in terms of older residents’ community social participation and mortality risks.
Methods In 2014, the half of the municipalities participating in the Japan Gerontological Evaluation Study (JAGES) received active supports from JAGES researchers for utilizing community diagnosis data and intersectoral collaborations with various organizations potentially contributing to health promotion for older adults. Participants were functionally independent community-dwelling older adults aged 65 years or more. First, we analyzed 107,292 older people in 25 municipalities participated in both 2013 and 2016 survey. Among them, 13 municipalities received active supports and community diagnosis data based on JAGES surveys (intervention) and remaining 12 municipalities obtained community diagnosis data only (control). We performed difference-in-difference (DID) analysis using multilevel Poisson regression to compare the changes in the prevalence of social participation among the older residents of the intervention and control group municipalities. Second, using the follow-up data (maximum 1267 days), we performed survival analyses applying Fine & Gray’s proportional hazard model for assessing the relative risk for death, considering competing risks of moving out. In both analyses, to control selection bias we calculated propensity of receiving active supports from demographic data and performed inverse probability of treatment weighting (IPTW) analysis. We stratified all analyses by gender and adjusted for age, education, income, living alone or not, marital status, comorbidity, depressive symptoms, Instrumental Activities of Daily Living (IADL), and considered the clusters of residential areas in 2013. Results In total, 4591 people have died for 235,534 person-year observation period. Among men, the estimated local activity participation was 46.6% (95% confidence interval [CI]: 45.5%, 47.7%) in 2013 and 57.1% (95% CI: 56.0%, 58.1%) in 2016, among residents in intervention group. In contrast, the participations were 46.4% (95% CI: 45.4%, 47.5%) in 2013 and 54.6% (95% CI: 53.0%, 55.3%) in 2016, among residents in the control municipalities (DID = 0.028, P = 0.006). Among women, there was no significant difference between the two groups (P = 0.131). The adjusted hazard ratio for death among those who lived in the supported municipality was 0.90 (95% CI: 0.84, 0.96) in men and 0.99 (95% CI: 0.90, 1.09) in women, compared to the control group. Conclusion Supporting health sector staffs in municipalities were associated with improved health risks among men. Better partnerships with various organizations, based on strategic risk and resource assessments, might lead to enrich community environment that provides more opportunities for social participation for older men. Building similar collaborating framework may be beneficial for advancing health promotion in local settings. Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.358

P7-40


Introduction/background Low immunization coverage in specific population groups, together with high viral infectivity, has aggravated the measles outbreaks happening in the past decade. Ecuador, a country in southwestern South America, introduced routine measles vaccination more than three decades ago. As a result, the last cases of autochthonous measles happened in that country around 1996. However, a new measles outbreak occurred in 2011–12. This study aimed to quantify socioeconomic inequalities associated with measles immunization coverage at the population level.

Methods An ecological study was performed using two datasets: the results of a measles immunization survey performed in Ecuador in 2011 and socioeconomic data from the 2010 census, aggregated by canton. The survey included 3,140,799 people aged 6 months to 14 years living in 220 cantons of Ecuador, in whom at least one dose of measles-containing vaccine received was inquired. Variables included were: previous measles immunization, Unsatisfied basic needs (UBNI) of urban cantons, percentage of the 15–17 year-old population in the canton attending school, percentage of the population self-identifying as indigenous or African-Ecuadorian in the canton, and employment rate. Multiple spatial regression was performed to identify socioeconomic inequalities associated with measles immunization coverage. Spatial autocorrelation was detected and conditional autoregressive analysis was performed for adjustment of variables. Principal components analysis was used to create a socioeconomic score. The slope index and relative index of inequality were calculated.

Results Measles immunization coverage ranged from 54.1% to 98.5% in the cantons of Ecuador. Measles immunization coverage was inversely associated with unsatisfied basic needs (P = 0.0007) in urban areas and proportion of indigenous and African-Ecuadorian residents in the canton (P = 0.015), and directly associated with unemployment rate in the canton (P = 0.037). The distribution of immunization coverage across the cantons was heterogeneous, indicating spatial dependence. In cantons in the lower socioeconomic stratum, the rate of
non-immunization was 71% higher than in cantons in the upper stratum, with a prevalence ratio of 1.71 (95% CI: 1.69–1.72), and an absolute difference of 6.44 percentage points. The slope index of inequality revealed a difference of 10.6 percentage points in immunization coverage between the canton estimated by linear regression as the one with the best socioeconomic level as compared to the canton with the worst socioeconomic level. In turn, the relative index of inequality showed that immunization coverage was 1.12 times higher in the canton estimated to have the best socioeconomic level compared to the canton with the worst socioeconomic level.

Discussion We observed a spatial distribution pattern for immunization coverage and socioeconomic indicators that suggest socially and economically vulnerable populations are also more susceptible to epidemic outbreaks. In cantons with lower immunization coverage, a higher proportion of UBN, lower employment rate, and higher proportion of indigenous and African-Ecuadorian residents were detected. Neighboring cantons were equally vulnerable to measles. Previous studies have shown an association between low immunization coverage and poverty indicators, lower maternal schooling, higher proportion of racial or ethnic minorities, and limited access to health services. The results of the present study must be interpreted with care. It is not possible to make inferences at the individual-level. However, these results seem consistent with those of studies having individuals as the unit of analysis.

Conclusions The spatial dependence between measles vaccination coverage and health inequalities suggests clusters of vulnerable populations for outbreaks. Health social inequalities must be considered to achieve and maintain measles elimination.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.360

P7-41
The impact of area deprivation on treatment and outcome quality of 29,284 pediatric patients with type 1 diabetes in Germany.

Results from the German DPV Registry

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Introduction Even within high-income countries, treatment and outcome quality of type 1 diabetes (T1D) differ between regions. For example, significant disparities in pediatric diabetes care were observed between the 16 federal states of Germany. Area deprivation might be one of the contributing factors explaining these regional variations. However, the influence of area deprivation on T1D outcomes has been investigated in a few countries only. So far in Germany, merely the influence of individual socioeconomic status (SES) on outcomes of patients with T1D has been investigated. Our objective was to analyze if area deprivation contributes to regional disparities in treatment and outcome quality of children and adolescents with T1D.

Methods Pediatric patients (< 20 y of age) with T1D and German residence from the years 2015/16 from the “diabetes patient follow-up” (DPV) registry were selected (n = 29,284). Area deprivation was assessed by quintiles of the “German Index of Multiple Deprivation” of 2010 (GIMD 2010) at district level, with Q1 corresponding to the lowest and Q5 to the highest deprivation quintile. Area deprivation was assigned to patients by linking patients’ residential post-codes to districts. We used regression models adjusting for sex, age, migration background and diabetes duration to investigate associations between GIMD quintiles and use of rapid-acting insulin analogues in patients on injection therapy, glycemic control measured by HbA1c, rate of severe hypoglycemia (with or without coma), and BMI SDS (BMI standard deviation score using national reference data). Additionally, regression models were adjusted for German federal states to investigate whether the effect of area deprivation is independent of the federal structure of the country. All analyses were implemented with SAS 9.4.

Results HbA1c worsened with increasing area deprivation from 7.78% in Q1 to 8.02% in Q5. BMI SDS increased steadily with deprivation from 0.28 in Q1 to 0.36 in Q5. By contrast, the rate of severe hypoglycemia decreased from 12.2 events/100 PY in Q1 to 6.9 events/100 PY in Q5. Rapid-acting insulin analogues were more frequently used with increasing deprivation from 66.8% in Q1 to 87.8% in Q5. All results were significant (P < 0.001).

Conclusion Area deprivation is associated with medical care of pediatric patients with T1D in Germany. Associations with outcome quality but not with treatment are independent of the federal states.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.361

P7-42
Role of participation in organized screening on the survival of women with breast cancer according to socioeconomic disparities: A population-based study

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Background Several observational studies have suggested the impact of socioeconomic disparities in breast cancer diagnosis. Living in a deprived area was associated to advanced tumor stage at diagnosis and poor prognosis. The participation in organized breast cancer screening (OBCS) program can help to detect cancers at an early stage and to reduce mortality. This study aimed at describing survival of women with cancer according to their participation in OBCS and socioeconomic characteristics in the department of Gironde.

Methods All cases of breast cancer in situ or invasive diagnosed over the period 2008–2010, in women aged 50 to 74 years were extracted from Gironde Cancer Registry. The participation in OBCS program was obtained from the Gironde Screening Coordination Structure (AGIDECA). Women were categorized in 4 groups according their participation in the OBCS. The socioeconomic environment was measured by an aggregated indicator of deprivation: the French European Deprivation Index (EDI). EDI was categorized in quintiles (quintile 1: women most affluent and quintile 5: women most deprived). We estimated net survival rates at 1 and 5 years using the Pohar-Perme method according to the participation in OBCS and socioeconomic deprivation. A correction of the advance bias at diagnosis (or lead time bias) was taken into account by modifying the survival time of the screened women according a method established by Duffy et al.
Results During the 2008–2010 period, 2,244 women were diagnosed with first breast cancer in Gironde department. In this population, 297 deaths were reported. Among all these women, 57% had participated in OBCS, 24% were non-screened, 14% had interval cancer (cancer diagnosed between 2 screening test) and 5% were diagnosed more than 2 years after the last screening test. Net survival was higher in the group of screen-detected women compared to non-screened women (97.3% vs. 83.8%, P < 0.0001). Non-screened women had lower net survival when they were deprived (quintile 1: 91.1% vs. quintile 5: 78.1%, P < 0.0106). Taking into account socioeconomic disparities, survival was higher for screened women than for non-screened women, but the difference was significant only in most deprived areas (quintiles 3 to 5). After correction for the bias in advance of diagnosis, the survival rates of screen-detected women were lower than without correction, but they remained higher than those of women who were not screened.

Conclusion Women with breast cancer participating in OBCS in Gironde had better net survival at five years compared to women who were non-screened. The role of OBCS on breast cancer survival seemed to be stronger for women in most deprived areas. The implementation of incentive actions in deprived areas in order to foster women to participate in OBCS could improve their survival in case of breast cancer diagnosis.

Keywords Breast cancer; Organized screening; Deprivation score; EDI; Net survival; Lead time bias

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.362

P7-43

The Sociolance: A mobile clinic requested through emergency medical dispatch center serving socially vulnerable and homeless people in the Capital City of Denmark

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Introduction Socially vulnerable and homeless peoples’ life situation is characterized by combined social, physical and mental problems resulting in complex health care needs. Yet, they are hard to reach and often do not seek or want help. Consequently, their life expectancy is found to be remarkably lower than for the general populations. In Denmark, the first mobile clinic “the Sociolance” has been operating as a pilot project in the period from December 2015 to August 2017 (with a subsequently extension of the service). The aim of the Sociolance is to assist socially vulnerable and homeless people in the capital city of Denmark, Copenhagen, with social and healthcare problems not requiring an emergency ambulance. The Sociolance is unique at an international level since it combines affiliation with the Emergency Medical Dispatch center, from where it is requested, with performing social outreach work. The Sociolance renders help on the spot and transports users to relevant offers. The aim of this study is two-fold:
– to describe the trips of the Sociolance;
– to characterize the people using the services of the Sociolance, including describing to what extent the users of the Sociolance accept referrals to social and healthcare services offered by the staff of the Sociolance.

Methods Data used for this study were collected in the study period between December 2015 and June 2017 from several sources:
– electronically registered data from the emergency medical service database;
– record sheets completed by the social workers in contact with the users of the Sociolance;
– case reports fulfilled by the staff (social worker and paramedic) daily at the end of each shift.

We performed descriptive analyses using frequency distribution indicating the number of observations and percentages, and the mean and interquartile range.

Results In total, 2072 transportations were registered in the study period. Of all transportations, 83% were related to requested transportations through the Emergency Medical Dispatch center. A requested transportation took in average 62 minutes (38–80 minutes) including 27 minutes spent with the user at the destination and 15 minutes spent with the user at the hospital. A total of 917 users (77% male) were registered in the study period with over half (58%) of the contacts registered in the street environment. Every third user in contact with the service was affected by alcohol or influenced by drug and around one out of four (26%) were mentally affected. One third were registered as homeless and nearly one out of five (18.6%) users was registered with another ethnicity than Danish. Approximately 40% of the users were connected to the social service system. Nine out of ten users were offered social - and/or healthcare services in contact with the Sociolance and three out of four accepted the offer they received. The users were referred to health care services related to substance abuse (40%), mental illness (20%) and somatic disease (13%), respectively. Nearly one out of four users were offered services related to combined healthcare (substance abuse and/or mental disease and/or somatic illness). Of social care, one out of five users were transported to housing services/shelters.

Conclusions The majority of the Sociolance transportations were made by request through the Emergency Medical Dispatch center unleashing resources for the use of emergency ambulances. The population in contact with the Sociolance had often severe combined health and social problems. It was found that, the acceptance of the services offered by the Sociolance was quite high demonstrating it to be an important approach in the effort to target “hard to reach” populations.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.363

P7-46

Targeted vaccination campaigns of teenagers after two clusters of serogroup B invasive meningococcal disease in Brittany, Northwest France, January to October 2017

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Introduction In December 2016, three cases of invasive meningococcal disease (IMD) serogroup B, including two children from the same middle school (11 to 15-years-old pupils), occurred in the district Côtes-d’Armor (Brittany, France). They were all infected by the same strain (B: P1.7-2, 4,5FS-9,c,c162), covered by the vaccine Bexsero®. An expert committee decided to implement a vaccination campaign in the school according to national guidelines. Four months later, in April 2017, two additional cases due to the same strain occurred in a high school (16- to 19-years-old students) of the same area. A hyperendemic situation was reached (at least 4 cases and an attack rate > 3 per 100,000 within 52 weeks). Vaccination was then proposed to students of the high school and to everyone aged between 11 and 19 years living or studying in the area. Since the vaccine was licensed in France (2013), this was only the third such vaccination campaign with Bexsero®.

Methods The targeted population of 11–19-years-old living or studying in the area included 8511 people: 579 in the middle school, 2007 in the high school and 5925 in community. Vaccination sessions were organized directly in the two schools (January and March 2017 in the middle school, May and June 2017 in the high school). A real time monitoring of the number of vaccinations was implemented in both schools. In the community, vaccines were made available in pharmacies and teenagers were vaccinated by general practitioners. Vaccination coverage was estimated from wholesale distributors’ data. A pharmacovigilance follow-up was set up to document adverse effects of the vaccine.

Results The vaccination coverage was 84% for 1 dose and 79% for 2 doses in the middle school and 56% for 1 dose and 42% for 2 doses in the high school. In the community, the vaccination coverage was estimated at 36% for 1 dose.
and 27% for 2 doses. Considering all 11–19-years-old living or studying in the hyperendemic area, the vaccination coverage was estimated at 44% for 1 dose (3775 doses) and 36% for 2 doses (3082 doses). No severe adverse effect was reported. The vaccination campaigns finished in October 2017.

Conclusions This experience, involving different public health actors, constitutes a reproducible approach for future targeted vaccination campaigns. The vaccination coverage was higher when vaccination sessions were organized within schools and lower in the community. The safety profile of Bexsero® is consistent with available data. No additional cases of the same strain occurred since the end of the campaigns in the area.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.366

P7-47
Living arrangements after family split-up, well-being and health of adolescents in French-speaking Belgium
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Introduction After a parental separation, different types of living arrangements exist for children and adolescents; joint physical custody (when children spend equal time with both parents), mostly with one parent and sole custody. Current findings on the effects of living arrangements on adolescents are not consistent. For some authors, joint physical custody is the most favourable living arrangement to health and well-being while for others, it is less favourable than other living arrangements. Finally, some authors argued there is no difference. In Belgium, about one fifth of the children below the age of eighteen experienced a parental separation. In 2006, joint physical custody was introduced in Belgian law as the default residential model. The objective of this study was to identify the most favourable living arrangement to adolescent health and well-being in French-speaking Belgium.

Methods The Health Behaviour in School-aged Children (HBSC) study is a repeated cross-sectional survey, in which every four years, adolescents are questioned about their health, well-being and health behaviours along with their living conditions, among which family environment. This study is based on data from two waves of HBSC survey in French-speaking Belgium (2010 and 2014). In total, 18,683 10–18-year-old adolescents were included. Self-rated health, multiple health complaints and life satisfaction were used as outcomes variables. Living arrangements was used as the main independent variable and categorised into “joint physical custody”, “mostly with one parent” and “sole custody”. All analyses were weighted according to the sample size of each survey year. Logistic regressions were used. Firstly, analyses were adjusted for survey year (model 1). Thereafter, analyses were adjusted for age, gender, survey year and family wealth perception (model 2). The family wealth perception is based on the question “How well off do you think your family is?”.

Results Over the two surveys, 18.3% of the adolescents were living with separated parents. Among them, 34.2% were living in joint physical custody, 41.8% were living mostly with one parent and 24.0% in sole custody. Globally, adolescents living with separated parents were more likely to report a poor self-rated health (OR = 1.30; 1.08–1.56), multiple health complaints (OR = 1.47; 1.36–1.60) and a poor life satisfaction (OR = 1.76; 1.58–1.96) than those living with both parents. In model 1, adolescents living mostly with one parent (OR = 2.06; 1.39–3.06) or in sole custody (OR = 2.46; 1.61–3.74) were more likely to report a poor self-rated health than those living in joint physical custody. This association was still significant after adjustment for sociodemographic characteristics in model 2. Adolescents living in sole custody were more likely to report multiple health complaints (OR = 1.42; 1.18–1.70) and a poor life satisfaction (OR = 1.48; 1.19–1.85) compared with those in joint physical custody. No differences were observed between adolescents living in joint physical custody and those living mostly with one parent. After adjustment for age, gender and wealth perception, both associations became non-statistically significant.

Conclusion In terms of health and well-being, few differences were observed between post-separation living arrangements. Only the self-rated health significantly differed between living arrangements, in favour of adolescents living in joint physical custody. Health and well-being differences between living arrangements in the non-adjusted model can be partially explained by socioeconomic disparities. Living arrangements per se have few impacts on adolescent health and well-being. Further researches are needed to investigate the role of other living conditions (e.g. socioeconomic characteristic, parenting style) on the association between living arrangements and adolescent health and well-being.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.367

P7-48
Incidence and risk factors of hypertension among population in a rural community, Thailand, 2008–2018
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Background In Thailand, the prevalence of hypertension was increased for 19.7% from 1991 to 2009. Moreover, the 4-year prospective study from Thai population between 2005–2009 presented that incidence hypertension was 3.5% and there are only few studies that investigate the risk factors of hypertension, especially in Thai rural area. Thus, the studying of potential risk factors of hypertension for further development on primary prevention for hypertension in Thai rural community still be needed.

Objectives To study the incidence and risk factors of hypertension in Tha-Kradan, Sanamchaikhet District, Chachoengsao, Thailand.

Methods Normotensive participants, who were 20-years-old and above, were collected the health information and associated factors of hypertension by the survey in 2008–2009 at Tha-kradan, Thailand. After 10 years follow-up, 756 hypertension-free individuals were reassessed again for blood pressure measurement. Hypertension in this study was defined as blood pressure ≥ 140/90 mmHg and/or using antihypertensive drug therapy. Incidence density and risk factors were analyzed by using univariate and multivariate Poisson regression.

Results The overall incidence rate was 43.8 per 1000 person-years [at 95% confidence interval (95% CI): 37.3–51.3]. The older subjects (≥ 60-years-old), the participants with high triglyceride levels and being overweight-obesity are responsible for a 1.57-fold increased risk of hypertension. (After using multivariate analysis by Poisson regression to adjust for gender, age, BMI, FPG, diabetes mellitus, cardiovascular disease and triglyceride level).

Conclusion In this Thai rural area, the incidence rate of hypertension was also high, comparing with incidence from the previous study in Thai urban area and in others developing country. With new cases occur predominantly among older subjects, the high triglyceride levels and those with overweight-obesity.

Keywords Adults; Incidence; Hypertension; Rural; Thailand

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.368
P7.50
Effect of delay at 12 months of age on developmental status at 48 months of age determined using the ages and stages questionnaire: The Japan environment and children’s study
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Introduction Few population-based studies have previously indicated the trajectory of developmental evaluation using an objective evaluation tool, Ages and Stages Questionnaire (ASQ). The ASQ is a screening tool originally designed to assess children’s developmental performance and is the most commonly used parent-completed developmental screener worldwide. The Japan Environment and Children’s Study (JECS) is an ongoing, nationwide birth cohort study that initiated in 2011 to investigate environmental factors affecting children’s health and development. In this population-based questionnaire study, the 30-item ASQ completed at ages of 12 and 48 months were included. JECS has been conducted in 15 regional centers located throughout Japan. Using a temporary data of a regional centre of the JECS in Yamanashi, this study aimed to examine whether the evaluation at the age of 12 months predicts developmental delay at the age of 48 months.

Methods In this study, 1704 participants completed the ASQ at 12 and 48 months. The ASQ consists of five domains: communication (CO), gross motor (GM), fine motor (FM), problem solving (PS) and personal social (PES). Cut-off values of less than two standard deviations (SDs) and 1 SD below the mean for the ASQ in each domain were used to define ‘fail’ and, ‘need to follow-up (follow-up)’, respectively, as recommended in a previous study in the United States. Multiple logistic regression analyses were conducted to examine whether the ‘fail’ and ‘follow-up’ at 12 months predicts ‘fail’ at 48 months in each domain.

Results At 12 months, ‘fail’ and ‘follow-up’ rates in each domain were 8% and 27% (CO), 17% and 21% (GM), 12% and 17% (FM), 19% and 20% (PS), and 18% and 19% (PES), respectively. At 48 months, the ‘fail’ rates were 3.4% (CO), 4.1% (GM), 1.1% (FM), 3.0% (PS) and 1.7% (PES), respectively. ‘Fail’ at 12 months in every domain were significantly predictive of ‘fail’ at 48 months (CO, odds ratio (OR): 5.7, 95% confidence interval (CI): 3.6–9.2; GM, OR: 5.4, 95% CI: 3.1–9.4; FM, OR: 9.6, 95% CI: 3.1–29.5; PS, OR: 10.6, 95% CI: 5.1–22; PES, OR: 6.4, 95% CI: 3.0–14.1). In contrast, ‘follow-up’ in the PES domain was not associated with ‘fail’ at 48 months (OR: 0.33, 95% CI: 0.04–2.6). The other domains of ‘follow-up’ at 12 months were significantly associated, although the OR were smaller than ‘fail’ at 12 months (CO, OR: 2.9, 95% CI: 1.6–5.2; GM, OR: 2.1, 95% CI: 1.1–4.0; FM, OR: 4.3, 95% CI: 1.2–15.1; PS, OR: 3.2, 95% CI: 1.3–7.7).

Conclusion There were some differences in screening rates between in Japan and the US. The magnitude of predictability of a later developmental delay is specific depending on the domain.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.370

P7.51
The impact of the Danish smoking ban from 2007 on smoking-related morbidity. A register-based natural experiment
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Introduction The number of countries introducing national tobacco control policies has increased. In terms of both countries and population covered, smoking bans in public settings that protect nonsmokers from second hand tobacco smoke, create supportive environments that encourage smoking cessation, and prevent smoking initiation, represents the one tobacco control policy with the greatest progress since 2007. Extensive research has documented the impact of smoke-free policies on preventing adverse health outcomes, especially cardiovascular diseases, reducing exposure to second hand tobacco smoke and decreasing smoking-related mortality. In 2007, Denmark introduced a national smoking ban, prohibiting all indoor smoking in workplaces and public places. However, little is known about the impact of this smoking ban over time on smoking-related morbidity in the Danish population. This study investigates the effect of the Danish smoking ban on hospital admissions for acute myocardial infarction (AMI), chronic obstructive pulmonary disorder (COPD) and cancer in oral cavity and pharynx. We hypothesized that admission rates decreased after the introduction of the Danish smoking ban in 2007 compared to pre-legislation.

Methods This study was designed as a natural experiment in which the whole Danish population form the study population (> 30 years). Interrupted time series analysis was performed to quantify changes in hospital admission rates for AMI, COPD and cancer in oral cavity and pharynx, pre- and post the introduction of the national smoking ban. Monthly age-standardised admission rates per 100,000 inhabitants were estimated for each diagnosis and two subperiods defined: pre-legislation (January 2000 to August 2007) and post-legislation (September 2007 to December 2015). As an immediate change in admission rates after the introduction of the smoking ban was not expected, increases or decreases in the slope of the trend after the introduction of the ban were compared with pre-legislative trends. Diagnostic information was obtained from the Danish National Patient Register and information on demographics was obtained from the Danish Civil Registration System. The exposure was defined as the introduction of the smoking ban in August 2007 and the outcome as hospital admissions during the study period 2000–2015 due to a primary diagnosis of AMI (I21), COPD (J44) and cancer in oral cavity and pharynx (C06-C06.9, C14).

Results We found no significant changes in trends for hospital admissions for any of the included smoking-related diseases after the introduction of the smoking ban compared to post-legislation trends. To exemplify, a steady decrease in hospital admissions for AMI was observed during the study period suggesting that the decrease in AMI admissions at the time the smoking ban was introduced represented a continuation of a pre-existing trend.

Conclusion The findings may be explained by the fact that the smoking ban included several exceptions resulting in a less comprehensive ban compared to other countries.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.371
**P7-52**

**Length of inter-pregnancy interval and subsequent preconception adiposity: Findings from a population-based cohort in the South of England**

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**Introduction** Maternal obesity is a key predictor of adverse short- and long-term health outcomes for both mother and child. The aim was to investigate the association between duration of the inter-pregnancy interval between successive pregnancies and change in maternal body mass index (BMI) during that period to assess the optimal interval associated with the least likelihood of starting the next pregnancy with a higher weight.

**Methods** A regional population-based cohort of prospectively collected routine healthcare data for antenatal care between January 2003 and September 2017 at University Hospital Southampton was utilised. Records of women with two or more consecutive singleton pregnancies (up to five) were analysed. Information on previous births was used to categorise pregnancies as first to second, second to third, third to fourth and fourth to fifth. Inter-pregnancy interval was defined as timing between a live birth and the next conception calculated by subtracting gestational age according to dating ultrasound scan of the latter birth from the interval between births. BMI was treated as a continuous and categorical variable, which was defined as underweight (BMI < 18.5 kg/m2), normal weight (18.5 to 24.9 kg/m2), overweight (25.0 to 29.9 kg/m2) and obese (≥ 30 kg/m2). Regression analyses were used to examine the association between change in maternal BMI measured at the first antenatal (booking) appointment and inter-pregnancy interval (adjusted for timing of booking appointments, age, ethnicity, highest educational qualification, employment status at booking appointment, baseline BMI, smoking status and whether undergone infertility treatment). Clustering of pregnancies within each woman was also adjusted for.

**Findings** In total, 20,571 women of which 12,636 had first two, 2654 had first three, 530 had first four and 120 had first five pregnancies were included. Two-thirds of women had gained weight when first presenting to antenatal care. A significant positive linear association between increasing maternal BMI per year of inter-pregnancy interval and inter-pregnancy interval with the coefficient remaining similar across pregnancies (adjusted 4–6% moving into a lower BMI category. A significant positive linear association (P<0.001, OR = 4.6 [2.5–8.1]).)

**Conclusion** Birth spacing of 12–23 months appears most protective against starting the next pregnancy with a higher body weight, even when adjusting for maternal age. In high-income country settings, getting pregnant within 1–2 years of the previous birth and advising those anticipating longer intervals to limit weight gain could be simple preconception preventive measures in tackling maternal obesity and hence achieving better subsequent maternal and offspring health outcomes.

**Disclosure of interest** The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.372

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**P7-53**

**Determinants of contraceptive practice among married women, in the health district of Dahra, Senegal**

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**Introduction** In Senegal, the contraceptive prevalence rate among married women was estimated in 2015 at 22% at the national level. It was particularly weak in the health district of Dahra where it was 14%. The health district has, since, benefited from the support of the United Nations Population Fund (UNFPA) and the Mother and Child Health Support Project (“Projet d’Appui à la Santé de la Mère et de l’Enfant (PASME)”. PASME is funded by the French Development Agency “Agence française de développement (AFD)”.

**Methodology** The cross-sectional, descriptive and analytical study was conducted from 8 to 22 June 2016 in the health district of Dahra whose area is 7,980 square kilometers for 161,446 inhabitants (22 inhabitants per square kilometer). It was centered on women of childbearing age (15–49 years), married and residing in the health district for at least, 6 months. These women were selected according to a two-stage cluster survey (village/neighborhood then concession).

**Results** The sample, calculated with the Schwartz formula and taking into account the cluster effect, was n=[1,962 × p × q/I2 × z = 162 × z = 370]. It was adjusted to 450 in order to have 30 clusters of 15 women to investigate at the household-level. The dependent variable was contraceptive practice. The independent variables were related to socioeconomic characteristics, knowledge and attitudes about family planning. Data were collected in households using a questionnaire in individual interviews. They were, then, entered and analyzed using the Epi-Info software version 3.5.3.

**Conclusion** The number of respondents was 433 (96%). The age, variable from 15 to 49 years, had an average of 29 (± 7.8). The majority of women were from rural area (69.3%) and in monogamous marital regime (62.3%). Among them, 89% knew family planning; and 52.7% had a husband who approves family planning. The contraceptive prevalence was estimated at 28.4% and the injectable methods were the most used (44.7%). The proportion of women with unmet need for family planning was 20.3%. Contraceptive practice was greater among those who: resided in urban area (P = 0.009, OR = 1.78 [1.14–2.76]), had an income-generating activity (P = 0.035, OR = 1.58 [1.03–2.43]), and/or had a husband who approves family planning (P < 0.001, OR = 4.6 [2.5–8.1]).

**Conclusion** At the health district of Dahra, the contraceptive prevalence rate has been raised but remains low. Its improvement requires a real global and inclusive dynamics for all actors. This calls for a multi-sectorial and interdisciplinary approach, aimed at empowering women and involving husbands, especially in rural areas.

**Keywords** Family planning; Contraception; Prevalence; Determinants; Dahra/Senegal

**Disclosure of interest** The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.373
Knowledge, attitudes and practices related to malaria: The case of community health workers in Leona, Sakal district, Senegal

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Introduction Community management of malaria reduces the problem of access to care for remote and/or landlocked populations. In the Leona area, since 2010, the Millennium Villages Project has put in place a community-based mechanism integrating mobile technology for overall household coverage. The objective of the study was to identify gaps in knowledge, attitudes and practices about malaria among community health workers (CHWs).

Method This was a descriptive and analytical cross-sectional study conducted from March 21 to April 15, 2016. It involved a comprehensive sampling of 51 CHWs, and 2,023 cases of fever registered in the records from January 1 to December 31, 2015. The data was collected using three media: an observation grid, a questionnaire and a observation grid. The questionnaire served as a basis for individual interviews focusing on the level of knowledge of signs, diagnostic means, and simple malaria treatment modalities. The observation grid made it possible to assess the availability of the material and the equipment of the agent, as well as the mastery of the rapid screening test, the management of malaria (follow-up of the flow chart, therapeutic management) and register filling. The reference parameters were the guidelines of the National Malaria Control Program (NMCP). The data was entered and analyzed with the Epi-info 3.5.3 software.

Results The 51 CHWs included two categories: home care providers were 12 (23.5%) and community relays 39 (76.5%). The sex ratio was 0.2. The age ranged from 17 to 47, with an average of 29.4 (±8.3) years. Of the CHWs, 13.7% had a good level of knowledge about malaria; and 80.4% mastered the rapid screening test (RST) technique. A total of 2023 patients had been identified with 89 (4.4%) cases of fever, of which 80 (89.8%) had RST. Out of 80 RSTs, the number of errors was 3 (3.75%). All confirmed cases were treated according to the NMCP guidelines. The filling of the registers was exhaustive for 93.8% of the CHWs. The level of knowledge of CHWs was statistically higher among those aged 25 and over (P = 0.029), and home care providers (P = 0.005). The correct filling of the registers was more common among the educated (P = 0.0005), trained (P = 0.001), supervised (0.0001), and the Relay category (P = 0.0002).

Conclusion The CHWs can respect the directives of the NMCP. For this, they must be supported by regular retraining and supervision. This would allow better preventive and curative coverage of malaria for remote and isolated populations.

Keywords Malaria; Community health workers (CHWs); Knowledge; Attitudes and practices (KPC); Sakal/Senegal

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.374

Use of administrative data to analyse comorbidities in hospitalized patients for ischemic stroke in Wallonia

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Introduction Ischemic stroke is a major cause of morbidity and mortality in European countries. The risk factors for stroke are either modifiable as high blood pressure, high cholesterol, diabetes, overweight or obesity, smoking or sedentary lifestyle or non-modifiable as age, sex, ethnicity and genetic factors. The importance of each risk factor may vary by age and sex. Knowledge of these variations may be important in terms of management of the acute event but also for prevention policies. The aim of this study is to analyse the comorbidities of acute ischemic strokes using routine administrative data.

Methods The present study was conducted in Wallonia from 1 January 2013 to 31 December 2014. Wallonia is the southern region of Belgium, with 3,563,060 inhabitants in 2013. The analyses presented below relates to patients aged 25 and over. The hospital admissions for stroke (ICD-9 code 433 to 435) were taken from the ‘Résumé Hospitalier Minimum’ (RHM). The RHM is a mandatory register kept by Belgian hospitals containing patient data (e.g.: year of birth, gender, place of residence), stay data (e.g.: admission date) and admission data (e.g.: principal and secondary diagnosis). Secondary diagnoses were considered as risk factors. Factorial correspondence analysis with graphical output was used to highlight risk factors across age and sex. This method is useful in analysing multivariate data to discover associations when a contingency table is not adequate. Correspondence analysis decomposes the chi-squared statistic associated with contingency table into orthogonal factors.

Results A total of 14,868 hospitalisations for stroke were analysed. The median age at admission is 72 for men and 79 for women. Men represented 48% of stroke hospitalisations. A significant number of stroke patients presented with comorbidity in the form of a history of hypertension (55%), hypercholesterolemia (46.5%), cardiac arrhythmias (32.9%), cardiac ischemic diseases (26.9%), diabetes (24.0%), smoking (20.6%) and overweight (16.9%). Factorial correspondence analysis shows a large variation in age-related comorbidities profiles. Overweight is more pronounced between 55–64-years-old. Hypertension, hypercholesterolemia and diabetes are very close to the 65–84 age group. Heart problems (cardiac ischemic diseases and cardiac arrhythmias) are more prevalent for patients 85 and over. Finally, smoking and excessive alcohol consumptions are mostly present in the younger age groups. The comorbidity profile is not influenced by gender.

Conclusions The medico-administrative data of the RHM allowed to highlight profiles of comorbidities of acute ischemic stroke according to age and sex. The results obtained are consistent with risk factors for stroke described in the scientific literature. However, the present study is the first to explore profiles of comorbidities in Wallonia, a region in the south of Belgium. Factorial correspondence analysis is often used in the social sciences but rarely in the field of health. Our study is the first to use this statistical method to highlight patterns of comorbidities by age and sex of patients with acute stroke. This study suggests the possibility of using administrative data for epidemiological purposes, which could avoid planning costly data collection.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.375
P7-56
Changing BMI scores among Canadian children, youth and young adults: An assessment of age, period and cohort effects

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Introduction
Overweight and obesity is a critical public health issue worldwide and is associated with the prevalence of comorbidities such as type 2 diabetes, cancer, and cardiovascular diseases. Hierarchical age-period-cohort (HAPC) analysis is a promising methodology that has been used to examine the independent effects of age, time period, and birth cohort for the prevalence of various health outcomes. The objective of this study is to examine age, period, and cohort effects on BMI among the Canadian population, using repeated cross-sectional survey data from the Canadian Community Health Survey (CCHS; 2001 to 2014).

Methods
Body mass index (BMI) was used to assess weight status and was calculated using self-reported height and weight values [BMI = weight (kg)/height (m²)]. Means for BMI scores were derived to describe the time trends in weight status by age, time period, and birth cohort. Cross-classified random effects two level models were used to estimate fixed effects for age and its quadratic term at level one, and also to estimate random effects for time periods and birth cohorts at level two while controlling for the effects of sex, model of interview, and response by proxy. Sampling weights were normalized to reflect the actual numbers of respondents participating in each cycle of the CCHS.

Results
The mean value for BMI, across all age groups, time periods, and birth cohorts was 24.27. The time trends in BMI appear to be very linear; at each time period, BMI increases for each successive cohort. Results of the HAPC analyses suggest that the increase in BMI in the Canadian population between 2000 and 2014 can be accounted for by age-related and secular (period) trends, as well as by cohort effects.

Conclusions
Overall, the results support the hypothesis that age and period effects are primarily responsible for the current obesity epidemic. It would be valuable for future research to explore changing patterns in more proximal determinants of health (e.g., health behaviours such as diet and physical activity), socioeconomic disadvantage, geographic variability, and the influence of public health initiatives, as this would provide greater understanding of the trends in overweight and obesity.

Disclosure of interest
The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.376

P7-57
Impact of intimate partner violence on ever-married women and utilization of antenatal care services in Tanzania

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Background and objectives
The Sub-Saharan Africa region is considered as one of the deprived regions of the world and women from this part of the world suffered most from intimate partner violence (IPV). This study was undertaken to assess the impact of intimate partner violence on utilization of antenatal care (ANC) services among the ever-married women of Tanzania.

Materials and methods
This was a descriptive cross-sectional study and the data used in this research was extracted from the Tanzania Demographic Health Survey 2015–16. A total of 13,266 women were interviewed.

Results
The mean age of the respondents was 28.69 years. About 74% women visited ANC services more than 4 times. The IPV in the present study among pregnant women who sought ANC was 31.3%. The socioeconomic characteristics of the respondents and respondents’ husbands were found to be significantly associated with IPV. Logistic regression results indicated that the middle-aged adult women (35–49 years age group) were identified having lower odds of IPV (odds ratio: 0.807, 95% CI: 0.693–0.940, P < 0.001) than women in younger age group. Women who did not complete their secondary education were less likely to experience IPV (odds ratio: 0.705, 95% CI: 0.540–0.922, P < 0.010).

Conclusion
IPV is one of the main challenges to women’s health and well-being during pregnancy period. Proper design and implementation of community-based interventions to support pregnant women to seek ANC services and to raise awareness regarding IPV are advocated.

Disclosure of interest
R. Kabir link with: maternal health, link with: domestic violence.

https://doi.org/10.1016/j.respe.2018.05.377

P7-62
Assessment of perceptions and attitudes linked to water pipe and cigarette smoking in Lebanon

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Introduction
Tobacco use is currently responsible for the death of about six million people across the world each year. Cigarette smoking accounts for the majority of tobacco attributed morbidity and mortality, and water pipe (WP) is gaining in popularity especially among the young population. The emerging trend of WP use can be attributed to many factors and research suggests that it is associated with health and dependence problems. Descriptive studies show some misconceptions and wrong beliefs among its users. The objective of this study is to assess some perceptions and attitudes linked to water pipe and cigarette smoking and to describe some contexts and patterns of WP use among Lebanese adults.

Method
This is a cross-sectional study conducted in Mount-Lebanon and Beirut Directorates through face-to-face interview on a random sample of adult population aged from 18 to 83 years. Data was collected using a piloted questionnaire containing sociodemographic information and dependence scales (Lebanese Cigarette Dependence LCD scale and the Lebanese Waterpipe Dependence Scale LWDS). Statistical analysis was performed using SPSS software version 23. Results were considered significant at P < 0.05. WP use contexts and patterns were described. WP harm perception and smoking social acceptability indexes were calculated and WP harm perception and smoking social acceptability were assessed among the different population subgroups (non-smokers, cigarette smokers and WP smokers). A regression analysis was done for each of the indexes to explain the factors affecting each point of view.

Results
The prevalence of cigarette smoking was 36.9% and that of WP was 22.6%, while 6.1% reported smoking both. LCD scale showed 69.4% of cigarette smokers at high dependence level while 65.8% were highly dependent on WP according to LWDS. The studied contexts and patterns of WP use were evaluated according to the level of dependence and showed that WP smoking is a socializing method since smoking WP with friends and at the café showed higher rates among low and high dependence subgroups. Concerning harm perception, 84.9% of the population reported no decrease in harm when switching from cigarette to WP. But when comparing the two methods of smoking, 52.1% of the total sample believes that smoking WP is less harmful than cigarettes while 62.9% of highly dependent cigarette smokers have a different point of view. Concerning smoking acceptability, 56.1% of the population agreed on banning smoking. While upon comparison between subgroups, the majority of cigarette and WP smokers disagreed. Regardless of the smoking status (non-smoker, cigarette or WP smoker) or the dependence level, people believe that WP is a safer method of smoking and that it is helpful to facilitate socializing. The majority agreed on banning smoking for minors but smoking in cafes is still considered “sacred.”
P7-63 Hospital staff’s opinion on a smoke-free policy: A survey at the Léon-Bérard Cancer Center of Lyon, France

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Introduction The Centre Léon-Bérard cancer center plans to become a “smoke-free hospital”, a place where it is strictly forbidden to smoke for anybody (patients, visitors, and staff) anywhere, even on the hospital grounds. This tobacco-free policy is in agreement with the 2016 INCa recommendations, which place smoking cessation as a part of cancer treatment. To assess smoking prevalence and collect patients’ and staff’s opinion about the new policy, surveys were conducted. The results of the staff survey are presented here.

Methods An anonymous questionnaire was distributed to the 1685 employees of the Centre Léon-Bérard, and 611 (37%) answers were collected between June and September 2017, of which 312 from nursing staff, 155 from non-nursing staff and 137 from employees of the research department. Answers that were originally defined in an ordinal scale were transformed into quantitative scores from 1 = “disagree totally” to 4 = “agree totally”. Multiple linear regression models were used to analyze those answers, including respondents’ smoking status, department status (nursing, non-nursing or research), age and gender.

Results Overall, 9.7% (n = 58) of the respondents smoked on a daily basis, 6.7% (n = 40) smoked occasionally, 15.7% (n = 94) were former smokers and 68% (n = 407) were nonsmokers. On average, daily and occasional smokers were younger than former and nonsmokers (respectively 34, 35, 38 and 42-years-old, P < 0.0001). Smoking prevalence was comparable between men and women (8.9% vs. 9.9%, P = 0.73), but was smaller for research staff (3.7%) than for nursing and non-nursing staff (respectively 12.2% and 10.3%). About the new tobacco-free policy, employees were broadly in favor of the nonsmoking on hospital grounds new rule, as 80% agreed totally, 12% were quite in agreement, 6% did not quite agree and only 2% disagreed totally, which could be translated into an overall mean score equal to 3.71 on a scale between 1 and 4. Nonetheless, we found disparities based on department and smoking status; smoking caregivers represented the most reluctant staff category towards that restriction (mean score = 2.81). When asked if they saw themselves as a role model to patients, the staff’s answers differed between departments (mean scores = 3.12, 2.72, 2.65 respectively for caregivers, non-nursing and research staff, P < 0.0001) and smoking status (mean scores = 3.01, 2.95, 2.92, 2.16 respectively for non-smokers, former, occasional and daily smokers, P < 0.001). Nonetheless, and regardless of their smoking status, caregivers were the only ones who considered having a role to play in convincing smoking patients to quit. Finally, 44% of respondents reported tensions between hospital smokers and nonsmokers, and surprisingly smoking status didn’t seem to impact this perception (P = 0.8).

Conclusion Overall, employees of the Centre Léon-Bérard cancer center seemed to be in favor of a smoke-free hospital. Nonetheless, this survey highlights differences of opinion between caregivers, non-nursing and research staff, especially on the role that should play the employees on the enforcement of that new policy. This study will be helpful for the organization of targeted preventive actions relying on the specific issues enlightened here.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.382

P7-64 Why are people increasingly attending the emergency department?

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Objective It is often asserted that the overcrowding phenomenon in emergency departments (ED) can be explained by an increase in visits considered as non-urgent. The aim of our study was to quantify the increase in ED visit rates and to determine the severity of the visits implicated in this increase.

Methods This population-based observational study covers all ED visits between 2002 and 2015 by adult inhabitant of the Midi-Pyrénées region, in France. Their characteristics were collected from the emergency visit summaries. We modelled the visit rates per year using linear regression models, and an increase was considered significant when the 95% confidence intervals did not include a zero. The severity of causes for visits to the ED was explored through the Clinical Classification of Emergency (CCE) as well as the diagnosis and outcome of the visits.

Results The 37 EDs managed more than 7 million visits between 2002 and 2015. This study therefore dealt with 14 annual visit rates and confirmed an increase in ED visits of 4.8% (95% CI=[4.33; 5.32]) more visits for 1000 inhabitants each year. This increase was mainly explained by an increase of intermediate severity visit-types, i.e. non-admitted patients but requiring diagnostic or therapeutic procedures (CCE level 2). This increase affected all age groups and all sexes, with a steeper slope for young women and people over 75 years of age.

Discussion It appears that the increase in ED use is not based on an increase in non-severe visit-types (CCE-1), but the question remains as to whether the visits implicated (CCE-2 and non-hospitalised) required management by EDs.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.384

P7-66 Effectiveness of an intervention program to reduce hypertension prevalence among employees, Sousse, Tunisia, 2009–2014

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Background Lifestyle or behavioral factors play a major role in hypertension epidemic. Many of the behaviours likely to reduce blood pressure also have independent beneficial effects on overall health outcomes. We aimed to assess the effectiveness of a 3-year community-based intervention targeting healthy lifestyle promotion in reducing hypertension prevalence among employees.

Methods We carried out a quasi-experimental study (pre- and post-assessment with intervention and control groups) between 2009 and 2014 in two regions of the governorate of Sousse. We selected three factories from each region. Data were collected at worksites by a questionnaire; via interview in both intervention and control groups at pre-assessment and post-assessment. Blood pressure was measured twice at rest. The intervention program lasted 3 years and consisted on a healthy lifestyle promotion.

Results The intervention group was composed of 914 and 1098 employees, and the control group was composed of 861 and 1015 employees, respectively, at
Hysterectomy is the most common gynecological surgery in many industrialized countries. In Germany, the hysterectomy rate is high in comparison to other European countries. The aim of this analysis was to determine the distribution of age at hysterectomy as well as the age-specific probability of undergoing a hysterectomy between the ages of 0–64 in the German female population.

Methods
Analyses were based on data from the MARZY study, a prospective, randomized, population-based cohort study investigating early detection of cervical cancer in western Germany. At baseline, 6429 women were invited to attend cervical cancer screening. The distribution of age at hysterectomy as well as indications for hysterectomy was reported. Based on survival analysis, which accounts for censoring at the age of interview, and the inverse probability weighting (IPW) method, the age-specific probability of undergoing a hysterectomy was estimated. The IPW method corrected for missing date of hysterectomy. Simulated calendar-period specific survival curves (1939–1979, 1980–1989, 1990–1999, 2000–2006) were computed to show how age and calendar year determine the probability of undergoing a hysterectomy.

Results
Data on hysterectomy were available for 4719 women. Of these, 961 women (20.4%) had undergone a hysterectomy. The main indication for hysterectomy was uterine fibroids (48%). A total of 850 women (88.4%) reported a date when their hysterectomy had been performed. The highest proportion of women was hysterectomized between the ages of 40–44 (24.6%). The IPW corrected probability of having a hysterectomy between the ages of 0–64 was 0.354. The age-specific probability of hysterectomy was highest in the 45–49-year age group (0.078). The age-specific probability of hysterectomy decreased between the years 1939 to 2006.

Conclusion
Data from the MARZY study allowed valuable conclusions to be drawn about the distribution of age at hysterectomy as well as the age-specific probability of undergoing a hysterectomy in Germany.

Disclosure of interest
The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.387
P7-69
Geographical and social inequalities in survival after incident acute myocardial infarction in Denmark: A spatial epidemiological cohort study based on nationwide register data
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Introduction Survival after acute myocardial infarction (AMI) is associated with receiving adequate and often time-dependent treatment as well as sociodemographic characteristics of the patient. Access to adequate AMI treatment might depend on where you live as distance to the nearest hospital differs substantially across the country. Moreover, where you live is to some degree influenced by your socioeconomic position and economical resources. The interplay between the geographical and social inequalities in survival after an AMI is not clearly understood and it remains unclear whether geographical patterns in survival can be explained by sociodemographic factors. This study aimed to examine whether the geographical patterns in survival after incident AMI can be explained by individual- and neighborhood-level sociodemographic characteristics.

Methods The study population consisted of patients (≥ 30 years) with an incident AMI between 1 January 2005 and 31 December 2014 registered in the National Patient Register or the Danish Register of Causes of Death. The population was followed for a maximum of 365 days or until emigration, study end or death, whichever came first. The year 2005 was used as run-in period to ensure adequate results estimates across calendar years. Hence, the study period was 1 January 2006 to 31 December 2014. Poisson regression of incidence rates was performed in R by use of the Bayesian Integrated Nested Laplace Approximations (INLA) method. The analysis included the individual-level variables age, sex, ethnicity, calendar year, cohabitation status, disposable household income, and educational level and the neighborhood-level variables population density, socioeconomic position, and ethnic composition of the neighborhood.

Results The study population consisted of 95,274 patients with incident AMI contributing with 62,8210 person-years at-risk between 2006 and 2014. During the study period 28,194 deaths occurred within 365 days. Crude mortality rates varied substantially across the country as well as across neighborhood and individual-level characteristics, e.g., 53.2/100 person-years died within 365 days after an AMI in neighborhoods with low socioeconomic position, whereas this number was 36.7/100 person-years in high socioeconomic position neighborhoods. Results from the model only including calendar year and the geographically structured random effect component showed clear geographical patterns in survival after an AMI with especially the northern part of Jutland being a high-risk area. After additionally including sociodemographic characteristics of the population and neighborhood in the model the variation in survival after an AMI decreased across the country, but high-risk areas were still observed. Results on fixed effects from the adjusted model showed that persons with low educational level, low-income level and persons living in neighborhoods with low socioeconomic position had an increased incidence rate ratio (IRR) of dying within 365 days after AMI compared to the most educated and affluent population groups [IRRs (95% confidence intervals) of 1.29 (1.23–1.36), 1.26 (1.20–1.32) and 1.11 (1.05–1.17), respectively]. Furthermore, risk of dying within 365 days after an AMI decreased throughout the study period. Results from sensitivity analyses showed that the geographical patterns were more pronounced in out-of-hospital than in-hospital deaths.

Conclusions Evident geographical and social inequalities in survival after an incident AMI exist in Denmark. Sociodemographic characteristics at the individual- and neighborhood-level explained part of the geographical variation in survival after an AMI; however, marked geographical patterns in survival after AMI persisted. Further studies are needed to explain the remaining geographical inequalities in survival after an AMI, especially with focus on out-of-hospital deaths.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.389

P7-70
Socioeconomic circumstances and respiratory function in childhood and adolescence: A systematic review and meta-analysis
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Introduction Childhood and adolescence seem to be a critical time for respiratory health, as during this period the foundations for development and growth are laid, and adverse life factors such as disadvantaged socioeconomic circumstances were associated with lung function poorer growth and faster decline. Therefore, this study aimed to summarise the evidence on the association between socioeconomic circumstances and respiratory function in children and adolescents.

Methods A systematic review and meta-analysis was conducted following the PRISMA guidelines. Pubmed, ISI-Web of Science, and Scopus were searched from inception up to 24th March 2017. Original studies addressing the association between socioeconomic circumstances and respiratory function early in life (i.e. including children and adolescents less than 25 years of age) were investigated. Two investigators independently evaluated articles, applied the exclusion criteria, and extracted data. A meta-analysis of the standardized mean difference in respiratory function between adolescents from different socioeconomic circumstances was also conducted using a random effects model. Between-study heterogeneity was quantified using I-squared statistics.

Results Disadvantaged socioeconomic circumstances were significantly associated with a reduction in respiratory function indices during childhood and adolescence, observed in 21 of the 31 included studies. The meta-analysis showed a significant difference of −0.26 litres (95% confidence intervals: −0.38; −0.15) in forced expiratory volume in first second between children and adolescents from disadvantaged versus advantaged socioeconomic circumstances.

Conclusion Children and adolescents from disadvantaged socioeconomic circumstances presented a significant reduction in respiratory function. This information help to explain the social patterning of respiratory diseases during adulthood and older ages and might contribute to inform policies to prevent respiratory health inequalities from early ages.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.390
Session 8–Epidemiology and surveillance, emerging infectious diseases, nosocomial infections, transmissible, one-health, vector-born diseases and tropical diseases, global health

P8-1
The influence of consanguinity on reproductive health in a population of western Algeria (SABRA)
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Background Inbreeding refers to unions between two people with at least one common ancestor. The practice of this type of marriage in Algeria and in the Arab-Muslim world is still commonplace. The purpose of this study is to determine the prevalence of consanguinity and to examine the impact of this practice on a few health parameters, including reproductive health: fertility, prenatals, perinatal, neonatal and postnatal mortality.

Methods A prospective cohort study was conducted on 123 people randomly recruited from the Sabra Public Health Proximity Institution (EPSP). The data were collected using a pre-established questionnaire, which included questions about women’s clinical, sociodemographic, and reproductive history characteristics. These data were processed by the khideux test.

Results The consanguineous unions all degrees combined in our population represent a proportion of 33.33% with a slight preference for unions between first cousins. Our results also show an early marriage age and increased fertility, as well as a significant association between consanguinity and reproductive health (abortion, mortality, and morbidity).

Conclusion Consanguineous marriage seems to be a predictive risk factor for certain fitness parameters, which is why setting up a health education program is fundamental to targeting prevention in terms of risk, which can have adverse effects on health, particularly the reproductive health that can weigh heavily on the family and the community.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.391

P8-2
Prevalence and risk factors of healthcare-associated infections in an Algerian Teaching Hospital
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Introduction/Aim Healthcare-associated infections are a major public health problem worldwide. The objective of our work was to determine the prevalence of these infections and the main risk factors in the University Hospital Establishment of Oran.

Methodology A cross-sectional descriptive study was conducted at the EHUO from April 27, 2014 to May 6, 2014. The study included all patients hospitalized on the day of the survey. All infectious sites were considered.

Results Five hundred (500) patients were included in the study. Forty-eight (48) healthcare-associated infections were recorded that is to say a rate of 9.6% [8.8 to 10.4] for healthcare-associated infections. Urinary tract infections represented 47.9% of documented infections sites followed by pneumonia (18.8%). Exposure to certain medical invasive devices were significantly associated with the occurrence of healthcare-associated infections: intubation and/or tracheotomy (OR = 10.3 [4.5 to 23.8], P < 0.001), the urinary catheter (OR = 4.9 [2.6 to 9.6], P < 0.001) and central venous catheterization (OR = 7.6 [3.7 to 15.9], P < 0.001). Acinetobacter baumannii was the most frequently isolated germ (21.2%) with 80% of strains with simultaneous resistance to imipenem and ceftazidime.

Conclusion The prevalence rate recorded in our study does not deviate too much from the range found in the majority of studies in Europe. Periodically conducting prevalence surveys allows us to track annual trends of healthcare-associated infections and bacterial resistance to antibiotics.

Keywords Healthcare-associated infections; Prevalence; Risk factors; Teaching hospital

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.393

P8-3
Ventilator associated pneumonia in the intensive care unit of an Algerian Teaching Hospital
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Introduction Ventilator associated Pneumonia is the most common nosocomial infection in intensive care units. The aim of our study was to describe the epidemiological profile of the VAP and to identify the main risk factors.

Methodology This is a prospective descriptive study conducted from June 3, 2012 to December 31, 2013, in the surgical intensive care unit of the university hospital of Oran. This study was followed by a case-control study nested in the cohort of patients hospitalized during the same period.

Results Among the 305 patients corresponding the criteria of definition, 60 had contracted at least one ventilator associated pneumonia, that is to say cumulative incidence of 19.7%. In multivariate analysis, the ventilator associated Pneumonia was significantly related to a duration of ventilation equal or greater than 18 days (ORa = 2.64; [1.1–6.0]), presence of central venous catheter infection (ORa = 10.1; [1.9–51.6]). Acinetobacter baumannii was the most frequently isolated organism (30.4%) with 82.1% of strains with simultaneous resistance to imipenem and ceftazidime.

Conclusion The prospective study of ventilator associated pneumonia conducted in adult intensive care unit is the first of its kind at our university hospital. It allowed us to know the incidence of these pneumonia, which is relatively high compared to some developed countries.

Keywords Ventilator associated pneumonia; Intensive care unit; Incidence; Risk factors; University hospital of Oran

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.393
P8-4
Assessment of exposure and serostatus of contacts persons to Ebola virus disease cases in Guinea (Contactebogui study)
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Background The West African Ebola virus disease (EVD) outbreak has resulted in 28,616 confirmed or suspected cases. Contact tracing and quarantine for 21 days were key actions. However, data on exposure to EVD cases, the proportion of antibodies to EBOV and of a- or pauci-symptomatic infection, as well as the presence of virus in body fluids of seropositive contact persons, remain scarce. The study aimed:
–to quantify individual risk of exposure of contact persons to EVD cases;
–to measure the presence of antibodies to EBOV;
–to look for EBOV RNA in semen of adult seropositive men.

Methods
Persons living in the same compounds than patients enrolled in a survivors’ cohort in Guinea in Conakry, Forecariah, Nzérékoré and Macenta (Postebogui) were invited to participate. After consent, a questionnaire detailing exposure to EVD cases was passed to establish a score of exposure and a history of vaccination against EVD. Antibodies to GP, NP and VP40 proteins were assessed using Luminex® and EBOV RNA in semen was analysed by PCR.

Results
As of September 30, 2017, 1721 individuals were enrolled (51% males, median age 22 years [17–32]) and have accumulated 3074 exposures. Overall, 18.5% declared to have been vaccinated and 80% were exposed to EVD cases. Zero to moderate risk exposure was analysed by PCR.

P8-5
Assessment of the national response to acute viral hepatitis A in Tunisia, 2016–2017
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Introduction In Tunisia, the epidemiology of hepatitis A has considerably changed in recent years, and the country has moved from high endemicity level to a low endemicity level with an overall national prevalence of IgG anti HAV antibodies estimated at 79% and a low level of immunity in young people. During 2016 year, the national notifiable diseases surveillance system detected the occurrence of a national outbreak of HVA affecting more than 12 governorates. In this context, we have strengthened the national response to the VHA outbreak by establishment of new guidelines. Our aim was to establish a summary report of the national response to HAV epidemic from 2016 to 2017.

Methods The national response is based on: early notification of any probable or confirmed HAV case from the regional level to the national level, the immediate epidemiological investigation around cases and active case finding (school or community-based survey), school eviction or work stoppage of any probable or confirmed case for a period of 14 days from the date of onset of symptoms and post-exposure emergency vaccination.

Results Until October 2017, 2046 confirmed cases of HVA were recorded, including 1553 in schools and 491 in community settings. The most affected governorate was Gabes (831cases). The number of schools affected was about 458, mostly in rural areas, with poor hygienic conditions and drinking water supply problems. The average age was 10.15 ± 8 years, and 82% of the subjects were enrolled in school. The icteric form was the most common in 68% of cases. Eleven cases of death were noted.

Conclusion The epidemic is still expanding in the country, especially schools in rural areas, which requires strengthening the response, awareness and involvement of the various structures concerned like the Ministry of Education, environment and civil society.

Keywords Hepatitis A; Outbreak; National response; Tunisia

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016f.respe.2018.05.395
Multiple linear regression was used to examine the association of both BMI and WHR with each lipid measure, adjusted initially for age and then for potential confounding by household assets, education, marital status, number of children, smoking, alcohol, physical activity, lipid-lowering medication, and HIV status. As the UK data were taken from largely urban/sub-urban dwelling adolescents and middle-aged females and males, we selected two age groups of participants from the urban group of the Malawi cohort that had similar age distributions to the UK cohorts to compare associations between Malawians and UK residents. Results We observed positive linear associations of BMI and WHR with TC, LDL-C and TG and inverse association with HDL-C. Associations between BMI/WHR and serum lipids were in general similar in females and males, however, differed by area, with the associations between BMI and all serum lipids being stronger in rural than urban females, except for HDL-C, which was stronger in urban females. Associations did not differ consistently between rural and urban male residents. Associations of BMI and WHR with lipids were mostly similar or weaker in Malawi than the UK urban residents in both sexes and age groups. However, in middle-aged males, there was some evidence that associations of BMI and WHR with TC and LDL-C were stronger in Malawians.

Conclusions The consistent associations observed of higher adiposity with adverse lipid profiles in females and males living in rural and urban areas of Malawi highlight the emerging adverse cardio-metabolic epidemic in this poor population. The similarity (or even stronger) associations between the Malawian and UK population highlight the importance of early interventions to control the emerging obesity epidemic in SSA populations.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.397

P8-8
Communicable diseases. The case of sexually transmitted infections: A retrospective 3-year study
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Introduction Health surveillance is essential for the effective impact assessment, monitoring and control of diseases and risks to health, including communicable diseases, and is necessary for an efficient public health practice capable of effectively protecting and promoting the health of populations. In Portugal, mandatory notification of communicable diseases established since 1949, in Law 2036, August 9. The current mandatory list of notifiable diseases encompasses 65 diseases, six of which are sexually transmitted infections (STIs), which are a public health problem.

Methods A retrospective and descriptive study conducted through the collection of information from the database of the National Epidemiological Surveillance System. The notified cases of STIs between 2015 and 2017 dis-aggregated by demographic variables: sex, age and geographical location and clinical variables: disease and case definition.

Results The total number of reported cases of STIs throughout these 3 years was 134, with the following distribution: 33.0% syphilis (n = 44), 25.4% gonorrhoea (n = 34), 13.4% hepatitis C (n = 18), 13.4% HIV/AIDS (n = 18), 9.7% chlamydiasis (n = 13) and 5.2% (n = 7) hepatitis B. Of the reported cases, 54.6% (n = 73) were males and 21.7% (n = 33) were female, with ages ranging from 13 to 75 years and mean age of 39.5 years. Most of reported cases of STIs observed in Alto Seixalinho and Baixa da Banheira. Overall, there was an increase in the frequency of reported cases of STI with a particular focus on gonorrhea.

Conclusion Notification should be early because it can protect the health of the population by ensuring identification and follow-up of cases, identification of contacts, investigation and containment of disease outbreaks.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.398

P8-9
Prevalence of pathogenic and non-pathogenic intestinal parasites in pregnant women living in poverty and social inequality
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Background Intestinal parasitism in large urban cities is an ongoing public health challenge. Although most epidemiological studies were concentrating on children, there is an ongoing concern that adult vulnerable populations are prone to protozoal and helmithmic pathogenic infestations. In pregnant women living in social inequality settings, this is particularly important as it may affect their overall health and that of their offspring.

Methods We investigated the prevalence of intestinal parasitic infections in pregnant women in three districts of Bogotá, the largest city in Colombia. We undertook a cross-sectional study including questionnaires on sociodemographic factors and living conditions, in addition to home visits. By examination of stool samples, we determined the prevalence of intestinal parasites, including protozoa and helminths that are pathogenic and of debated pathogenicity. The presence of microorganisms was detected by multiple approaches including direct smears, concentration techniques, double stool sampling and/or qPCR techniques. Five hundred and fifty pregnant women from low-income urban areas participated in this study by answering the questionnaire, with 331 providing in addition a stool sample, 98 of them providing two stool samples, and 48 of them being prospectively analyzed for the presence of protozoal and helmithmic parasites with quantitative PCR.

Results The findings revealed an overall 41.4% prevalence of intestinal parasites, with an unexpected 40.5% predominance of protozoa that are considered non-pathogenic and/or of debated pathogenicity, with Blastocystis hominis as the most prevalent parasite (25.1%). The low prevalence of pathogenic parasites was confirmed with all techniques. Double sampling and qPCR showed highest diagnostic capacity. Sociodemographic, pregnancy and living conditions analyses in women infected with any parasite revealed associations with civil status (higher parasites in married women or those living with someone, P < 0.038) and with last deworming (higher when deworming was done over a year ago, P = 0.018).

Higher trends were found between intestinal polyparasitism and women from minority groups and those not having water sinks.

Conclusions This is the first study focused on pregnant women in Bogotá, the largest city in Colombia that estimates the prevalence and factors associated with intestinal parasitism in vulnerable populations living in conditions of poverty and social inequality. Although a low prevalence of pathogenic parasites was found in pregnant women, a high prevalence of parasites with disputed pathogenicity was revealed. In Bogotá, the good quality of water for human consumption, open availability of broad-spectrum anti-parasitic drugs, better educational level and appropriate sanitary facilities play an important role in the prevention of pathogenic parasitic infections. However, the high prevalence of non-pathogenic parasites indicates that fecal-oral contamination continues in these communities. Accordingly, public health services should emphasize education campaigns to prevent these contamination routes, particularly in women belonging to minority groups, those without water sinks and who have not been dewormed recently. Additionally, public health services could take into account the findings that double stool sampling may increase diagnostic capacity in these populations, a cost-effective strategy in middle income countries like Colombia.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.399
Influenza B in the general population. Retrospective analysis of French surveillance data from 2003 to 2017

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Context Much attention has been paid to influenza over the past three decades with a rare focus on influenza B. Since 2000, two distinct influenza B lineages (Yamagata and Victoria) circulate alternately or simultaneously, raising the issue of potential vaccine mismatch with prevalent vaccines that contain only one of the 2 B lineages. Since 2013, WHO influenza vaccine recommendations give advice on a vaccine strain for each influenza B lineage and manufacturers have developed quadrivalent seasonal vaccines containing the two lineages of influenza B viruses. In France, between 1984 and 2017, influenza surveillance in the general population has been performed by two sentinel networks, based on general practitioners and paediatricians, the Réseau national des GROG (from 1984 to 2014) and the Sentinelles network (since 2014). Practitioners of the network are providing weekly data describing their activity and collect nasal swabs in a fraction of their patients consulting for acute respiratory infection (ARI) or influenza-like infection (ILI). These swabs are sent by surface mail to the laboratories of the National Reference Centre.

Objective Our study aims to describe the circulation of the two lineages of influenza B viruses in the general population, during fourteen influenza seasons in France (2003–2017).

Methods A retrospective descriptive analysis of the GROG 2003–2013 database, completed by the Sentinelles surveillance data publicly available from 2014 was performed. Every virologically confirmed influenza positive case was included in the study, except for those with an influenza A and B co-infection. Patients whose age was unknown were also excluded.

Results and discussion Overall, 21,070 virologically confirmed influenza cases could be included, comprising 5478 influenza B cases (26.0%). The contribution of influenza B to the seasonal influenza burden varied from year-to-year. Influenza B represented more than 5% of influenza viruses detected in eight of the fourteen studied seasons. Influenza B was considered as dominant (>60% of all influenza viruses of the season) in 2005–2006 (61.8%) and 2015–2016 (71.5%) and was co-dominant (41–60% of all influenza viruses of the season) in 2010–2011 (47.4%) and 2012–2013 (55.0%). The influenza B viruses impact was mainly observed in children of the 5–14 years old group (33.0%) but was also significant in the ≥ 65 years old group (22.5%). In the 8 seasons where influenza B viruses substantially circulated, both Victoria and Yamagata lineages were detected. They respectively accounted for 57.8% and 42.2% of all influenza B cases for which the lineage was available. Each lineage was predominant during four seasons: Victoria in 2005–2006, 2008–2009, 2010–2011 and 2015–2016; Yamagata in 2004–2005, 2007–2008, 2012–2013 and 2014–2015. A mismatch between the dominant circulating influenza B lineage and the lineage included in the seasonal influenza vaccine was observed during four (28.5%) of the fourteen seasons analysed, including two seasons where influenza B viruses predominated (2005–2006, 2007–2008, 2008–2009 and 2015–2016). This is consistent with the results of a similar study carried out in 26 countries that reported a type B lineage mismatch in 25% of seasons. In our study, for 58.2% of the documented type B infections, the reported lineage was not included in the seasonal trivalent vaccine. Again, this is consistent with results recently published from Finland between 1999 and 2012 where 41.7% of the documented influenza B cases belonged to the mismatched lineage.

Conclusion Our results support the added value of the quadrivalent vaccine to increase vaccine effectiveness.

Disclosure of interest A. Mosnier link with: member of Sanofi influenza board, link with: member of GEIG Scientific Committee; I. Daviaud, J.-C. Soulary declare that they have no competing interest; S. Van der Werf link with: member of GEIG Scientific Committee; B. Lina link with: financial support to attend scientific meetings by Sanofi-Pasteur and Roche; J.-M. Cohen link with: member of Astra Zeneca influenza board.

https://doi.org/10.1016/j.respe.2018.05.400

Trayectories of seasonal influenza vaccination uptake in French people with diabetes from 2006 to 2015

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Introduction Seasonal influenza vaccine (SIV) is recommended in France for people aged 65 years or older and those with clinical risk factors, including diabetes. The French National Health Insurance Fund (NHIF) can identify these individuals and send them a voucher so they can obtain the vaccine free of charge. Despite this, SIV coverage remains below the target of 75% and has progressively decreased since the 2009 pandemic. We aimed to temporal trajectories (T) over a 10-year period of SIV uptake (SIVU) among patients with diabetes and to describe their correlates.

Methods We identified patients with diabetes in 2006 (n = 17,259) among a representative sample of French NHIF beneficiaries. We followed them from 2006 through 2015, using SIV reimbursement claims and group-based trajectory modeling to identify SIVU-T and drug reimbursement claims to assess diabetes severity and comorbidity status. A multinomial logistic regression allowed us to study characteristics associated with the SIVU-T.

Results We found 6 SIVU-T: (1) “never” T (prevalence: 32%); people with quasi null SIVU probabilities (≤ 5%); (2) “late increasing” T (4%); SIVU probability varying from ≤ 10% before 2011/12 to 85% in 2015/16; (3) “early increasing” T (8%): probability varying from ≤ 10% in 2006/07 to ≥ 80% in 2009/10; (4) “regular” T (33%): probability always ≥ 95%; (5) “progressively non-vaccinated” T (14%): probability decreasing from 90% in 2006/07 to 20% in 2015/16; (6) “post-pandemic decreasing” T (9%): probability decreasing right after the 2009/10 season.

Overall, compared to the “never” T group, people in all other trajectories had poorer health at inclusion and/or over the study period (severe diabetes, high comorbidity score), people in the “late increasing” T group were more likely to have received newly free vaccination vouchers and/or changed general practitioners (GPs) during follow-up, and those in the “early increasing” T more likely to have received newly free vaccination vouchers and to have been hospitalized for an influenza-like illness during the follow-up. Those with “regular” T were slightly older than those with “never” T and less likely to have been hospitalized due to diabetes; those with a “progressively non-vaccinated” T were oldest (mean age at inclusion = 80 ± 7 years versus 65 ± 14 in the study population). Finally, people with a “post-pandemic decreasing” T were more frequently women, more likely to have been hospitalized due to an influenza-like illness, and to have changed GPs during the follow-up.

Conclusions SIVU behavior was stable in most people with diabetes over the study period: one third were vaccinated regularly and another third never. The latter were globally healthier than the other groups and may feel less vulnerable to it, despite their clinical risk. About 25% became less inclined toward vaccination in one of two different patterns: the “progressively non-vaccinated” T may reflect the patient and/or healthcare professional’s doubts about the benefits of SIV after a certain age (in part due to immunosenescence); those in
the “post-pandemic decreasing” T may have lost confidence in SIV after controversies in France during the 2009 mass vaccination campaign against the pandemic. About 10% became more likely to be vaccinated during the study period; our results suggest that receiving free vouchers for the first time might have triggered or fostered this behavioral change. Changing GPs and hospitalization for an influenza-like illness were associated with both increasing and decreasing trajectories. These events may represent key opportunities to foster or prevent behavioral changes toward SIV. Further research is needed to better understand the chronology of these events and potential causal pathways. These results should help stakeholders to adapt public health interventions to specific subgroups.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.401

P8-13
Demand for family planning satisfied among adolescents by marital status and parity: An analysis of 73 low and middle-income countries
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Introduction Despite the worldwide positive trends in contraceptive use and family planning indicators over the last decades, progress among adolescent women has been happening in a slower pace, and the demand for family planning satisfied remains very low in this population. Social-cultural and structural barriers often prevent adolescents from achieving their reproductive desires, which can result in unintended and unhealthy pregnancies. The aim of the present study is to describe the demand for family planning satisfied with modern methods (mDFPS) among adolescents aged 15–19 by marital status and parity in low and middle-income countries (LMICs).

Methods We obtained data from nationally representative surveys (Demographic and Health Surveys and Multiple Indicator Surveys) with public available datasets carried out since 2005. We use the most recently collected data from any country. The present analyses are based on currently sexually active adolescent women aged 15–19 years. mDFPS was defined as the proportion of women in need of contraception that are currently using a modern contraceptive method (IUD, implants, pill, injectable, diaphragm, condom, foam or jelly, patch, emergency contraception; and male and female sterilization). Women in need of contraception are those who are fecund and do not want to become pregnant within the next two years or are unsure if or when they want to become pregnant. Pregnant women with a mistimed or unwanted pregnancy are also considered in need of contraception. We estimated the mean mDFPS coverage for each country and world region by adolescent group defined by marital status and parity (married 1 + children, married no children, not married sexually active). Analyses are presented by world region following the UNICEF classification. All analyses took into account the multistage sampling strategies and sample weights.

Results A total of 73 LMICs with available information for sexually active adolescents were included in this analysis (9 from the CEE and the CIS, 8 from the East Asia and the Pacific, 16 from the Eastern and Southern Africa, 16 from the Latin America and Caribbean, 3 from South Asia and, 21 from the West and Central Africa). Adolescents who were married with no children presented the lowest mean mDFPS coverage in all world regions when compared to married adolescents with one or more children and those who were not married. mDFPS coverage ranged from 12.8 % in West and Central Africa to 41.6 % in Latin America and Caribbean among not married with no children adolescents; from 18.8 % in West and Central Africa to 60.5 % in Latin America and Caribbean among married with one or more children adolescents and, from 19.4 % in East Asia and the Pacific to 73.9 % in CEE and the CIS among not married sexually active adolescents. mDFPS among married adolescents with no children was below 20 % in 32 of the 73 the low and middle-income countries analysed, of which 14 presented a mDFPS below 10 % (8 of them belonging to the West and Central Africa).

Conclusion Overall, we found that most of the girls who wanted to delay, or limit pregnancy were not using a modern contraceptive method. In all world regions, the lowest mDFPS coverage was found for married adolescents with no children. In this sense, priority countries for interventions are those belonging to the West and Central Africa region. Global efforts to prevent unintended pregnancies and improve pregnancy spacing among adolescents should consider the existing social norms regarding marriage and fertility expectations so that family planning strategies can effectively reach adolescents in these countries.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.403

P8-14
The global influenza hospital surveillance network (GIHSN), a worldwide platform for timely generation of severe influenza epidemiological data
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Introduction According to World Health Organization (WHO) estimates, annual influenza epidemics are estimated to result in about 3 to 5 million cases of severe illness, and about 290,000 to 650,000 deaths worldwide. While policy makers are expected to place higher value on vaccines indicated for prevention of severe illness, high quality global data on severe influenza are scarce. This is further complicated by the variability of the viruses and the severity of influenza epidemics between years and geographical areas. The Global Influenza Hospital Surveillance Network (GIHSN) supported by the Foundation for Influenza Epidemiology is a platform to generate such important public health data.

Methods The GIHSN consists of a network of country sites affiliated with public health authorities coordinating several hospitals. This multicenter, prospective, hospital-based active surveillance, is coordinated by the Open Health Company and funded by the Foundation for Influenza Epidemiology created by Sanofi Pasteur. A standard protocol is shared between sites allowing for comparison and pooling of data across sites. Patients hospitalized during the influenza season are asked for recent (less than 7 days old) influenza-like-illness (ILI) symptoms before admission. All consenting ILI cases are swabbed and tested by multiplex real-time polymerase chain reaction (RT-PCR) for influenza. Influenza positive RT-PCR samples are subtyped to identify A/H1N1, A/H3N2 strain subtypes or B/Yamagata, B/Victoria lineages. When vaccine uptake allows, vaccine effectiveness is estimated using a test negative design method. Sites are invited to share their data through an online collection tool. Data are then aggregated, and indicators are displayed using state-of-the-art data visualization techniques on the network website www.gihsn.org. Data are managed through an associative engine, which can combine a very large number of data sources and indexes every possible relationship in the data. Users are not restricted to linear exploration within partial views of data and can gain immediate insights and explore data in multiple directions.

Results The GIHSN has been progressively scaled up and has generated data for six consecutive seasons, for both Northern and Southern hemisphere, representing now a yearly sample of more than 12,000 individual samples tested by RT-PCR with detailed demographic, clinical and virological data. During the 2016–2017 season, close to 3000 cases of hospitalizations from influenza cases were asked for recent (less than 7 days old) influenza-like-illness (ILI) symptoms before admission. All consenting ILI cases are swabbed and tested by multiplex real-time polymerase chain reaction (RT-PCR) for influenza. Influenza positive RT-PCR samples are subtyped to identify A/H1N1, A/H3N2 strain subtypes or B/Yamagata, B/Victoria lineages. When vaccine uptake allows, vaccine effectiveness is estimated using a test negative design method. Sites are invited to share their data through an online collection tool. Data are then aggregated, and indicators are displayed using state-of-the-art data visualization techniques on the network website www.gihsn.org. Data are managed through an associative engine, which can combine a very large number of data sources and indexes every possible relationship in the data. Users are not restricted to linear exploration within partial views of data and can gain immediate insights and explore data in multiple directions.

Results The GIHSN has been progressively scaled up and has generated data for six consecutive seasons, for both Northern and Southern hemisphere, representing now a yearly sample of more than 12,000 individual samples tested by RT-PCR with detailed demographic, clinical and virological data. During the 2016–2017 season, close to 3000 cases of hospitalizations from influenza have been documented. Type of data generated include influenza activity and lengths of epidemics, pattern of strain circulation by subtype by region, burden of severe laboratory confirmed influenza for various populations, analyses of disease risk factors and vaccine effectiveness estimates. Genetic strain sequencing characterization is also generated locally. Results are published yearly in peer reviewed scientific journals and presented in international conferences. For the 2017–2018 season, the GIHSN expanded to more than 40 hospitals in 20 countries.
Conclusion The GIHSN platform is a useful tool to fill a knowledge gap about the variability of the influenza burden across season and regions. Other respiratory viruses are now being incorporated. The on-line data collection tool and data display help to provide access to this information in a timely manner to inform public health authorities.

Funding statement The GIHSN receive a funding from the Foundation for Influenza Epidemiology and Sanofi Pasteur.

Disclosure of interest C. El Guerche-Séblain is an employee of Sanofi Pasteur. C. Commaille-Chapus, M. Morizet, J.-Y. Robin declare that they have no competing interest. C. Mahé is an employee of Sanofi Pasteur.

https://doi.org/10.1016/j.respe.2018.05.404

P8-15
Outcomes of acute kidney injury depend on initial clinical features: A national French cohort study C. Couchoud a,∗, N. Riffaut b, T. Hannedouche c, O. Moranne a, A. Hertig e

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Background Acute kidney injury (AKI) is a common condition that is associated with poor short- and long-term outcomes. The aim of this nationwide cohort study was to profile the long-term outcome of patients admitted for AKI in France.

Methods Based on the comprehensive French hospital discharge database, all hospitalizations for an AKI episode were categorized in four groups according to the presence of at least one dialysis session (RRT) and according to the coding of AKI as the principal or associated diagnosis (PRINC_DIAG or ASS_DIAG). The cumulative incidences of death and ESRD in each group were analyzed with a subdistribution hazard (Fine and Gray) model to take into account the competing risks between those two outcomes. A subgroup analysis was done for patients who were alive and not on RRT at hospital discharge. The effect of the initial clinical feature on death or ESRD was analyzed with an adjusted cause-specific Cox proportional hazard regression censored at other outcomes. All the models were adjusted for age, gender and comorbidities.

Results In this nationwide cohort of 989,974 patients (median age 77 years) hospitalized with AKI during the 2009–2016 period, 422,739 (43%) patients died (25,572 during the first hospitalization) and 40,015 (4%) patients reached ESRD (5962 during first hospitalization) up to 31 December 2016. Former cardiovascular disease and CKD were diagnosed in 40% and 16% of patients, respectively. Patients without RRT and discharged from hospital had a cumulative incidence of ESRD which ranged from 5.3% [5.2–5.4] in the ASS_DIAG group to 28.7% [27.9–29.5] in the RRT-PRINC_DIAG group at 60 months. The cumulative incidence of death ranged from 31.0% [30.2–32.2] in the RRT-ASS_DIAG group to 45.5% [45.3–45.7] in the ASS_DIAG group. Initial clinical features were associated with outcome independent of comorbidities and age. Compared to RRT-PRINC_DIAG, PRINC_DIAG (HR: 0.4, 95% CI: 0.4–0.4), ASS_DIAG patients (HR: 0.1, 95% CI: 0.1–0.2) and RRT-ASS_DIAG (HR: 0.4, 95% CI: 0.4–0.5) patients were at lower risk of reaching ESRD. Results were similar in each age group and whether or not patients had a previous diagnosis related to urinary tract or kidney disease. RRT-ASS_DIAG patients had a higher risk of death (HR: 1.9, 95% CI: 1.9–2.0) as compared to RRT-PRINC_DIAG, while patients with AKI as principal diagnosis (PRINC_DIAG) or associated diagnosis (ASS_DIAG) not requiring dialysis had a lower risk (HR: 0.7, 95% CI: 0.6–0.7 and HR: 0.9, 95% CI: 0.9–0.9, respectively).

Conclusions The major strength of our observational study was the national coverage obtained from the comprehensive French hospital discharge database and a long follow-up over seven years. Our study strengthens the current recommendations for long-term follow-up of patients with AKI. The novelty of this study is to propose a clinical classification of AKI episodes that is easy to detect in administrative medical databases and that is strongly associated with immediate and long-term outcomes. This novel classification is based on the perceived primacy of AKI as a driver of the illness that brought the patient to the hospital and the need of RRT. Further studies are now warranted to compare the performance of our classification to predict long-term outcome to other classifications, including the KDIGO, AKIN or RIFLE.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.405

P8-16
Incidence of hospital-acquired infections following kidney, pancreas or kidney-pancreas transplantations: A surveillance-based study E. Munier-Marion a,b,c, C. Dananché a,b,c, L. Badet e, E. Morelon d, C. Pouteil-Noble e, T. Bénét a,b,c

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Background Bacterial hospital-acquired infections (HAI) are frequent complications of the early post-transplantation period. The most frequent infections are urinary tract infection, bacteremia and surgical site infection. The objective was to report the incidence of early HAI among kidney, pancreas or kidney-pancreas transplant recipients in a French university hospital.

Methods An active standardized surveillance of HAI among kidney, pancreas or kidney-pancreas recipients was done in a university hospital of 800 beds (Lyon, France). All patients transplanted between October 1, 2013 and December 31, 2016 were followed during their hospital stay or up to 30 days post-transplantation. Data on patient characteristics, invasive devices, transplantation type, outcome in the unit and HAI were recorded. HAI included urinary tract infections, bacteremia, surgical site infections and pneumonia. Only the first infection per site and per patient was analyzed. Incidence rates were expressed per 1000 patient-days with their 95% confidence interval (95% CI). Multivariate Poisson regressions adjusted on gender, age, ASA score, transplantation type and time period were fitted to assess the risk of HAI.

Results Overall, 568 transplanted patients accounting for 8800 patients-days were analyzed (489 kidney, 12 pancreas and 67 kidney-pancreas transplantation). Mean age was 51 years (range 19–80 y), 61% were men, mean BMI was 25 (range 15–38). Seven patients deceased (1%, none because of infection) and 50 underwent a revised surgery (4 for infectious complications); 17 grafts were removed (1 for infection). Mean length of stay, length of urinary catheterization and central venous catheterization were respectively 18 days (+14), 8 days (+6), and 10 days (+8). Donor type was living-related donor, unrelated living donor, brain death donor and cardiac arrest donor for respectively 10%, 3%, 77% and 59% of transplanted patients. Concerning deceased donor, preservation solution was contaminated for 39% of cases, with negative coagulase Staphylococcus identified in 59% of them. HAI incidence was 10.2 (95% CI: 7.2–11.3; N = 80) per 1000 patient-days, without difference according to the transplantation type (adjusted incidence rate ratio [aIRR] = 1.37; 95% CI: 0.71–2.65) in kidney-pancreas or pancreas recipients or time period (aIRR = 0.90; 95% CI: 0.80–1.02, per 1 semester). The 3 most frequent causative microorganisms were Escherichia coli (29%), Enterococcus faecalis (16%) and Enterobacter cloacae (13%). Enterobacteriaceae were found in 53% of HAI and 57% of them were resistant to third generation cephalosporin. Incidences of urinary tract infections, bacteremia and pneumonia were respectively 6.0 (95% CI: 4.6–7.8; N = 58), 2.4 (95% CI: 1.5–3.5; N = 23) and 0.7 (95% CI: 0.3–1.4; N = 7), without differences according to transplantation type after multivariate analysis. Surgical site
P8-17
Maternal infection rates: Surveillance in three obstetric units of a French University Hospital group in 2016
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Introduction
To identify infection risk after caesarean section (CS) or vaginal delivery (VD), nosocomial infection surveillance has been conducted since 2009 in three obstetric units of a French University Hospital Group. Such infections lead to an important increase in morbidity, mortality and costs. Monitored maternal infections were: urinary tract infection, surgical site infection, endometritis, bacteremia, infections associated with intravascular devices and breast infection. Active healthcare-associated infection surveillance was combined with quality of care improvement measures, practices audits and permanent benchmarking, comparatively to the other maternity units.

Methods
In 2016, the surveillance was targeted to infections after delivery in three maternity wards of a French University Hospital Group, according to the French MATER network surveillance protocol. All mothers who delivered in these hospital wards were included. The observed period varied from 4 to 12 months, depending on obstetric unit. Patients’ follow-up was carried out for up to 30 days after VD or CS. Data collected were demographic data, maternal and delivery risk factors, antibiotic prophylaxis, infections of mother or child. Four types of infection are specially targeted in the surveillance: urinary tract infection (UTI) after vaginal or caesarean delivery, endometritis after VD and surgical site infection (SSI) after CS. The observed numbers of infections were compared to estimated numbers of infections according to infection rates obtained from the French maternity network. This network publishes infection rates of 62 maternity units since 1999. Concerning endometritis and UTI after VD and SSI and UTI after CS, standardized ratio of nosocomial infection (SRNI) was calculated.

Results
Globally, 4248 patients were included in the surveillance study in 2016: 3341 (78.6%) after VD and 907 (21.3%) after CS. Forty-five nosocomial infections were observed: 25 urinary tract infections (UTI), 14 surgical site infections (SSI) and 6 endometritis. The incidence rate of UTI was 0.7% after vaginal delivery and 0.3% after caesarean; 0.2% for endometritis and 1.5% for SSI. Global rate of nosocomial infections was 1.0%. The infection rate was calculated in comparison with French maternity network data. The standardized ratios of each infection were 2.30 for UTI and 1.65 for endometritis after VD; 0.69 for UTI and 1.32 for SSI after CS. The rate of patients’ follow-up at 30 days or more was 10.4% after VD and 39.4% after CS. Patients’ follow-up 30 days after delivery was superior to the mean network values [11.3% vs. 10.4% (P = 0.02)]. Several risk factors were more frequent in our University Hospital Group than in the network: urinary tract infection rate during pregnancy [15.8% vs. 5.7% (P < 10⁻³)] and at hospital entry [5.7% vs. 1.1% (P < 10⁻³)], artificial delivery and uterine review rate [15.3% vs. 11.4% (P < 10⁻³)]. Very few of caesareans were first caesarean interventions [7.2% vs. 55.5% (P < 10⁻³)]. However, antibiotic prophylaxis was very frequently practiced for CS [92.3% vs. 75.7% (P < 10⁻³)].

Conclusions
Standardized incidence ratios of endometritis, SSI and UTI after delivery were superior to ratios of the French maternity network for this surveillance. The significantly higher percentage of nosocomial infections could be explained by the fact that, in our University Hospital Group, 76% of them were detected after the end date of hospital stay, while in the French MATER network some obstetric units have chosen to count only infections that occur during hospitalization. In addition, patient recruitment in our University Hospital was different to most other hospitals in the French maternity network, since it targeted a particularly at risk population. Finally, measures of quality of care improvement need to be constantly reviewed.

Disclosure of interest
The authors declare that they have no competing interest.

https://doi.org/10.1016/j.jrespc.2018.05.406

P8-18
Infodengue: A nowcasting system for the surveillance of arboviruses in Brazil
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In cities dengue is endemic, various protocols exist for monitoring the disease activity as well as its risk factors, such as vector density, climate favorable for transmission and case counts. However, the complexity and cost of the data collection, together with the delays caused by the flow of data from data collections systems, through central health authorities and back to the health agents in charge of controlling the disease, makes timely responses to dengue outbreaks very hard to achieve. In this presentation we describe a system put in place through a joint initiative of the Brazilian National Health Ministry, city level health authorities, and multiple research institutions, bringing together epidemiologists, statisticians, entomologists, computer scientists among other specialties, to tackle the problem of bringing up-to-date epidemiological information to health agents, local decision-makers and the population as a whole. This system is operating in 788 cities in Brazil since 2015 (http://info.dengue.mat.br). One of the main design goals of the system was to include all data streams deemed relevant which were available on a regular time-frame. These are data streams selected based not only on their epidemiological relevance, but also on their continuous availability: mention about dengue on Twitter, filtered according to content and aggregated as a city level time series. Climate data (temperature, humidity, and atmospheric pressure measure); epidemiological data (these are the official case data, clinically confirmed cases reported by medical professionals through official channels). A pipeline was developed to clean, filter, and integrate the datasets. Statistical techniques were developed to:
–correct for reporting delay using a efficient bayesian framework;
–estimate the effective reproductive number of dengue taking into account the variation in temperature;
–and to detect sustained transmission.

The pipeline delivers a classification of alert every week: green (poor conditions for transmission), yellow (favorable transmission conditions), orange (sustained transmission), red (high incidence). To assess the quality of the system, a confusion matrix was constructed to compare the system classification with an expert classification of risk. At last, we discuss how the developed pipeline can be extended to other climate-sensitive diseases, exemplifying with zika and chikungunya.

Disclosure of interest
The authors declare that they have no competing interest.

https://doi.org/10.1016/j.jrespc.2018.05.407
The effects of annoyance due to aircraft noise on psychological distress: The results of the DEBATS study in France

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Background Many studies have evidenced adverse effects of exposure to aircraft noise on health, such as annoyance, sleep disturbance, cardiovascular diseases or altered cognitive performance. Mental health has been less investigated. In France, about 18% of the population suffer from mental disorders. The effects of noise annoyance on psychological distress have rarely been evaluated, and no study exists in France. We investigated associations between annoyance due to aircraft noise and psychological distress for people living near airports in France.

Methods The DEBATS longitudinal study included 1244 residents around three French airports: Paris–Charles-de-Gaulle, Toulouse–Blagnac, and Lyon–Saint-Exupéry. Information about psychological distress was assessed by a face-to-face questionnaire, including a single question about the feeling of depression, and the 12-version of the General Health Questionnaire (GHQ-12). Annoyance due to aircraft noise was assessed with the following question “Thinking about the last 12 months, when you are at home, how much does aircraft noise annoy you?” The five-point verbal scale proposed by the International Commission on the Biological Effects of Noise was used: extremely, very, moderately, slightly or not at all. Associations with psychological distress were investigated using logistic regressions including relevant confounders such as gender, age, country of birth, occupational activity, marital status, alcohol consumption, smoking, sleep duration, number of stressful life events, education, income, and antidepressant use.

Results About 13% of the participants reported depression and 22% were considered to have psychological distress according to the GHQ-12. Significant associations were found between annoyance due to aircraft noise and the feeling of depression, and between annoyance due to aircraft noise and psychological distress evaluated with the GHQ-12. The odds ratio (OR) for the feeling of depression ranged from 0.89 (95% CI: 0.50–1.59) to 2.61 (95% CI: 1.09–6.23). The OR for the GHQ-12 ranged from 1.49 (95% CI: 0.94–2.39) to 3.64 (95% CI: 1.70–7.78). For both outcomes, OR reached the maximum estimate for people reporting to be extremely annoyed compared to those who are not at all annoyed.

Conclusions The present study found significant associations between annoyance due to aircraft noise and psychological distress assessed both with a single question about the feeling of depression and with the GHQ-12, with gradual ORs across the different categories of noise annoyance. This result is in line with the findings of the few studies performed on this issue. However, the direction of the association can be questioned. Extremely annoyed people might be more at risk to have psychological disorders, but it is also possible that people with psychological disorders might be more at risk to be annoyed.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.409
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Introduction Bloodstream infections (BSI) are a leading cause of morbidity and mortality in hospitalized patients. Moreover, a significant concern is antibiotic resistance among causative agents. Surveillances of BSI provide important information for developing therapeutic guidelines and helping the prevention strategies to evolve.

Methods We report a 15-year surveillance of community and nosocomial bacteremias in hospitals and clinics of three Cantons of Switzerland (VD, NE, JU). Data were collected by infection control nurses. We analyzed retrospectively the data according to 3 distinct periods: 2001–2005, 2006–2010 and 2011–2015.

Results From 2001–2015, we observed 11,788 BSI, 8858 community (75%) and 2930 nosocomial (25%). Community BSI proportion increased over the observation period (respectively 6.8, 8.39 and 10.11/1000 admissions). Mean duration stay remained stable (6.14–6.71 days). Mean age significantly increased over time (respectively 6.8, 8.39 and 10.11/1000 admissions). Mean duration stay remained stable (6.14–6.71 days). Mean age significantly increased over the years (from 64–69 years, P < 0.001). Most common sources of nosocomial BSI were catheter and urinary related. The proportion of urinary related BSI increased over time from 15.1–25.9% (P < 0.001). However, the proportion linked to a urinary catheter remained stable (from 44.1–47.4, P = 0.69).

E. coli is the most common microorganism (36.3% of community and 22.4% of nosocomial BSI). Proportion of Enterococci in nosocomial BSI significantly increased over time (from 6.1–10.4%, P = 0.03). Moreover, the proportion of S. aureus with methicillin resistance (MRSA) significantly decreased from 5.7–2.9% (P = 0.05) in community BSI and from 11.6–7.9% (P = 0.27) in nosocomial BSI. Concomitantly, the proportion of E. coli with extended spectrum beta-lactamase (ESBL) significantly increased among community E. coli BSI, but not in nosocomial BSI (from 1.3–4.5% P < 0.001 and 4.8–7.0% P = 0.32, respectively).

Conclusion Proportion of community BSI increased over time contributing to risk factors for developing nosocomial infections. Catheter and urinary related infections should be a priority target in order to prevent nosocomial BSI. Multidrug resistant bacteria distribution changed gradually, resulting in a significant MRSA decrease and an increase in ESBL E. coli in the community. This tendency, also not significant, is also true in nosocomial BSI and should be taken into account when treating the patient. Concomitantly, a special attention should be made to Enterococci seen the recent vancomycin-resistant Enterococci outbreaks in this part of Switzerland.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.410

Emerging extensively drug resistant bacteria (EXDR) in a French University Hospital in 2016: Description of incident cases and evaluation of five years trend

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Introduction Emerging extensively drug resistant bacteria (eXDR), including Carbapenem-Producing Enterobacteriaceae (CPE) and Vancomycin-Resistant Enterococci faecium (VRE), represent a major world health emergency over the last ten years. About CPE, in France, 2376 episodes were reported from 2009 to 2015, their incidence increased from 10 episodes in 2009 to 942 episodes in 2015 (based on National Public Health Institute); the most common CPE is Klebsiella pneumoniae (58% of CPE episodes). The proportion of foreign-related episodes decreased from 80% in 2009 to 42% in 2015. The objective is to describe eXDR incident cases at Lyon University Hospitals (LUH, France) in 2016 and to evaluate eXDR 5 years trend.

Methods eXDR surveillance was implemented at all hospitals from LUH (5362 beds) between 01/01/2016 to 31/12/2016. Population included all
hospitalized patients. The infection control unit was informed by the microbiology laboratory for each eXDR identification. A case was defined as a patient with eXDR isolation in clinical sample or in rectal swab (including index or secondary cases, colonization or infection cases, whatever the anatomic site). An index case and the secondary cases possibly generated determined an episode. A contact patient was a patient who received care by the same healthcare team as a case. Demographic data, type of case (index/secondary, infection/colonization, foreign link), and bacteriological data were collected and analyzed; eXDR trend was evaluated since 2012.

**Results** In 2016, 79 eXDR cases were identified (equally distributed between CPE and VRE); among them, 47 were index cases (episodes). Concerning index cases, 61.7% of them were men and mean age was 62.7 ± 18.8 years (range 11–103 years). On average, 16.1% of the episodes lead to secondary cases, which represented 32.6% of all the cases. Regarding CPE species, 35% of them were represented by *Klebsiella pneumoniae*, followed by *Enterobacter cloacae* (30%), *Citrobacter freundii* (12%) and *Escherichia coli* (10%); 27.7% of cases were infected with CPE, 70.2% were colonized. For 42.5% of the index cases, a link with foreign countries was identified (65% of them were represented by CPE). About CPE resistance mechanism, OXA-48 represented 62% of the cases, followed by VIM (25%), NDM (5%) and OXA-23 (3%); for VRE, the main mechanism of resistance was VanA (54%). In previous years of surveillance, 11 cases in 2012, 12 in 2013, 32 in 2014, 61 in 2015 and 79 in 2016 were identified. In summary, in our university hospital, a significant eXDR increase from 2012 to 2016 has been observed. According to the “National Action Program for the Prevention of Healthcare-Associated Infections” (2015), two objectives must be reached: proportion of episodes with secondary cases < 10% and proportion of secondary cases on the total number of cases < 20%. In LUH, in 2016 these two indicators were 16.1% and 32.6%, respectively and at the national level in 2015 10% and 21%, respectively.

**Conclusions** eXDR augmentation trend observed in the last 5 years in our university hospital is in line with the national one; this increase is due to the strong antibiotics utilization in human medicine, animal nutrition and agriculture since many decades, and only to a lesser extent to the improvement of diagnostic tools. To prevent eXDR spreading and cross-transmission, a constant effort must be devoted to: fight against antibiotic resistance, identify patients at risk of infection or colonization by eXDR, apply isolation measures and contact precautions, track and screen all carrier patients and their contacts.

**Disclosure of interest** The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.414

**P8-25**

**Surveillance of surgical site infections cases in prosthetic orthopedics in a French University Hospital, from 2013 to 2016**

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**Introduction** Surgical site infections (SSI) in prothetic orthopedic surgery are infrequent but serious complications. They are responsible for repeated and prolonged hospitalizations, morbidity, and severe disabilities, which can be life-threatening and lead to high hospitalization costs. SSI incidence after total articular prosthesis is estimated between 0.5 and 6% in the United States and between 0.5 and 1% in Europe. In France, in 2015 SSI incidences after total hip arthroplasty (THA) and total knee arthroplasty (TKA) were 0.8% and 0.5%, respectively. The objective is to report SSI incidence trends and to describe SSI cases for patients hospitalized for THA and TKA in a Prosthetic Orthopedic Unit of Lyon University Hospital (LUH), from 2013 to 2016.

**Methods** This surveillance was targeted to adult patients operated on for a scheduled or emergency surgery of THA and TKA in an Orthopedic and Traumatological Surgery Unit of Edouard-Herriot University Hospital (Lyon, France, 1160 beds), from January 1, 2013 to December 31, 2016. Patients’ follow-up lasted one year; all the cases of surgical revision in Orthopedic or Emergency Surgery Unit were identified and consulted, in order to check for a possible infectious reason. All SSI suspected cases were studied and evaluated in collegial discussion, after consultation of patient records, analysis of revision reasons and of bacteriological positive samples. SSI incidence was calculated by % cases/total population of patients operated on from 2013 to 2016 [95% confidence interval (95% CI) is indicated].

**Results** In total, from 2013 to 2016, 1497 patients have been operated on for arthroplasty (40.3% of TKA, 59.7% of THA); 60.7% of them were women, average age was 68.6 ± 14.4 years. ASA distribution was: 1 (9.5%), 2 (53.6%), 3 (34.7%), 4 (1.5%), 5 (0.1%). Average surgery duration was 105.1 ± 43.4 min (surgery duration < 75 percentile for 74.4%). In total, from 2013 to 2016, 18 SSI were identified (1.2%); 95% CI: 0.7–1.9%; 1.1% (95% CI: 0.6–2.0) for THA and 1.3% (95% CI: 0.6–2.5) for TKA. Men and women were equally represented; average age was 65.0 ± 18.7 years. In particular, 88.9% of them were deep infections; 55.6% of them occurred on a THA. Average surgery duration was 144.0 ± 106.7 min; only ASA score 2 (61.3%) and 3 (38.9%) were present. In 61.1% of the cases, infection responsible bacterium was *Staphylococcus aureus* methicillin-sensible; for the remaining cases or as secondary germ, the following bacteria were involved: *Staphylococcus epidermidis* (3), *Escherichia coli* (2), *Propionibacterium acnes* (2), *Proteus mirabilis* (1), *Morganella morganii* (1), *Raoxiella ornitholytica* (1), and unidentified germ (2). Average delay time of infection occurrence was 49.9 ± 48.6 days; 3 SSI cases (16.7%) occurred more than 3 months after surgery. SSI incidence values per year in LUH were: 1.1% in 2013, 0.9% in 2014, 1.2% in 2015 and 1.2% in 2016 for THA; 0.6% in 2013, 1.1% in 2014, 0.8% in 2015 and 3.3% in 2016 for TKA.

**Conclusions** In our university hospital, SSI incidence on prosthetic orthopedics interventions (THA and TKA) from 2013 to 2015 maintained a nearly constant trend, higher than national level (national global incidence from 2013 to 2015: 0.6% [95% CI: 0.6–0.7]). In 2016, SSI incidence on THA remained constant, while SSI incidence on TKA showed a threefold increase. SSI cases analysis indicated that they were all characterized by known patients (overweight or obesity, insulin-dependent diabetes or immunosuppressive therapies) or intervention risk factors (longer intervention duration). The most frequently identified microorganisms are of cutaneous origin, emphasizing the importance of preoperative preparation, including preoperative showers, depilation and skin disinfection. According to the “National Action Program for the Prevention of Healthcare-Associated Infections” (2015), the objective of SSI incidence on THA and TKA inferior or equal to 1% must be reached and maintained.

**Disclosure of interest** The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.415

**P8-27**


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**Introduction** Mandatory health investigations of children before school entrance in Germany allow the surveillance of vaccination rates in subsequent age cohorts of school beginners at the age of school entrance (about six years). The aim of the study presented here was an overview of secular
Results The percentage of children with a written documentation of the vaccinations they received was 90% > 92% compared to all children investigated. The highest vaccination rates during the whole observation period were observed for the vaccinations against diphtheria, tetanus and poliomyelitis. Vaccination rates against pertussis covered 10–20% of the children until 1996 and increased since then to 93% in 2014 after the introduction of acellular pertussis vaccines and recommendation of the vaccination for all children. The vaccination rates against measles, rubella, hepatitis B and varicella mainly reflect the development of recommendations of the German Standing Committee on Vaccination (STIKO). So the second vaccination against measles was recommended until 2000 at the age of 4 to 5 years. This recommendation was changed 2001 to the age of 1 to 2 years, which led to an increase in the corresponding vaccination rates to almost 95% in 2014. The general recommendation of the vaccination against varicella for children was introduced in 2004 and subsequently the vaccination rates among school beginners increased and reached 77% in 2014. This is still below the rates of other vaccinations introduced decades before.

Conclusions The regular collection of data on vaccinations in school entrance health investigations allows a continuous surveillance of vaccination rates based on 90–92% of all school beginners. The interpretation of secular trends has to take into account changes in the recommendations of the German Standing Committee on Vaccination as well as potential changes in the age of the children at time of investigation. The time series can indicate infections risks due to missing vaccinations among adolescents and adults, in case these age groups did not receive missing vaccinations after school entrance. Therefore the regular collection of these data from vaccination documents of school beginners should be continued for a long-term surveillance by public health offices.

Disclosure of interest The authors declare that they have no competing interests.

https://doi.org/10.1016/j.jrespc.2018.05.418

P8-30 Trends in the incidence of asthma in adults: A Korean population-based study J.Y. Shin a,⁎, J.H. Hwang b, M. Park c, J.S. Lim d, M.S. Yang e, J.Y. Lee d

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Background Current population-based data on the incidence of asthma in Korean adults are scarce, although the cross-sectional prevalence study had been conducted. Moreover, estimates of asthma incidence in elderly are rare. Objective We aimed to investigate the annual incidence of asthma among Korean adults and identify differences in the asthma incidence according to demographic and socioeconomic characteristics over the study period 2004–2012. Methods A population-based cohort study was conducted using the 2002–2014 National Health Insurance Service–National Sample Cohort (NHIS-NSC). It consisted of 1,025,340 randomly selected participants, comprising 2.2% of the total eligible Korean population in 2002. Among these, 746,816 adults older than 20 years receiving National Health Insurance were included in the study. The cohort consisted of 746,816 adults aged over 20 years with National Health Insurance (NIH). We defined cases as a person with two or more physician claims with a primary diagnosis of asthma (ICD 10 code J45 or J46) and asthma medications within at least 1-year interval. Age- and sex-specific incidence rates were determined by dividing the total number of adults newly diagnosed with asthma by the total number of person-years (PY) accumulated. The incidence rates were age-adjusted to according to the 2005 Korean population census. Poisson regression analysis was used to calculate sex- and age-adjusted incidence rates and to test the difference in incidence trends according to age, sex, and income groups. Trends in incidence over time were assessed using Joinpoint Regression Software. We analyzed the trend of each line segment using the annual percent change (APC), and the overall trend for the whole study period (2004–2012), using the average APC (AAPC).

Results The incidence rate was significantly increasing until 2008 (AAPC 13.8), and from 2008 to 2012, it showed decreasing trend although not significant (APC −2.9). The crude incidence rate per 1000 person-years was 4.53 in 2004, 8.04 in 2008, 7.08 in 2012, respectively. Age and sex adjustment did not change this trend. Incidence for women was higher than for men and the difference was constant according to the year. Incidence rates increased with age and this difference increased over calendar time. There were no significant differences in the incidence of asthma by five income groups.
Conclusion Our population-based cohort study observed that the incidence of asthma in Korean adults (2004–2012) has not increased from 2008 onward, directly indicating the stabilization of asthma incidence as suggested in previous studies. Further studies are needed to investigate the decrease in asthma incidence rate and high incidence in susceptible groups.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.420

P8-31 Who Lyon Office: Supporting countries in achieving the international health regulations (2005) core capacities for public health surveillance

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Introduction The International Health Regulations (IHR) are a legally binding agreement revised in 2005 and endorsed by 196 countries. Through the IHR, countries obliged themselves to develop, strengthen and maintain a set of minimum core capacities for surveillance and response at all levels of the country (i.e. local, intermediate, national level). These capacities include: the detection of any unexpected public health event at all times and in all areas of the country; the immediate reporting of these events to the upper level; the immediate implementation of preliminary control measures; the notification to the World Health Organization (WHO) of any potential public health emergency of international concern. These requirements provide a paradigm change in national public health surveillance, with an emphasis put in the early detection and response to any type of public health event. Global guidance and tools are useful to support countries in achieving the IHR core capacities for surveillance and response.

Methods Established in 2001, the WHO Lyon Office is part of the WHO Health Emergencies Programme and aims to support countries in achieving the IHR core capacities. The Laboratory and Surveillance Strengthening team is in charge of developing global guidance and tools and providing support to priority countries for public health surveillance strengthening.

Results Over the years, the WHO Lyon office has developed guides, training materials, and provided financial and technical assistance to public health surveillance systems in resource-limited countries. To strengthen the early detection and response function of the public health surveillance system, WHO has published two guides: “Implementation of Early warning and response with a focus on event-based surveillance” and “Coordinated public health surveillance between points of entry and national health surveillance systems”. An implementation toolbox is available for the later guide to support countries in assessing their existing capacities, developing a tailored action plan, and implementing the action plan for capacity strengthening. An electronic tool (Argus) has been developed to facilitate the reporting and management of public health surveillance data in respect of the integrated Disease Surveillance and Response technical guidelines, the WHO Regional Office for Africa surveillance strategy. A systematic literature review has been performed to understand how to better involve the community in event detection and prepare a roadmap to strengthen so-called community-based surveillance. Additional topics of interest to achieve IHR core capacities for public health surveillance have been identified and will lead to additional activities.

Conclusions In many countries, achievement of the IHR core capacities for surveillance and response needs appropriate global guidance and tools, but also international cooperation among all stakeholders to ensure priority needs are supported first and in a coherent manner. The presentation of the WHO Lyon Office activities for public health surveillance strengthening may be the occasion to highlight priority needs and create new partnerships.

Disclosure of interest J. Guerra link with: Pierre Nabeth, previous team leader of the surveillance team at WHO Lyon office. S. Cognat, F. Fuchs declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.421

P8-32 Drinking unboiled water is the risk factor of Blastocystis incidence in rural community Thailand from prospective cohort study

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Introduction Blastocystis sp. is one of the most common intestinal protozoa in humans, which is found to be asymptomatic. Recently, there are reports suggesting it is to be pathogenic in immunocompromised host. The patients will present with history of watery stool and diarrhea. Despite the discovery of Blastocystis approximately 100 years ago, limited information is available regarding its incidence and risk factors. The aim of this study was to identify the incidence and the risk factors associated with Blastocystis infection in the rural community of Thailand.

Methods The prospective cohort study was performed between February and December 2016 in PhraPloeng community, KhaO Cha Kan district, Sakaeo province, Thailand. All stool samples were tested for the presence of Blastocystis sp. By direct microscopy of native (0.09% NaCl) and culture john media techniques. Cox’s proportional hazard regression analyses were performed to identify potential risk factors for infection.

Results Total of 354 persons who primary identified as Blastocystis negative at baseline in February 2016 were enrolled into this study. In the 10 months follow-up, we identified 26 new cases of Blastocystis infection and this participants contribute total person time of follow-up as 289.8 person-years. The incidence for Blastocystis infection is 8.97 per 100 person-years. In addition, we also follow-up of 50 infected participants from the baseline, which show the incidence of spontaneous recovery and persistence or reinfection as 75.73 per 100 person-years and 46.41 per 100 person-years, respectively. After adjusted for potential confounding factors by using multivariable Cox’s proportional hazard regression analysis, we found that drinking unboiled water is independently associated with incidence of Blastocystis infection (IRR = 3.1, 95% CI = 1.11–8.47).

Conclusions A high incidence of Blastocystis sp. infection was found in rural community of Thailand, which was 5 times higher than the orphanage study in Bangkok. Unboiled water intake of the incidence of Blastocystis sp. was highlighted as the risk factor for the infection. The results implicate the waterborne transmission of Blastocystis sp.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.422
P8-33
Responding to yellow fever outbreaks in West and Central Africa: Rapid prioritization assessment for the pre-emptive vaccination campaigns
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Introduction
Recent yellow fever (YF) outbreaks in Africa, such as 2016 in Angola, or 2017 in Nigeria, have demonstrated the ongoing threat of large-scale urban YF outbreaks. Moreover, outbreaks of other mosquito-borne diseases (Zika, chikungunya) have increased awareness of the potential for rapid, international spread of arboviruses. Swift outbreak response, for YF primarily in the form of vaccination, is therefore essential to prevent local and international spread. However, limited global stockpiles means that the prioritization of geographic areas for pre-emptive vaccination campaigns is required (i.e., vaccination campaigns targeting areas that are at risk of disease introduction and spread but as yet unaffected). Conducting a rapid prioritization assessment based on the risk of disease spread is thus highly valuable to inform decisions on vaccination activities in a context of emergency.

Objective
To develop a method for rapid risk assessment of YF spread to prioritize sub-national administrative units (hereafter called province) for pre-emptive campaigns. Specific requirements for this method are:
– speed of implementation in the context of emergency response;
– transparent methodology to allow discussions with and feedback from decision-makers.

Method
We developed a heuristic method to quantify the risk of YF spread by integrating multiple data streams: population sizes, estimates of existing vaccine-induced population-level immunity, recent incidence of yellow fever cases in the province and travel flows between provinces. The resulting risk score primarily reflects the expected absolute number of yellow cases in the respective province, accounting for local cases and the risk of case importation. Based on their risk score, provinces are ranked according to priority for vaccination and target population sizes are estimated. This baseline, quick-to-compute, risk assessment can be refined by integrating additional elements. For example, the presence and population size of large urban centres at the province level may be relevant to characterize the risk of urban outbreaks, and of international spread in the case of highly connected urban centres. Similarly, independent estimates of the local transmission potential of the disease produced by a mathematical model can be combined into this risk metric.

Results
This heuristic method has been used in collaboration with the World Health Organization in the context of urgent response to yellow fever outbreaks that affected Angola and the Democratic Republic of Congo (DRC) in 2016 and Nigeria in 2017. Results were provided in a form that allowed decision-makers to easily and interactively adjust the relative weights of different factors and visualize the effect on the results. Moreover, the transparency of the method allowed decision-makers to provide feedback and to request the integration of additional elements considered as relevant for outbreak control (for instance: trans-border movements in Angola-DRC). This risk assessment contributed to inform decision for mass vaccination campaigns conducted in the DRC in 2017 and for campaigns (still under consideration) in Nigeria in 2018.

Conclusion
By integrating different, mostly publicly available, data streams, we developed a risk assessment method that can be quickly implemented in the context of yellow fever outbreak response. The transparency and flexibility of the method enhanced interactions with decision-makers to refine estimates.

Disclosure of interest
The authors declare that they have no competing interest.
https://doi.org/10.1016/j.respe.2018.05.425
Burden of infections related to antibiotic resistant bacteria in France in 2015: Results from the French Hospital discharge database

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Introduction The massive use of antibiotics has led to a significant increase of bacterial resistance to these drugs, making infections more difficult to treat; antimicrobial resistance has become a major public health issue. Few studies have assessed the total burden of antimicrobial resistance, and there is a paucity of comprehensive population-based data. In 2014, because of the impact of antimicrobial resistance on public health, the World Health Organization revised its codification of infections and antimicrobial resistance in the 10th revision of the international classification of diseases (ICD-10), which is used in the French Hospital Discharge Database (PMSI). In France, special attention was given to resistance causing therapeutic difficulties leading to additional specific codes in ICD-10. These improvements are an opportunity to use national healthcare database in order to reduce assumptions and to base burden estimations on actual nationwide data. This study aims to estimate the overall situation of antimicrobial resistance in France based on the PMSI.

Methods Study population was incident hospitalizations with an acute infection caused by *Streptococcus*, *Staphylococcus*, *Enterobacteriaceae* or another Gram negative bacteria in 2015. Hospitalizations with infections were identified in the PMSI database from established lists of ICD-10 corresponding to infections, microorganisms and resistances codes. Stays (>1 day) with an admission between January 1 and December 31, were selected when at least one code of infection was present in principal, related, or significant associated diagnosis. Patients hospitalized with infections in the 12 months preceding the admission were excluded. Using medical-administrative databases for a different objective from their original purpose leads to difficulties, in particular in the context of infectious disease: diagnoses are not related, and some information could be unknown. First, stays were usable only if the infection, the microorganism and the potential resistance could be related. For these stays, bacteria were considered susceptible when no resistance was recorded. Second, if no bacterial species was noted (i.e. because the physician considered irrelevant/unnecessary to obtain microbiological sample or because the culture results may be negative, etc.), the causal agent and its resistance status were extrapolated from the stays with usable information, according to sex, age (7 categories) and site of infection (11 categories). Resulting stays were characterized, characteristics of infections with resistant bacteria analyzed and the burden of resistance in France estimated.

Results In 2015, 979,902 incident hospitalizations with an acute infection were selected. Bacteria species was recorded in 30% of the cases. After extrapolation, it was estimated that bacterial resistance was associated with 111,177 incident infections in France, corresponding to 11.3% of all incident infections. These infections were mostly of the urinary and genital tracts (25.2%), lower respiratory tract (21.1%), gastrointestinal and abdominal (20.7%) and skin and soft tissues infections (14.2%). Among resistant bacteria, the most frequently detected were ESBL-producing *Escherichia coli* (28.0%), methicillin resistant *Staphylococcus aureus* (MRSA, 19.9%), and *Klebsiella pneumoniae* ESBL (5.2%). MRSA and ESBL-producing *Enterobacteriaceae* (ESBL-PE) were estimated to cause 22,081 and 39,600 infections annually, respectively.

Conclusions This study is the first study to evaluate the burden of resistance from a national comprehensive database. Resistance rates among blood infection estimated from the sample (ESBL-PE, MRSA and VRE) were in accordance with those provided by EARS-net, validating the extrapolation. This study also confirms the importance of ESBL-PE and MRSA in the overall burden of resistance.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.427

Influence of physical chemical water parameters on abundance and presence of the arbovirus vector *Aedes Albopictus* (Diptera: Culicidae) in Larval habitats of forest fragments

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Introduction The species *Aedes albopictus* (Diptera: Culicidae) is a mosquito of great epidemiological importance because it carries several arboviruses that cause diseases in humans, including the dengue virus. In Brazil, this species was introduced in mid-1986 and nowadays is found in almost the whole country cities, developing in natural or artificial breeding sites in peri-urban and urban areas. For aquatic insects living in lentic environments, such as immature forms of mosquitoes, the physicochemical environment factors represent important constraints that can influence the development, survival and adaptation of the organism. Despite this, few studies have sought to investigate the influence of physicochemical factors on the incidence and abundance of vector mosquitoes. In this study we investigated the influence of pH, practical salinity unit (PSU), water temperature in degrees Celsius (°C) and oxygen dissolved in parts per million (DO ppm) on the incidence and abundance of *Aedes albopictus* collected in larval habitats found in four urban green spaces in the city of São Paulo.

Methods Natural breeding sites (bromeliads, bamboos, trees holes, and puddles) and artificial ones were explored (water boxes, plant pots, tires, etc.) during 12 months of collection. The physicochemical parameters were measured using a multiparameter device Hanna-HI-9828. The predictive relationship between the measured physicochemical factors and the incidence and abundance of *A. albopictus* was evaluated by generalized additive models (GAM). Akaike Information Criterion corrected for small samples was used to select the model with the best fit and explanatory power. For a better understanding of the non-linearity of relationship between the variables, a tree regression analysis was made from the selected model.

Results A total of 4212 specimens of *A. albopictus* were collected in 142 positive samples from both natural and artificial breeding sites. In relation to the positive samples the variation in the physicochemical parameters was: pH 2.3 to 9.8, PSU < 0.01 to 6.33, °C 9.8 to 31.5, and OD ppm < 0.01 to 24.2. The model that best explains the incidence includes the parameters pH and salinity, as the maximum probability of occurrence of the species (79%) in pH > 4.8 and PSU > 0.175. The abundance was better explained by pH, salinity and temperature, with higher average abundance (151 individuals/mean) in PSU > 0.335, pH < 7.1 and °C < 22.15.

Conclusions The mosquito *A. albopictus* showed to be adapted to wide variations in physicochemical conditions of larval habitats, which in part explains its wide ecological value and worldwide dispersion. The predictive models proposed in this study may be useful to help understand the relationship of *A. albopictus* and other vector mosquitoes with abiotic environment constraints.

Keywords Arbovirus vector; *Aedes albopictus*; Physicochemical parameters; Breeding sites

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.428
Surveillance of leishmaniasis in the WHO European Region

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Introduction Leishmaniasis is a neglected tropical disease (NTD), which is endemic in large parts of the world. \textit{Leishmania infantum} is the etiological agent of canine leishmaniasis (CanL\textsuperscript{[1]}) in Europe, with dogs as the major reservoir of the parasite for humans and other mammalian hosts. This zoonotic \textit{Leishmania} species is responsible for the majority of human cutaneous leishmaniasis (CL) and visceral leishmaniasis (VL) cases in the WHO European Region (EUR). Here, the disease mainly occurs around the Mediterranean basin as well as in Caucasus and Central Asia. Surveillance is key to better estimate the burden of leishmaniasis in EUR and take appropriate action to control the diseases.

Methods WHO supports countries in their fight against the burden of leishmaniasis. This includes the collection, analysis and publication of data to monitor the disease. Every year, WHO collects the number of new autochthonous and imported cases, both for CL and VL. These indicators, along with the endemicity status of each Member State, are published in the Global Health Observatory (GHO). Since 2014, WHO has strengthened data collection in 25 priority countries worldwide, 3 belonging to EUR (Georgia, Spain and Turkey). For these countries, WHO publishes detailed country profiles annually on leishmaniasis burden and control. These data are also entered in the WHO integrated data platform, based on DHIS2, which aims at strengthening data collection, use and dissemination, both at national and global levels.

Results Twenty-five Member States of EUR (47%) are classified as CL-endemic and 27 (51%) are classified as VL-endemic in the GHO. Of these countries, 12 reported cases of CL and 14 reported cases of VL in 2015 and/or 2016. A total of 2815 autochthonous and 1180 imported CL cases were reported in EUR in 2016, which corresponds to 1.6% and 84.6% of cases reported globally, respectively. Moreover, a total of 303 autochthonous and 38 imported VL cases have been reported from EUR in 2016, which corresponds to 1.5% and 66.7% of cases reported globally respectively. Since 2016, six additional countries from EUR have been reporting detailed data to enable the publication of country profiles. As a result, nine detailed country profiles from EUR Member States were published for 2015 and 2016. They are publicly available at http://www.who.int/leishmaniasis/burden/endemic-priority-alphabetical/en/Affected-countries in EUR also met in 2017 at a meeting in Sofia, Bulgaria, to exchange data and develop future control strategies. Since then, Armenia has made efforts to strengthen their surveillance system and the DHIS2 platform was customized to fit the nationally collected data of individual cases.

Conclusions Cutaneous and visceral leishmaniasis are endemic in wide areas of the WHO European Region, with a large population at risk of disability and death. As the main \textit{Leishmania} species involved is zoonotic, One Health considerations linking up human and veterinary public health and control efforts are required. WHO supports Member States in strengthening leishmaniasis surveillance, e.g. through standardizing indicators and facilitating reporting, in order to better estimate burden and take appropriate action to tackle the disease as stated in the United Nations’ Sustainable Development Goals to end the epidemic of neglected tropical diseases.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.429

Meningococcal carriage in the European Union from 2007–2016: A systematic review and meta-analysis

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Introduction Despite an overall decrease in the incidence of meningococcal disease within the European Union (EU) in recent years, it continues to be a public health concern due to the disease severity, outbreak potential, and peaks in incidence among infants and adolescents. Since pharyngeal carriage of meningococcal disease is the primary means of disease transmission, it is important to compare carriage data to disease data from the same region to inform future vaccination policy. We aim to characterize the recent state of meningococcal carriage within the EU by reviewing the prominent serogroups associated with pharyngeal carriage.

Methods We conducted a systematic review of the literature and relevant conference abstracts to identify studies reporting on serogroup-specific meningococcal carriage among age groups and in high-risk settings (military, university, and Hajj) for 2007–2016. Additional data were requested from authors of meningococcal carriage studies in specific age groups to standardize age ranges. These data were then used to conduct age-specific meta-analyses to elucidate serogroup-specific carriage in various age groups. Independent random effects meta-analyses were conducted for key serogroups—A, B, C, W, X, and Y—using the Freeman–Tukey transformation and exact binomial confidence intervals. For studies not eligible for meta-analysis, a narrative synthesis was performed.

Results In total, 15 studies of the 4965 identified met our inclusion criteria and reported carriage data among military personnel (N = 3), university students (N = 6), and/or defined age groups (N = 12) from EU countries. No study reported serogroup-specific carriage among Hajj/Umrah pilgrims. Overall carriage rates in military personnel were higher among new recruits in Greece (15.2%) than in professional soldiers in Poland (5.2–5.7%). Serogroups B (range: 1.6–6.8%) and Y (range: 0.5–1.4%) were the most prevalent serogroups in all military studies. Among university studies, overall carriage ranged from 10.4% in Greece in 2015 to 62% in England in 2009. Serogroups B, W, and Y were the most common key serogroups identified. Overall carriage rates in defined age groups were lowest among 10–12-year-olds in England at approximately 3% and highest among studies from university-aged students (range: 13–62%). No studies were conducted among older adults. Data from eight studies were included in the meta-analyses. Four studies reported data among 11- to 17-year-olds (England N = 1, Italy N = 2, France N = 1), and seven among 18- to 24-year-olds (England N = 3, Italy N = 2, France N = 1, Portugal N = 1). In 11- to 17-year-olds, among key serogroups, serogroup B was most prevalent (1.92%, 95% CI: 1.26–2.71). The remaining key serogroups in this age group each had a prevalence of < 1%. Carriage increased among 18- to 24-year-olds, with serogroup B (5.04%, 95% CI: 3.02–7.51) and Y (3.91%, 95% CI: 1.30–7.75) the most prevalent. As in 11- to 17-year-olds, carriage rates in the other key serogroups was < 1% each.

Conclusions The primary serogroups identified in the age groups responsible for transmission correspond to those with higher incidence within the EU: serogroups B and Y with W increasing in recent years. Surveillance of invasive disease and carriage studies should continue, especially in light of the introduction of new vaccines within many countries’ national immunization schedules. Since conjugate vaccines for serogroups A, C, W, and Y have been shown to induce herd immunity and decrease carriage for serogroups A and C, the national vaccine strategies targeting age groups at highest risk for carriage acquisition and transmission could further reduce the overall burden of disease. Additional studies are required to understand the impact of new meningococcal serogroup B vaccines on carriage and their breadth of protection against disease.

Disclosure of interest M.E. Peterson, Y. Li, R. Mile, H. Shanks, H. Nair declare that they have no competing interest; M.H. Kyaw link with: MHK is an employee of Sanofi Pasteur.

https://doi.org/10.1016/j.respe.2018.05.430
Prevalence and risk factors

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Introduction Healthcare-associated infections (HAI) represent a major public health problem. Our study aimed to determine prevalence of HAI in Sahlo University Hospital, and their risk factors in order to redirect preventive measures and improve the quality of care.

Methods A cross-sectional study of one-day prevalence with a single pathway was carried out in 2017. All services were included in the survey, except emergency and hemodialysis services due to their very short length of stay. We used a questionnaire, NosoTun plug (national HAI prevalence survey), filled beside all hospitalized patients, since at least 48 h. HAI risk factors were analyzed by step by step descendant logistic regression with a significance degree of P < 0.05.

Results In total, 307 patients were included. The mean age was 49 ± 22.16 years. The prevalence rate of infected patients was 10.4% (n = 32). The prevalence of nosocomial infections was 11.4% (n = 35). This prevalence was most frequent in intensive care units (40%). Infections on surgical site infections were the most frequent (n = 9; 25.71%), followed by respiratory infections (n = 8; 22.85%). In total, 26 germs were identified, the most frequent were Gram Negative Bacilli (53.8%). Retained HAI risk factors after univariate and multivariate analysis were obesity (P = 0.034), prosthesis placement (P = 0.020), central venous catheter (P = 0.000) and surgery (P = 0.006).

Conclusion The present study showed that HAI are more frequent among patients who are exposed to invasive healthcare procedures. So, the results of this study should be considered in our strategy for preventing HAI.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.432

Post-operative antifungal prophylaxis in lung transplant recipients: Unprecedented evidence

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Introduction/Objectives Despite recent advances in lung transplantation, Aspergillus infections are still a major concern in lung transplant (LT) recipients. The genus Aspergillus may manifest as colonization or infection forms. The latter being associated with significant mortality and morbidity. Colonization, defined as bronchoalveolar lavage or bronchial aspirate, or positive bronchoalveolar lavage galactomannan test, or at least two positive sputum cultures, or tracheal aspirate for Aspergillus spp. in asymptomatic patients with normal-appearing respiratory mucosa or absence of endobronchial lesions, usually precedes infectious forms and complicates transplantation course. While several antifungal prophylactic strategies have been used to limit this deadly disease that mesh with this complex endeavor, evidence from retrospective or prospective studies is lacking. In a recent international survey, only 50% of lung transplants’ centers use antifungal prophylaxis, yet, substantial differences regarding the duration and the modality of antifungal prophylaxis exist among centers and, hence, increase the unmet need for clear recommendations. Since airways’ colonization usually precedes Aspergillus infections and LT recipients are most vulnerable, in particular, during the early post-operative period due to anastomotic ischemia, Aspergillus’ eradication seems to be a plausible solution to prevent or minimize Aspergillus colonization/infections post-transplantation. Consequently, all patients who underwent single or double lung transplantation in our center after 2014 received antifungal prophylaxis started on day 1 post-transplantation and carried on till healing of bronchial anastomosis. We report our 4-year experience with antifungal prophylaxis in LT recipients.

Methods A retrospective analysis was conducted and compared LT recipients who systematically received inhaled amphotericin B deoxycholate (6 mg twice daily) and 200 mg twice daily voriconazole (2014–2017) to those who did not (2008–2013). Only non-cystic fibrosis LT recipients were included in the analysis given that cystic fibrosis patients usually harbor aspergillus species in their sino-nasal/respiratory tract, a fact that may underestimate such therapeutic strategy benefit and Aspergillus’ eradication may not be achieved. The data showed in this analysis was traced till hospital discharge.

Results A total of 142 non-cystic fibrosis patients had undergone single/double lung transplantation. Between 2014 and 2017, 59 LT recipients received antifungal prophylaxis and Aspergillus spp. was found in 20 patients (incidence of 33%), while in the control group (n = 83) Aspergillus spp. was recovered from 42 patients (incidence of 50%). The difference between these two groups was statistically significant (P = 0.04) suggesting a potential beneficial effect of prompt post-operative antifungal prophylaxis in reducing Aspergillus colonization. Aspergillus fumigatus, A. niger, and A. flavus were most commonly found.

Conclusions Immediate post-operative antifungal prophylaxis using amphotericin B deoxycholate and oral voriconazole significantly reduced nosocomial Aspergillus colonization in non-cystic fibrosis LT recipients. A finding that might decrease subsequent Aspergillus related complications and reduce unnecessary morbidity. However, prospective controlled randomized trials with long-term follow-up are eagerly awaited.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.433

Post-operative antifungal prophylaxis in lung transplant recipients: Unprecedented evidence

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Prevalence study of nosocomial infections in University Hospitals in South Algeria, February 2017
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Introduction Nosocomial infections or hospital-acquired infection (HAI) are a real public health problem because of their frequency, severity and socioeconomic costs. Prevalence surveys are the basic tool for surveillance of nosocomial infections and have even been recommended by WHO for national or international studies.

Methods In order to estimate the prevalence of hospital-acquired infection and research factors associated with its occurrence, a one-day prevalence survey was conducted at the Tidjini Damerdji University Hospital, Algeria. To collect data, a questionnaire survey method was used.

Results We studied 117 patients who had been present in the same ward for at least 48 h, and who had occupied a hospital bed between 05 to 09 February 2017. The overall prevalence of HAI was 17.94%. The sex ratio was 1.29. The average age was 48.95 with a standard deviation of 19.73 years. The average length of stay was 14.18 ± 18.62 days. The most frequently infected sites were the lungs (33.3%), surgical wounds (28.6%) and the urinary tract (23.8%), the most frequently isolated organisms were Gram negative rods (64.3%). The percentage of patients with intrinsic risk factor (61.90%). The percentage of patients with extrinsic exposure (90.47%).

Conclusion This survey provided information on the prevalence of HAI in an Algerian hospital, the breakdown of infections, and HAI predisposing factors.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.434

P8-45

The Community Screening Network project - Surveillance of HIV, viral hepatitis and sexually transmitted infections in the community in Portugal
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Background Since May 2015 the Community Screening Network established an human immunodeficiency virus (HIV), hepatitis C virus (HCV), hepatitis B virus (HBV) and syphilis screening network in Portugal based on community structures directed to key populations, with the objective of increasing early detection, provide linkage to healthcare and monitor the frequency of infections and its predictors.

Methods As part of the Community Screening Network information is collected on rapid tests results from 25 community-based structures that offer HIV (anti-HIV 1/2), viral hepatitis (HBs antigen and anti-HCV) and syphilis (anti-Treponema pallidum) screening. Users aged 18 or older were invited to be part of an open prospective cohort, to complete a structured questionnaire and offered testing; data was anonymously stored but participants have a unique identifier to allow for data linkage.

Results From January 2016 to October 2017, 28,072 eligible contacts were performed resulting in 24,281 (86.5%) baseline or follow-up questionnaires (3791 - 13.5% - refusals). During this period 19,088 persons performed a test at any of the organizations (57.1% men, 42.5% women and 0.4% transgender). In total, 2648 had at least one follow-up evaluation. We found 471 prevalent HIV cases and 47 additional incident cases were detected during follow-up; also, 440 HCV reactive tests of which 24 incident, 310 HBV reactive tests of which 14 incident and 757 syphilis reactive tests of which 112 incident. A reactive result for more than one infection was present in 135 users.

Conclusions This structure is a valuable tool for identification and the monitoring of HIV, viral hepatitis and syphilis in the community and showed the added value of offering combined screening.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.437

P8-48

Time trends in HIV reactive tests among men who have sex with men testing for the first time at CheckpointLX in Lisbon, Portugal
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Introduction In high-income countries with concentrated HIV epidemics, sustained increases in HIV cases attributed to sex between men over the last decade have been observed. Currently a number of effective preventive approaches, that include treatment as prevention and pre-exposure prophylaxis (PrEP) among others, are available and have the potential to reduce HIV. We aimed to describe the proportion of HIV reactive tests by year among adult men
who have sex with men (MSM) testing for the first time at CheckpointLX in Lisbon, Portugal.

Methods We used data from men reporting to have sex with men, aged 18 or more, who presented for testing for the first time at CheckpointLX, a community-based HIV testing and counselling (CBVCT) center tailored for MSM run by trained peer counsellors. The proportion of HIV reactive tests at baseline was computed by year since April 2011.

Results From April 2011 to December 2017, 6211 adult MSM tested for the first time at CheckpointLX of whom 249 (4.0%) had a reactive HIV test at first visit. The proportion of HIV reactive tests at baseline was 3.3% from April 2011 to March 2012 and increased to the highest of 5.8% from April 2014 to March 2015. Then, it decreased to the lowest of 3.1% observed in the period from April to December 2017. In these, almost, seven years of recruitment we observed a mean annual percentage change of 1.8%.

Conclusions We observed an important decrease in the HIV reactivity among new testers at a CBVCT in Lisbon since March 2015. Similar falls in new HIV diagnoses among MSM were reported at selected London sexual health clinics since early 2015. These findings can partially be explained by increased access and uptake of HIV testing as documented in sustained increasing number of new testers at CheckpointLX, combined with immediate access to treatment and, although limited, use of PrEP.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.438

P8.49
Prevalence and risk factors associated with leishmanial infection in Trang Province, Southern Thailand
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Background Autochthonous cutaneous and visceral leishmaniasis caused by Leishmania martiniquensis and Leishmania siamensis have been considered emerging infectious diseases in Thailand. The disease burden is significantly underestimated, especially the prevalence of Leishmania infection among HIV-positive patients.

Methods A cross-sectional study was conducted to determine the prevalence and risk factors associated with Leishmania infection among patients with HIV/AIDS living in Trang Province, southern Thailand between 2015 and 2016. Antibodies against Leishmania infection were assayed using the direct agglutination test (DAT). DNA of Leishmania was detected by ITS-PCR using the buffy coat. Species of Leishmania were also identified.

Results Of 724 participants, the prevalence of Leishmania infection was 25.1% (182/724) using either DAT and/or PCR assays. Seroprevalence of Leishmania infection was 18.5% (134/724), while Leishmania DNA was detected by PCR method was 8.4% (61/724). Of these, 24.9% (180/724) were asymptomatic, whereas 0.3% (2/724) were symptomatic VL and VL/CL. At least five species were identified, that is, L. siamensis, L. martiniquensis, L. donovani complex, L. lainsoni, and L. major. Multivariate analysis showed that CD4+ levels < 500 cells/µL and living in stilts houses were independently associated with Leishmania infection. Those who were PCR positive for Leishmania DNA were significantly associated with detectable viral load. Whereas, non-injection drug use (NIDU) and CD4+ levels < 500 cells/µL were potential risk factors of Leishmania seropositivity.

Conclusions A magnitude of prevalence of underreporting Leishmania infection among Thai patients with HIV was revealed in this study. Effective public health policy to prevent and control disease transmission is urgently needed.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.439
Integrating entomological covariates in a predictive model of malaria incidence in Farafangana, Madagascar: Limitations and benefits

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Introduction
Malaria is one of the leading causes of morbidity in Farafangana, an urban area in the southeastern coast of Madagascar with around 35,000 inhabitants. Predictive models of incidence are needed to strengthen prevention measures in case of an epidemic risk. In a context of large scale vector-control interventions, with changing mosquito density and behaviour, entomological surveillance data could be useful to better forecast malaria incidence. Our primary objective was to build a predictive model of malaria incidence (up to two months in advance) in the primary healthcare center (PHC) of Farafangana, including past incidence (at least two months back), climatic, environmental, vector-control and entomological covariates. Our secondary objective was to quantify how entomological covariates might have improved the model fit.

Methods
Diagnosed malaria incidence data at the PHC of Farafangana came from the Fever Sentinel Surveillance Network of the Institut Pasteur de Madagascar. Climatic data (temperature and precipitations) and environmental data (Normalized Difference Vegetation Index - NDVI) were extracted from the International Research Institute for Climate and Society (missing values were imputed by exponential smoothing). Vector-control covariates, insecticide treated nets from mass distributions and indoor residual spraying, were binary (1 value means effective). From January 2014 until March 2017, human landing mosquito collections were performed every two months for two consecutive nights (from 6 pm to 6 am), inside and outside five houses spread over one central district, close to the PHC. As entomological data were not measured continuously, we made the hypothesis that they could be repeated until the next capture session. We focused our work on the three most abundant vectors: Anopheles gambiae (n = 209), An. coustani (n = 215) and An. funestus (n = 19). Aggressiveness was calculated for each vector species and capture time [number of bites per human and per evening (from 6 to 10 pm), night (from 10 pm to 2 am) or morning (from 2 to 6 am)]. Exophagy percentage was calculated for each species as the number of captures outside houses on the total number of captures (except for An. funestus due to a small number of captures). These entomological data were transformed on a weekly-basis, resulting in 167 cases ofcapture outside houses on the total number of cases (except for An. funestus due to a small number of captures). These entomological data were transformed on a weekly-basis, resulting in 167 weeks of observations. Lags between incidence and non-entomological covariates were determined by cross-correlation maps for quantitative variables and by univariate analyses for binary variables. Accordingly, lagged covariates were built. Only non-correlated lagged covariates were kept (Pearson’s correlation coefficient > 0.70) to avoid collinearity. Negative binomial regression models were built with or without entomological covariates. Better models were chosen according to Akaike’s information criteria (AIC) and validated by leave-one-out cross-validation. Model fit was measured by the determination coefficient (R²) and the root-mean-square error (RMSE).

Results
Lagged NDVI was excluded because of a correlation with lagged temperature and a negative correlation with incidence. Entomological covariates in the reduced model included the evening aggressiveness of An. gambiae, the night and morning aggressiveness of An. funestus and the exophagy percentage of An. gambiae. The model with entomological covariates (R² = 0.619 and RMSE = 11.607 malaria cases per week) had a better fit than the model without (R² = 0.406 and RMSE = 14.654 malaria cases per week).

Conclusion
Entomological surveillance data may improve the prediction of malaria incidence, even in a context of large scale vector-control and when mosquitoes are only captured every two months and from one town district. More frequent captures may generate a better predictive model. However, field Anopheles surveillance remains time- and money-consuming. More studies in various transmission contexts are needed to confirm these results and assess benefits in terms of malaria control and prevention.

Disclosure of interest
The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.440

Correlates of drug resistance comparison between hospital-acquired and community-acquired infections: A multicentre study in Lebanon

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Introduction
Hospitals are a threatening environment because of a variable number of virulent pathogens that are brought to it from the community through admitted patients. The prevalence of hospital-acquired infections is generally higher in developing countries of limited resources. Appropriate antimicrobial therapy is important for treatment of patients with severe infections. Factors related to the host may contribute to an increase in mortality associated with resistant organisms because the severity of the underlying disease may be synergistic with infection with resistant organisms. Patients from socioeconomically deprived areas develop morbidity a decade before people in affluent areas due to the high burden of infectious diseases. Due to the availability of antibiotics in community pharmacies without physician prescription, our country is witnessing an increase in the resistance of a number of bacterial infections to common antimicrobial agents. To our knowledge, no study has ever identified characteristics of bacteria comparing community and hospital settings in Lebanon. Our objective was primarily to determine the patients’ risk factors of infection with multidrug resistance in accordance with the type of infections and to examine the comorbidities as possible determinants of resistant infections.

Methods
This was a multicenter study from five private hospitals. These patients were selected according to positive cultures from the microbiology laboratory in each hospital. Each patient was only included once. Two hundred fifty-eight patients were enrolled in our study. Data were collected through a standardized sheet of patient identification. “Hospital-acquired infection (HAI)” was defined as a localized or systemic condition that resulted from an adverse reaction due to the presence of infectious agents, which occurred 48 hours or more after hospital admission and was not incubating at the time of admission. “Community-acquired infection (CAI)” were defined as an infection detected within 48 hours of hospital admitted patients. Statistical evaluation was conducted through bivariate and multivariable risk factor analyses, with the presence of infection with resistant bacteria as dependent variable. Furthermore, we did stratification according to (HAI) versus (CAI). Data was entered and analysed, using Statistical Package for Social Sciences (SPSS) version 24 software. In all analysis, a P-value <0.05 was considered significant.

Results
Eighty-four patients (32.6%) had resistant bacteria and 174 (67.4%) were infected with sensitive bacteria to their usual antibiotics. Patients having resistant bacteria were older than patients with sensitive bacteria (ORA = 2.82 CI [1.146; 6.945]). As comorbidities, these patients had impaired immune system (ORA = 2.14; CI [1.66; 3.940]). Regarding patients who had (HAI), 54 (46.6%) had resistant bacteria and 62 (53.4%) had sensitive bacteria and a significant relationship was shown with patients having diabetes mellitus (ORA = 3.371; CI [1.307; 8.696]). Among patients with (CAI), 112 (78.9%) had sensitive bacteria while 30 (21.1%) had resistant bacteria and the factor that had a significant relationship was patients having chronic renal failure (ORA = 2.721; CI [1.027; 7.025]).
Conclusion Physicians should be aware of patients’ comorbidities to properly guide initial therapy and should identify patients at risk of bacterial resistance from the onset of infection.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.442

P8-53
The global influenza B study (GIBS): Sharing data from national surveillance to understand the impact of influenza B disease
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Introduction According to World Health Organization (WHO) estimates, annual epidemics result in 3 to 5 million cases of severe illness, and 290,000 to 650,000 deaths worldwide. Traditionally, attention has been directed toward influenza A, which accounts for the majority of influenza cases in most seasons. However, influenza B can represent a considerable proportion of total cases and little is known on the epidemiology of influenza in the tropics. The Global Influenza B Study (GIBS) was launched in 2012 and aimed to collect and analyze information on the epidemiology and burden of disease of influenza B in the world during the past decades and assess differences, in order to support future prevention policies.

Methods National surveillance systems in over fifty countries in the Northern, Southern hemispheres and the inter-tropical belt were contacted to join the GIBS study from June 2013 to February 2016. All countries were asked to make data available from their influenza surveillance system during recent years. Each participating country was asked to provide the weekly number of influenza cases reported, broken down by age group and virus type and subtype, and the weekly influenza-like illness (ILI) or acute respiratory infection (ARI) rates per 100,000 population or 100 consultations when available. For large countries, especially when stretched across different climate zones, stratified data by region/province were requested. The proportion of influenza cases due to type B and Victoria and Yamagata lineages in each country and season were calculated; the correlation between the proportion of influenza B cases and maximum weekly ILI rate during the same season was tested; the frequency of vaccine mismatches was determined; and the age distribution of cases by virus type was described.

Results Twenty-six countries in the Southern, Northern hemispheres and intertropical belt provided virological and epidemiological data from national surveillance from 2000. The database includes almost 1 million influenza cases. Overall, the median proportion of influenza B was 22.6%, with no statistically significant differences across seasons. During seasons where influenza B was dominant or co-circulated, Victoria and Yamagata lineages predominated during 64% and 36% of seasons, respectively. A vaccine mismatch was observed in a quarter of seasons. Patients infected with influenza B were usually younger than patients infected with influenza A. Regional Latin America analyses showed improvements of characterization of influenza B specimens are needed. There is substantial heterogeneity of spatio-temporal patterns of influenza epidemics. An analysis of the age distribution indicated that influenza B is more frequently detected in school children (5–18), influenza A(H1N1) in small children (0–4), influenza A(H1N1)p in adults and influenza A(H3N2) in the elderly (65 years and older).

Conclusion Influenza B is a common disease with some epidemiological differences compared to influenza A. Sharing national surveillance data at a regional or global level is key to understanding the evolution of epidemics and differences of timing between countries. Results from this study should be considered when optimizing control and vaccination strategies in different regions and reducing the global burden of disease due to influenza.

Funding statement The study received a funding support from Sanofi Pasteur.

Disclosure of interest S. Caini, F. Schellevis, J. Paget declare that they have no competing interest; C. El Guerche-Séblain link with: is an employee of Sanofi Pasteur.

https://doi.org/10.1016/j.respe.2018.05.443

P8-54
Coordinated surveillance of the multi drug resistant organisms in a French University Hospital: Results since 2013
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Introduction The control of the cross-transmission of multi drug resistant organisms (MDRO) is a major concern in the healthcare centers. That is the purpose of one of the axes of the French national program of prevention of healthcare-associated infections (Propias). To adapt the recommendations, a French multicenter university hospital started a coordinated and standardized surveillance of MDRO since 2013. The objective of the study is to know the global incidence rate of MDROs and to follow this rate along time.

Methods An active standardized surveillance of MDRO was carried out in a university hospital of about 6000 beds. The methodology was based on the French national MDRO’s surveillance network (BMR-RAISIN). All mexitilin resistant Staphylococcus aureus (MRSA), and extended spectrum beta-lactamase Enterobacteriaceae (ESBLE) detected in clinical specimens performed between April 1, and June 30, in 2013, 2015, and 2017, in the hospitalized patients (in conventional ward or week hospitalization) were included. Screening for colonization and environment samples were excluded. To describe the population with MDROs, we collected data on patient characteristics, specimen sample site, acquired or imported, infection or colonization, ESBLE species, resistance profile for certain antibiotics markers. To calculate the incidence rates, the number of hospitalization days was collected for each period of surveillance.

Results For the 3 surveillance periods, a total of 1191 MDRO were included, distributed in 989 ESBLEs (93.04%) and 202 MRSA (16.96%). The main ESBLE species were Escherichia coli (41.6%), Klebsiella pneumoniae (31.6%) and Enterobacter cloacae (11.4%). The proportion of E. coli decreased along time to the detriment of the other Enterobacteriaceae species, in particular for imported ESBLE (P = 0.0304), while the time evolution was not statistically significant for acquired ESBLEs (P = 0.0555). There were 506 acquired MDROs (42.5%) and 651 imported (54.7%). The most frequent sample types were urine samples (N = 608, 52.9%), respiratory specimens (N = 185, 16.1%) and bloodstream specimens (N = 123, 10.7%). MDROs were responsible of 786 infections among the 1108 for which the information was available (70.9%). Fifteen ESBLEs among 952 were imipenem-resistant (1.6%), and 54 among 868 were ertapenem-resistant (6.2%). The proportion of ertapenem-resistant ESBLE was 2-fold increased between 2013 and 2017, from 4.3% to 8.4% (P = 0.06). A 20% decrease of the incidence rate of MRSA was observed between 2013 and 2017: from 0.25/1000 hospitalization-days in 2013, to 0.17 in 2015, and 0.20 in 2017. This decrease was higher in imported MRSA group. A 62.7% > increased of the ESBLE incidence rate was observed, from 0.83/1000 hospitalization-days in 2013 and 2015 to 1.35 in 2017. This increase was observed both for the imported and acquired ESBLE but was higher for the imported ones.

Conclusions The implementation of this surveillance allowed the University hospital to know its global incidence rate of MRSA and ESBLE, and to propose straightway coordinated prevention measures. We observed over the 3 periods of surveillance a decrease in the MRSA incidence and an increase in the ESBLE incidence. These results are coherent with the national network data. We observed also an increase in the proportion of ertapenem-resistant ESBLE. These data should be construed in the light of the change of the national epidemiology of the antibiotic resistance in Enterobacteriaceae, and particularly the increasing number of episodes of carbapenem-producing Enterobacteriaceae which the university hospital have to manage. These data suggest that a strengthening

https://doi.org/10.1016/j.respe.2018.05.443
Dramatic decrease of implanted central venous catheter-related infections by applying a simple but multicomponent prophylactic multidisciplinary program in a lung cancer clinic

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Introduction Subcutaneous implanted ports (SIP) are long-term devices often used in oncology practices because they have fewer infectious complications than others central venous catheters and because they preserve a better quality of life for patients, especially for sequential treatments. In literature, the incidence of infectious complications on SIP differed depending on patient’s pathology, perfusions (parenteral nutrition), catheterization durations and other infectious events.

Methods In order to meet the demand of lung specialist to decrease infections, an observational study was conducted to describe the infectious complication incidence and to identify the risk factors of catheter infections during two periods before and after a multimodal infection prevention program. All patients who had undergone SIP insertion, whatever the indication, during a stay in one of the three units of Pulmonology were included in the study. Two periods of surveillance were studied: (i) P1 of November 15 2012 to December 31, 2013; and (ii) P2 from September 1, 2014 to November 1, 2015. All patients were followed prospectively from the date of SIP insertion to the occurrence of the first infection, until the removal of SIP, until the death of the patient, or for a maximum of 6 months. The incidence of catheter infection is expressed as events per 1000 catheter days. Catheterization days were calculated from the start date of infection to the end of the follow-up. During P1, parameters collected were demographic factors of patients, diabetes, patient dependence score, infectious disease history, indication and SIP placement, first or second SIP, immediate complications after catheter placement (hematoma), perfusions type (transfusion, chemotherapy, parenteral nutrition). During P2, the statistically significant factors of P1 were recorded. In univariate analysis Pearson’s χ2 test and the Z test were used. For multivariate analysis, a Cox model was used for the comparison of survival of CVC without an infection-related problem. Each factor related to infectious risk in univariate analysis and interactions was included in the model. Univariate and multivariate analyses were made using SPSS software.

Results All patients have care both in hospital (in ambulatory care unit or hospitalized unit) and at home. During the first period, 61 SIP for 56 patients were included covering a total of 6,966 catheterization days. The incidence of infections was 2.87 per 1000 catheter days corresponding with 16 catheter-related infections. The prevention program included: –used of taurolidine lock prophylaxis for patient with parenteral nutrition; –observations and education of surgical staff on hand hygiene and aseptic technique.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.445

Prevalence, infection intensity and risk factors of Opisthorchis viverrini infection in rural area of Central Thailand

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Introduction Opisthorchis viverrini (OV) infection is a food-borne trematode infection through the consumption of uncooked cyprinoid fish containing infective stage, metacercariae. Adult flukes are living in hepato-biliary system. Infected cases could be unaware of the infection because of asymptomatic clinical presentation and chronic infection is strongly associated with cholangiocarcinoma, which IARC has declared OV to be carcinogenic to human. In Thailand, uncooked cyprinoid fish is popular in the North and Northeastern region as a traditional dish especially Koi pla (Chopped raw fish mixed with spicy herbal ingredients).

Methods The study was conducted in Phra-plerng sub district located in Sa Kaeo Province, Central Thailand in 2015 using cross-sectional design. The study areas are combined of Central and Northeastern descendants. Stool specimen was examined with three methods: direct smear, modified Kato-Katz and FECT aimed to measure prevalence and intensity of OV infection. Infection intensity was measured as EPG (eggs per gram) and risk behaviours were assessed by questionnaires. Zero-inflated model was used for zero-excess data from EPG.

Results Study areas comprised of 5 villages with 1267 participants. Overall prevalence of OV infection was 9.4%. The prevalence was significantly higher in Village Moo 9 (P < 0.001) where most of villagers are Northeasterners. Male gender increased risk of acquiring infection (OR = 2.8, 95% CI: 1.1–7.5). Infection intensity showed overdispersion with mean EPG = 3.2 and SD = 28.1. Zero-inflated negative binomial model showed that male gender, increasing age and Koi pla consumption were associated with increasing EPG (P < 0.05).

Conclusion Modelling zero-excess and overdispersion for infection intensity could help shaping more robust analysis. Up-to-date information on risk factors are valuable for targeting intervention to high-risk population.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.448
High rates of colonisation with ESBL (+) gram negative bacteria in newly admitted neonates in a neonatal care unit, Port au Prince, Haiti

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Background Nosocomial invasive Gram negative bacterial (GNB) infections are common causes of mortality in neonatal care units (NCU). Gastrointestinal tracts of hospitalized infants can serve as a reservoir for these infections. We aimed to estimate the faecal colonisation proportion by GNB and ESBL (+) GNB of systematically sampled newly admitted neonates in an NCU in Haiti, to describe the antimicrobial resistance profiles (AMR) of isolated GNB and identify factors associated with colonisation.

Materials/methods We included all neonates admitted to the NCU from May to August 2016 who were started on prophylactic antibiotics or treated for infection. Neonates had faecal swabs taken before treatment was initiated; these were tested for GNB, AMR profiles and ESBL status. We calculated adjusted prevalence ratios (aPR) using binomial regression.

Results Of the 800 neonates admitted in NCU, 409 were treated with antimicrobials and 78 received second treatment. One hundred and twenty-five out of 279 (45%) screened neonates were colonised by GNB, 85% before the second treatment and 34% before the first treatment (aPR 2.5; 95% CI: 2.0–3.0). Twenty-three percent (52/224) of neonates were colonised by ESBL (+) GNB, 70% (32/46) before the second treatment, 8.8 (95% CI: 5.6–14) times higher than those before first treatment (7.9%; 20/254). Ninety-eight out of 175 (56%) of isolated GNB were Escherichia coli, Klebsiella oxytoca and Klebsiella pneumoniae. Fifty percent of the tested GNB were susceptible to first-line antimicrobials and 99% to second-line antimicrobials; 4% and 35% of isolates indicated intermediate resistance to amikacin and ceftazidime, respectively. Vaginal delivery (aPR 2.1; 95% CI: 1.4–3.2) and length of stay (aPR 1.82; 95% CI: 1.2–2.7) were associated with GNB colonisation among newly admitted neonates. Neonates sampled > 48h after admission were 19 times more likely to be colonised by ESBL (+) GNB (aPR 19; 95% CI: 8.9–41) than those sampled < 24h.

Conclusions GNB colonisation was high and increased with length of stay. Second line antimicrobial treatment seems still adequate, but signs of intermediate resistance to ceftazidime were observed. We recommend to re-enforce:

–surveillance for suspected pathogens of nosocomial infections using blood cultures for septic infants;
–monitoring of antimicrobial treatment failure in infants receiving antibiotics.

Disclosure of interest The authors declare that they have no competing interest.

Attitudes towards the influenza vaccine in Bulgaria-lessons learned from a pilot questionnaire study

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Introduction Influenza is one of the leading causes of morbidity and mortality worldwide. Each year 5–15% of the world’s population suffers from an influenza infection. There is a significant difference in the seasonal influenza vaccine coverage between the countries in the European union. In Bulgaria there is no policy to provide free vaccines to the risk groups and there is no credible information available about the coverage with the influenza vaccine. Based on the number of sold vaccines the coverage is extremely low (between 2–5%) and after the 2010–2011 flu-season the trend is descending.

Methods In the period November 2016–February 2017 we conducted an anonymous questionnaire study in Plovdiv, Bulgaria. In total, 545 people over 18 years of age responded. The questionnaire includes 15 questions-from them 6 are of multiple choice. The questions are divided in three groups-demographical data, knowledge about influenza and attitudes toward the influenza vaccination. We used three different approaches for collecting data: visiting ambulatories for primary care, questioning medical students and an online survey. The statistical methods used were parametric and non-parametric tests: Pearson’s Chi\textsuperscript{2} test to examine possible associations.

Results Over 95% of the respondents demonstrated high level of knowledge: 95.96% recognized the contagiousness of the infection; 96.15% recognized the risk for serious complications and 97.98% were able to point out the risk groups for contracting influenza. In a contrast to this results only 11% of the respondents claim to have been vaccinated in this flu-season (60/545). No association was found between the income of the respondents and possible influenza vaccination (Pearson’s Chi\textsuperscript{2} = 1.88, \textit{P} = 0.759). The reasons for non-vaccination chosen by the respondents were as follows: the vaccine is not effective (30.5%), the flu is not so dangerous (28.2%) lack of enough information (27.6%) and I am against the vaccines (15.2%). Concerning is the fact that almost one third of the respondents believe the influenza vaccine is not effective. But on the contrary almost half of the respondents (48.1%) are willing to change their attitude towards the influenza vaccination and the recommendation and advice from a doctor is most important for them in this direction (61.6%).

Conclusion The conducted study is one of the few in the country to assess the attitudes towards the influenza vaccine. One of the conclusions from it is the importance of a recommendation of the vaccination from a doctor and the willingness of almost half of the respondents to change their attitude towards the vaccine if enough information is provided. This shows us the direction for future work.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.450
Neonatal nosocomial infections-rates, characteristics and microbiological profile

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Introduction The prevention and control of nosocomial infections (NI) is a real challenge for all the people, responsible for the hospital care of newborns. The clinical presentation and the outcome of those infections depend on the gestational age and the birthweight. Some organisational factors like overcrowding of the intensive units and the suboptimal proportion of medical staff can additionally contribute to an increase in the frequency of those infections. The aim of the present study is to analyse the main epidemiological characteristics of NI in the neonatology unit and to outline directions for future studies.

Methods A retrospective epidemiologic study for the period 2012–2016 has been conducted in the Neonatology clinic of UMHA T “St. George” Plovdiv, Bulgaria. Information has been collected for 10,273 newborns (9166 full-term and 1107 premature). Data from 224 tracheal aspirates, 39 hematocultures and 55 mucous secretions (eye, nose and throat swabs) has been analysed. The methods used are conventional microbiological methods for identification of the isolated microorganisms (90.9% and 9.1% respectively, P < 0.001). The predominant part of infected newborns (93.4%) are with one nosocomial infection and 21 newborns (6.6%) are diagnosed with 2 or more nosocomial infections. In the etiological structure of NI the proportion of Gram negative microorganisms is statistically significantly higher than the Gram positive microorganisms (90.9% and 9.1% respectively, P < 0.001). The main causative agent for NI and the leading type of infection-VAP is Pseudomonas aeruginosa, followed by Klebsiella spp. and Acinetobacter spp. 58.5% of all nosocomial infections and 64.3% of VAP are caused by one of those microorganisms. The leading microorganism from the Gram positive microflora is the Coagulase (−) Staphylococcus (9.4%).

Conclusion For the period 2012–2016 the incidence of NI in the neonatology clinic of UMHA T “St. George” is relatively low, in the reference ranges. VAP is the leading type of infection, followed by bloodstream infections. The Gram negative microorganisms are the prevailing type of microorganisms isolated with P. aeruginosa as a leading causative agent. The results from this study outline the necessity to direct the attention of the medical staff to the importance of observing and complying with the infection control practices when caring for newborns in the neonatology unit.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.452

Towards real-time mortality surveillance by medical causes of death: A strategy of analysis for alert

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Background In 2004 the French Public Health Agency set up a reactive all-causes mortality surveillance-based on the administrative part of the death certificate, in the final objectives:

−to detect unexpected or usual variations in mortality;
−to provide a first evaluation of mortality impact of public health events.

In 2007, an Electronic Death Registration System (EDRS) was implemented, enabling electronic transmission of the medical causes of death to the agency in real time. It allows approaching the cause accountability when an excess death is observed. A strategy has been developed for the analysis in routine of the medical causes of death with the objectives of early detection of expected and unexpected events and reactive evaluation of the impact of these events. The aim of this study is to present the syndromic indicators and their definitions that will be routinely followed for mortality surveillance.

Method Mortality syndromic indicators were defined as a cluster of medical causes of death (pathologies, syndromes or symptoms) with the same nosological meaning and meeting the objectives of alert and impact evaluation of mortality surveillance. The causes of death are either free-text (words, terms, expressions) or ICD-10 codes. To build the pertinent syndromic indicators, we explored multiple biomedical classifications such as the Mesh, SNOMED, UMLS. We also used a dictionary [provided by the Center of Epidemiological Causes of Death (Inserm-CépiDc)] of each term/expression found in the death certificates since 2005 and the associated ICD-10 code. Each indicator and its definition were also discussed in working groups including medical and epidemiological experts.

Result The list of established indicators was composed of:

−indicators for detection of expected seasonal events such as: “influenza”, “pneumonia”, “gastroenteritis”, “chikungunya”, “heat related death”, “dehydration”…;
−other complementary indicators for detection of the impact of unexpected events such as: “epilepsy”, “aneurysm rupture”, “pulmonary embolism”, “chock”, “coma”, “unspecified fever”, “headache”…;
−indicators for the decomposition of the mortality linked to an event; they include the previous indicators.

Examples of detection of winter seasonal events and heat related events will be presented as well as the detection of death with chikungunya cause in the death certificate.

Conclusion The use of free-text causes of death for mortality surveillance required the development of a strategy for the analysis of these data. The building of a list of syndromic indicators for alert and impact evaluation was essential for the implementation of systematical classification methods of the death certificates in routine.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.453
Session 9 - Epidemiology of healthcare, quality of care, quality of life and behaviours healthcare, quality of care, quality of life and behaviours

P9-1
Cases of bed blockage in Northern Spain during 2010–2014: Delayed discharge from acute hospitalization to long-term care
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Background The term ‘bed blocking’ is used in a situation where “patients who no longer require acute care are occupying acute care beds while awaiting lower-level placement”. This term is related with delayed discharge and represent an inefficient use of acute hospital beds. Evidence about this topic describes characteristics associated with a higher likelihood of becoming a bed-blocking: older age, lack of functional ability, emergency case and hospital’s weighting. Our aim is to determine in our region, which characteristics may influence the problem and to quantify inadequate hospitalization’s days.

Methods A descriptive retrospective study of patients with delayed discharge from acute hospitalization to long-term care was conducted. This study involved three public hospitals from the region of northern of Spain (Cantabria), during 2010–2014. The variables collected includes: age, gender, planned or emergency admission, level of hospital, diagnosis-related group (DRG) and inadequate hospitalization’s days. Mean and standard deviation were estimated to continuous variables. Proportions were estimated with confidence intervals at 95% (95% CI) to discrete variables. Means were compared with r de Student and Anova.

Results In the period between 2010 to 2014, it is found 1415 bed-blocking’s cases in hospitals from Cantabria, waiting to be admitted in a to long-term care. Spent a total of 19,183 inadequate hospitalization’s days. Mean of delayed discharge: 13.56 days [SD 14.34], range 1 to 131; 66.7% are delayed less than two weeks; 53.1% male and 46.9% female. Gender were not found to be significantly associated with delayed discharges but women [mean age 80.70] are significantly older than men [mean age 75.99]. The mean age of our population was 78.49 years [SD 10.48], range 27 to 102; 74.6% are older than 75 years but younger inpatients had delayed significantly longer; 94.1% of cases were emergency patients. Diagnosis-related group (DRG) more frequents were hip fracture (8.0%), stroke (7.5%), other central nervous system’s disorder (5.6%) and simple pneumonia (4.0%). Compared with local hospital, the university hospital had delayed significantly longer.

Conclusion Inpatient’s characteristics related with bed blocking risk: older than 75, emergency admission in a university hospital and diagnosis that suppose unexpected lack of functional ability. Relation between gender and age could be related with gender role of caregiver. These results may reflect that university hospitals treat the more complex patients. Known the inpatient’s characteristics, an early detection since the emergency admission could solve the delayed and prevent this inefficient use of acute hospital beds.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.454

P9-2
Workplace violence towards workers in the emergency department in secondary healthcare center in Tunisia: Aggressor and aggrieved specificities and gender consideration

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Background Throughout recent years, Workplace violence in hospital emergency departments has become common problem. Thus, rate of emergency departments workers who are experiencing it is increasing significantly especially since Tunisian revolution. Closely related to reduced job satisfaction and performance. The objective of this study was to have an overview the characteristics of Workplace violence against workers in emergency departments in a secondary healthcare center in Tunisia.

Methods We conducted a cross-sectional study in the emergency department in Sidi Bouzid Hospital. The study investigated all types of violence against Emergency department workers including physicians, nurses, admission/registration personnel and security officers. Assaults that occurred during the year of study were included. Data were collected from registers, medical certificate files and interviews with aggressor and aggrieved from October 2014 till October 2015. Socio-demographic characteristics of both of them as well as types of violence were recorded. Data were verified and analyzed using Statistical Package for Social Science (SPSS), software version 18.0.

Results A total of 110 participants were enrolled: 27 (25%) physicians, 45 nurses (41%), 16 security officer (14%), 18 workmen (16%) and 4 administrative personnel (4%). The majority (56%) experienced at least one type of workplace violence in the past 12 months: 29% exposed to physical violence, 41% to non-physical assaults or verbal abuses and 30% experienced both types of violence. Males were more prone to violence than females (61% vs. 31%). Same results were reported regarding type of violence (physical/verbal). In fact, in either types men were more concerned but insignificant statistically (P = 0.86). Regarding aggressors profile, our results showed that they are mostly males (77%) with a mean age of 36 years (± 12). They were drunk/intoxicated and suffering from mental disorders in 47% and 12% among all cases, respectively.

Conclusion Violence against workers in emergency departments is highly common. All categories are affected. Neither men nor women are exempted even if our results concluded a male predominance. All stakeholders should collaborate in order to prevent and tackle this problem.

Keywords Violence; Workers; Emergency; Care

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.455
P9-3
Causation between child behavior problems and physical abuse in the area affected by the Great East Japan earthquake and tsunami
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Introduction Research has shown a reciprocal relationship between child behavior problems and maltreatment and has not come to conclusion about their causation. On the other hand, a study that targeted children living in the area affected by the Great East Japan Earthquake and Tsunami, exposure of which can be considered as random, found those with trauma experiences related to the earthquake were more likely to have clinically significant behavior problems. This study aims to examine causal association between child behavior problems and physical abuse by using trauma experiences related to the Great East Japan Earthquake and Tsunami as an instrument variable.
Methods The target population of this study is children who were enrolled in a class of 3- to 5-year-olds in preschools in Iwate, Miyagi, and Fukushima prefectures at the time of the Great East Japan Earthquake and Tsunami on March 11, 2011. Questionnaire surveys and interviews were conducted for these children and their caregivers between September 2012 and June 2013. Frequency of use of corporal punishment and physical abuse was measured through questionnaires for caregivers, using three items of Alabama Parenting Questionnaire (APQ). Caregivers were also asked to assess child behavior problems with Child Behavior Checklist (CBCL). Trauma experiences caused by the earthquake and tsunami, such as losing of friends and witnessing someone being swept away by the tsunami, were asked in the interviews for children. A total of 184 sample was used for analysis after excluding those who did not report outcome, exposure, and instrument variables. Ordinary least squares (OLS) regression and two-stage least squares (2SLS) regression analysis using instrument variables was employed.
Results Among the children, 15.2% (N = 28) reported their experience either of losing friends or witnessing someone being swept away by the tsunami. Mean score of corporal punishment and physical abuse assessed with APQ (3–15) was 5.5 (SD: 1.8), and mean T score of CBCL (0–100) was 55.6 (SD: 9.4). Among the children, 17.9% had clinically significant behavior problems and 13.0% were considered to be borderline clinical. The OLS regression analysis, which does not address endogeneity, suggested that children with more behavior problems were more likely to be physically abused. However, when instrument variable method was used to address endogeneity, the positive association between child behavior problems and physical abuse was not found.
Conclusions Our findings did not support that child behavior problems can cause use of corporal punishment and physical abuse. It is important to further explore ways to buffer the impact of physical abuse on children.
Disclosure of interest The authors declare that they have no competing interest.
https://doi.org/10.1016/j.respe.2018.05.456

P9-5
Sociodemographic correlates of alcohol consumption among young adolescents from two different sociocultural contexts in Belgium
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Introduction At young age, while the body is still in development, alcohol consumption can cause irreversible damages. In this study, we were interested in sociodemographic characteristics associated with alcohol consumption among young adolescents in French-speaking Belgium. Such characteristics were investigated separately in the Walloon Region (WR) and in the French part of the Brussels-Capital Region (BCR); indeed, these two regions are characterized by distinct sociocultural and economic contexts, which could lead to differences in alcohol consumption and determinants of consumption.
Methods Analyses were based on data collected with self-administered questionnaires within the 2014 “Health Behaviour in School-aged Children” (HBSC) cross-sectional survey, among 5029 10–14-year-old adolescents (4128 in the WR and 901 in the BCR). Alcohol consumption was defined has having drunk at least one day during the last 30 days before the survey. Sociodemographic characteristics included the sex, age, socioeconomic status measured through the “Family Affluence Scale”, family structure, and migration background. Associations between sociodemographic characteristics and alcohol consumption were estimated using multivariable logistic regressions models, separately for the WR and the BCR.
Results In the WR, 22% of 10–14-year-old reported having consumed alcohol at least one day during the last 30 days before the survey. After adjustments, adolescents aged 13–14 years compared with those aged 10–12 years (OR: 4.74 [3.94–5.71]), boys versus girls (OR: 1.23 [1.06–1.44]) and natives compared with adolescents with foreign origins (OR: 1.60 [1.32–1.93]) were more likely to consume alcohol. In addition, adolescents living in a single-parent family (OR = 1.53 [1.25–1.87]) or a stepfamily (OR = 1.52 [1.24–1.88]) were more likely to consume alcohol than those living with their two parents. Concerning the socioeconomic status, adolescents from “medium” (OR = 1.45 [1.13–1.85]) or “high” (OR = 1.68 [1.31–2.17]) socioeconomic status were more likely to consume alcohol than those from “low” socioeconomic status. In the BCR, 9% of 10–14-year-old reported having consumed alcohol at least one day during the last 30 days before the survey. After adjustments, boys (OR: 1.88 [1.14–3.10]), 13–14-year olds (OR: 2.40 [1.38–4.16]), adolescents from stepfamilies (OR: 3.32 [1.70–6.50]), those from “high” socioeconomic status (OR: 2.83 [1.43–5.63]) and natives (OR: 2.05 [1.22–3.45]) were more likely to consume alcohol. A significant interaction between gender and family structure was identified (P = 0.008). Alcohol consumption was not socially marked among young boys; all associations were non-significant. Conversely, among young girls, those aged 13–14 years (OR: 4.80 [1.65–13.93]), those from stepfamilies (OR: 8.02 [2.63–24.44]) or single-parent families (OR: 6.82 [2.50–18.57]), those from “high” (OR: 10.80 [2.70–43.17]) or “medium” (OR: 4.06 [1.02–16.17]) socioeconomic status and natives (OR: 2.96 [1.24–7.06]) were more likely to consume alcohol.
Conclusion Despite very different prevalence, alcohol consumption in young adolescence was associated with the same sociodemographic characteristics in both regions. However gender differences varied between RW and RBC. These results highlight the sociodemographic profile of adolescents to be targeted in the awareness-raising measures to the danger of early alcohol consumption.
Disclosure of interest The authors declare that they have no competing interest.
https://doi.org/10.1016/j.respe.2018.05.458
To return or not to return for STI-HIV tests results: A study among 214 patients screened positive in a free center in Paris offering SMS reminders to reduce failure to return

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Introduction
Sexually transmitted infections (STI) are a major challenge in public health as nearly one million people become infected every day in the world with chlamydia, gonorrhea, syphilis or trichomoniasis. Moreover, 2 millions of people become infected every year with HIV in the world. Despite progress in treatment and screening, incidence of STI continues to increase. To decrease the spread of STI, it is needed not only to focus on screening access but also to reduce the high proportion, 15–20%, of patients screened positive for at least one STI and who do not come back for their results generating delay in their medical care and risks of STI transmitting to their partners. In our free testing center for STI in Paris (France), in order to reduce failure to return, patients are offered the possibility of being notified by SMS after testing. If at least one of the STI results is positive, the SMS invites the patient to come back to the center to obtain his/her results. However, even when informed by up to three SMS, a part of patients still fails to return. To target improvement actions, it is needed to define their profile. This study aimed to explore factors associated with failure to return within 30 days after testing (FTR30) among patient screened positive for STI.

Methods
Between October 2016 and May 2017, all patients with at least one positive result for STI testing (HIV, HBV, HVC, syphilis, gonorrhea and chlamydia) and who accepted to participate in the study were included (n = 214). Data were collected from the consultation database and a self-administered questionnaire. The FTR30 was measured based on information in the consultation database. This database also includes data on STI tested and results of the screenings performed. The self-questionnaire included socio-demographic factors, sexual behavior and factors related to the center visit. Factors associated with FTR30 were assessed using logistic regression models. The choice of the final multivariate model was based on the result of a backward stepwise selection with a 0.2 significance level for removal from the model.

Results
More than two-thirds of patients were men (72%), and the median age of patients was 27 years. Most patients were born in metropolitan France (56%) or in sub-Saharan Africa (25%). Men having sex with men represented 30% of the study population. The FTR30 rate was 14% (95% CI [10%–19%]). Even if non-significant, FTR30 tend to be lower among the 72% of patients who accepted to be notified by SMS than among patients who did not (12% vs. 20%, P = 0.10). In multivariate analysis, patients aged 25 or under were more likely to not return than patients older than 25 (aOR: 2.84; 95% CI: 1.09–7.41). A lower self-perceived risk of HIV infection was significantly associated with FTR30 (aOR: 3.05; 95% CI: 1.17–7.94), as well as not being tested for chlamydia and gonorrhea using self-swabbing (aOR: 5.98; 95% CI: 2.03–17.6). Probability of FTR30 was higher for patients coming with someone (aOR: 3.73; 95% CI: 1.41–9.88) compared to patients coming alone.

Conclusions
The SMS program was well accepted but had a limited impact on FTR30 in our study population. To reduce the risk of failure in delivering STI screening results, systematic phone call after testing might also be proposed to patients. Moreover, no self-swabbing for chlamydia and gonorrhea testing and a lower self-perceived risk of HIV infection were associated with a higher probability of FTR30. Thus, improving STI/HIV knowledge and level of health literacy to empower patients would be an efficient way to decrease failure to return for results.

Disclosure of interest
The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.459

Lifestyles associated to sleep duration

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Introduction
Optimal sleep duration varies significantly between individuals, age, gender, and world region. The value established for short sleep duration (SSD) in adults is 5 h and long sleep duration (LSD) is 9 h.

The aim of this study was to study potential associations between SSD and LSD with sociodemographic variables and lifestyles.

Methods
Cross-sectional evaluation of the third wave of follow-up of the EpiDoC Cohort that enrolled in 2011 10,661 adults living in private residences in Portugal, (i.e., EpiDoC3 study, population interviewed 5653). Participants from EpiDoC3 who answer the question regarding hours of sleep/day (n = 5436) compose the current analysis. Data collection was performed Sept 2015–July 2016, by telephone. The EpiDoC cohort measurements were sociodemographic, socioeconomic characteristics and socioeconomic variables. The lifestyle habits evaluated were alcohol intake, smoking habits, physical activity, frequency of watching television and of using a computer. Height and weight were collected. For the dietary intake, the number of meals/day and the adherence to the Mediterranean diet was assessed by the PREDIMED score; for the daily total sleep time three categories were established: SSD (≤ 5 h), normal sleep duration (NSD) (6 h–8 h) and LSD (9 h). To verify the representativeness of the sample according to the Portuguese population, we first compared the participants and non-participants of the EpiDoC3 study with respect to their sociodemographic, socioeconomic, and health status characteristics. Extrapolation weights were computed and used in the subsequent statistical analysis. These were obtained by calibrating the extrapolation weights originally designed for the EpiDoC1 study sample. Baseline characteristics of the study cohort were described according to SSD, NSD and LSD. Absolute frequencies and weighted proportions were used to summarize categorical variables. Two logistic regression models were performed in order to find lifestyle predictors for SSD and LSD. All analyses were performed using STATAIC12.

Results
Prevalence values for SSD and LSD were 24.6% and 7.5%. The region with higher prevalence for SSD was Algarve (SSD 26.5%, LSD 61.1%), while Azores have the lowest value (16.4%). Furthermore, the higher prevalence NSD was found in Azores (80.5%). The higher prevalence values for SSD and LSD were both found in females 22.0% and 21.1%. Variables associated to a higher risk of SSD were having 65 years (OR = 1.92; CI = 1.48, 2.50); being female (OR = 1.26; CI = 1.00–1.58); being overweight (OR = 2.25; CI = 1.03–4.87) or obese (OR = 2.74; CI = 1.24–6.02) and having 0–4 years of education (OR = 1.95; CI = 1.32–2.86); protective variables to SSD were to watch TV 3–4 h/day (OR = 0.45; CI = 0.22–0.90) and 5 h/day (OR = 0.38; CI = 0.19–0.80); to use computer 3–4 h/day (OR = 0.50; CI = 0.30–0.84) and 5 h/day (OR = 0.56; CI = 0.37–0.83); have 2 meals/day (OR = 0.46; CI = 0.22–0.98), 3 meals/day (OR = 0.36; CI = 0.17–0.78) and 4 meals/day (OR = 0.43; CI = 0.15–0.73). Variables associated to a higher risk of LSD were, having 65 years (OR = 1.94; CI = 1.41–2.67); to have 10–12 meals/day (OR = 0.33; CI = 0.15–0.73) and 5 h/day (OR = 0.50; CI = 0.30–0.84) and 5 h/day (OR = 0.56; CI = 0.37–0.83); have 2 meals/day (OR = 0.46; CI = 0.22–0.98), 3 meals/day (OR = 0.36; CI = 0.17–0.78) and 4 meals/day (OR = 0.43; CI = 0.15–0.73). Variables associated to a higher risk of LSD were, having 65 years (OR = 1.94; CI = 1.41–2.67); to have 10–12 meals/day (OR = 0.33; CI = 0.15–0.73) and 5 h/day (OR = 0.50; CI = 0.30–0.84) and 5 h/day (OR = 0.56; CI = 0.37–0.83); have 2 meals/day (OR = 0.46; CI = 0.22–0.98), 3 meals/day (OR = 0.36; CI = 0.17–0.78) and 4 meals/day (OR = 0.43; CI = 0.15–0.73).
Introduction  It is commonly accepted that the more a hospital perform a procedure the better the procedure is done, even if explanatory mechanisms of this dogma have not been deeply elucidated so far. We aimed to identify if surgical outcomes were altered when patients were admitted to hospitals experiencing significant volume changes over time and if a learning effect existed at the individual hospital level.

Methods  We selected all patients who underwent one of ten specific surgeries in French hospitals from a nationwide database, between 2010 and 2014. For each surgery, we ascertained three groups of hospitals according to their volume trend toward increase, decrease or no change over study period. In-hospital mortality, reoperation, unplanned hospital readmission and a composite outcome of these complications within 30 days were compared between groups using Cox regressions, taking into account clustering of patients within hospitals and potential confounding factors. Interaction between the group of trend in hospital volume and type of procedure the better the procedure is done, even if explanatory mechanisms of this problem to Portugal.

Disclosure of interest  The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.460
P9-10
Cyber-bullying perpetrator and victimization among adolescents: Prevalence and associated factors in population-based sample of secondary school student in rural community of Thailand
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Introduction Cyber bullying is misbehavior by using electronic communication technologies to bully the others. Nowadays, it has been a serious global problem. However, the study of cyber bullying in Thailand is still limited. The objective of the study is to determine the prevalence and associated factors of cyber bullying perpetrator and cyber victimization among secondary school in Chachoengsao province, Thailand.

Methods A cross-sectional study was performed during December 2017 to January 2018. Students were completed a standardized questionnaire on their activities and factors related to Cyber bullying perpetrator and cyber victimization. Multivariable logistic regression analysis was used to identify potential risk factors for Cyber bullying perpetrator and cyber victimization.

Results A total of 4928 secondary school students were enrolled into the study. Of those 1080 (21.9%) reported as being cyber victimization, 857 (17.4%) reported as being cyber perpetrator and 655 (13.3%) reported as being dual cyber perpetrator and victimization. Cyber perpetrators and cyber victims were more likely to be males, failed to exam, smoke, alcohol drinking, school absenteeism and school bully. Cyber perpetrators was significantly associated with not living with parents (OR = 1.52), internet addiction (OR = 1.44), online sex seeking (OR = 1.68), traditional victimization (OR = 1.84), traditional perpetrator (OR = 3.63), alcohol drinking (OR = 1.53), school absenteeism (OR = 1.21), mild stress (OR = 1.33), moderate to severe stress (OR = 1.56) and sleeping duration less than 8 hours (OR = 1.27) after controlling for gender and failed to exam. Cyber perpetrators was significantly associated with not living with parents (OR = 1.40), internet addiction (OR = 1.38), online sex seeking (OR = 1.68), traditional victimization (OR = 2.80), traditional perpetrator (OR = 1.68), alcohol drinking (OR = 1.58), school absenteeism (OR = 1.19), mild stress (OR = 1.23), moderate to severe stress (OR = 1.65), smoking (OR = 1.27) and suicidal ideation (OR = 1.57) after controlling for gender and failed to exam.

Conclusion Cyber perpetrator and cyber victimization is a new public health priority of adolescent in Thailand. This study found that the high prevalence of both cyber perpetrator and victimization among secondary school students in rural community of Thailand. It is found to associate with various risky behaviors and traditional school bullying. Given the greater risk and unique challenges experienced by youth in rural community, prevention and intervention programs may need to be tailored to their specific needs and circumstances. Further research is needed to understand the specific factors and mechanisms involved in bullying victimization among immigrant youth. Future studies are needed to establish causation and to further investigate the relative importance of correlates of the traditional bullying and cyber bullying.

Disclosure of interest The authors declare that they have no competing interest.
https://doi.org/10.1016/j.respe.2018.05.463

P9-11
Staphylococcus aureus nasal carriage among healthcare professionals: Unexpected categories at risk
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Introduction Staphylococcus aureus, known as a major human pathogen, is also found as a commensal in different body sites. Nares represent the main reservoir, with about 30% of the general population being nasal carriers. It has been shown that nasal carriage is (i) increased in populations with repeated contact with patients, and (ii) associated to a higher risk to develop infections. We conducted a prospective study in two university hospitals to explore S. aureus nasal carriage among healthcare professionals.

Methods Volunteers among the personnel of Lyon and Grenoble University Hospitals had a nasal swabbing in April 2014 and June 2016, respectively. An anonymous questionnaire including demographic data, profession, type of contact with patients, and hygiene rules habits were filled out by participants. S. aureus carriage was screened by real-time PCR (GenXpert® SA Nasal Complete, CEPHEID France). A second study, based on the same design, was led in 2015 in Lyon, focusing on semi-skilled workers and biomedical technical agents. After the initial nasal swabbing, participants were given education on basic rules of hygiene and hydro-alcoholic solutions for three months. A final nasal screening was performed at month + 3. Positive samples were cultured and S. aureus isolates were characterized by spa-typing.

Results Thirty-six percent of the 280 hospital personnel participants in Lyon and 44% of the 157 participants in Grenoble were detected as carriers. The nasal carriage rates in Lyon and Grenoble, respectively, were distributed as follows: 40.9% and 37.3% in healthcare workers (including nurses and physicians), 35.7% and 44% in laboratory technicians, while only 14.3% and 18.2% in the hospital administration personnel. Unexpectedly, the group including semi-skilled workers and biomedical technical agents revealed a significantly higher rate of nasal carriers: 50.0% and 59.4% in Lyon and Grenoble, respectively (P 0.001). This high rate was confirmed in the second study led in 2015 in Lyon (52.4%, n = 23/44). The characterization of the 23 strains revealed the presence of 19 different spa-types, ruling out the hypothesis of a single clone dissemination among colleagues. After the 3-month hygiene awareness campaign, 16 of the 23 positive individuals were re-screened. Interestingly, all of them were positive again, and with their respective initial strain based on spa-type. These results questioned the compliance of workers to basic hygiene rules.

Conclusions Our study revealed that S. aureus nasal carriage among hospital personnel depends on the profession. While one could expect a high rate among healthcare workers with repeated contact with patients such as nurses and physicians, the highest rate was found in semi-skilled workers and biomedical technical agents. Our results may be explained by divergent behaviours. We assume that despite the risk of contamination, healthcare workers are well aware of and comply with hygiene rules in their professional activity. On the other hand, technical professionals, who also happen to be in contact with a contaminated environment, when intervening in a patient’s room for instance, do not comply with hygiene rules as strictly as healthcare workers, probably due to a poorer education on this issue. Such professional categories should be taken into account for infectious risk educational campaigns.

Disclosure of interest The authors declare that they have no competing interest.
https://doi.org/10.1016/j.respe.2018.05.464
P9-14

Is prenatal identification of small-for-gestational-age fetuses useful?

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Introduction Small-for-gestational-age (SGA) neonates have an increased risk of neonatal mortality. The utility of prenatal detection of these fetuses (<5th percentile for gestational age) by ultrasound to reduce adverse obstetric outcomes is still debated. In this complicated clinical situation, the decision to deliver must aim at an optimal balance between minimizing iatrogenic morbidity related to the preterm delivery and the challenge of a healthy preterm delivery. The principal aim of this study was to assess whether prenatal identification of SGA fetuses reduces neonatal complications. As secondary outcomes, we examined whether their prenatal identification reduces the prevalence of low 5-min Apgar scores or increases the rate of cesarean deliveries.

Methods This historical cohort study included women giving birth at 247 French maternity units. Women with a singleton delivery (≥32 weeks), in cephalic presentation were eligible for the study. Medically-terminated pregnancies, pregnancies with intrauterine fetal deaths, and women with missing delivery data were excluded. Among the SGA infants, we compared those who had been identified as such in utero (i.e., exposed group) (n = 4525) with those who were not (n = 18,516). The term “SGA” at birth describes a neonate whose birth weight is at least 1.64 standard deviations (SD) lower than the mean for the infant’s gestational age and sex, that is, the 5th percentile for gestational age, based on data derived from the reference population included in our national database. The principal outcome was measured by a composite variable, defined as resuscitation in the delivery room, or death in the delivery room or the immediate postpartum period, or transfer to a neonatal intensive care unit. The secondary outcomes were the 5-minute Apgar score, and the rates of neonatal traumatic lesions, operative vaginal deliveries, and cesareans. Study ethics approval was obtained on June 30, 2017 (CECIC Rhône-Alpes-Auvergne, Grenoble, IRB 5921). A log-binomial model was used to adjust for covariates previously reported in the literature as either a risk factor or a confounding factor for each outcome we studied.

Results The mean birth weight in the cohort was 2472 ± 343 g. Risk of resuscitation in the delivery room or death in the delivery room or the immediate postpartum period or of neonatal transfer to the NICU was higher for the babies in the preeventually suspected group: RR = 2.31 (95% CI: 2.20–2.42). The adjusted RR was 1.22 (95% CI: 1.09–1.36) (39.7% in the group identified preeventually as SGA vs. 17.2% in the other group). The 5-min. Apgar scores, and the rates of neonatal traumatic lesions, operative vaginal deliveries, and global and elective cesarean deliveries did not differ significantly between the 2 groups. The a posteriori study power with α = 0.05 was 99%.

Conclusions Contrary to what we expected, among children born SGA, prenatal identification did not improve neonatal or maternal outcomes. Therefore, we cannot currently recommend the systematic screening of SGA fetuses to improve their neonatal prognosis. More particularly, this strategy improved the diagnosis of SGA fetuses, but paradoxically this diagnosis was not followed by improved fetal outcome. Further studies on this topic should be based on customized in utero weight estimates.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.467

P9-15

Systematic review: Association of occupational information communication technology and burnout including a discussion about age as a modifier

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Introduction Job burnout is a negative occupational outcome that develops due to prolonged chronic stressors during the job. Previous studies suggested that the association between ICT use and burnout is important, as ICT use might create chronic work overload during the job. For tailored job interventions, it is important to know if different age groups are differently provoked by ICT use. An author from a Finish study hypothesized that occupational ICT use affect stress most pronounced in middle aged populations. The aim of this systematic review is to summarise quantitative studies in occupational settings observing the association between Information communication technology (ICT) and burnout, additional considering age as an effect modifier.

Methods A systematic review using PRISMA guideline was done through following bibliographic databases: PubMed, Web of Science, Psycinfo and the Cochrane Library. Inclusion criteria were occupational setting and considering the relevant association between ICT use and burnout. Risk of bias analysis was assessed using the Newcastle-Ottawa scale.

Results In total 189 relevant abstracts were found. In most articles (5 out of 9) outcome measurement was based on Maslach Burnout inventory questionnaire. Results on the association of ICT use with burnout, exhaustion and depression showed a concordant picture. One intervention study showed an association of ICT-related overload with exhaustion in a 5-day intervention with exhaustion. From the eight listed cross-sectional studies, five showed a clear positive association, but three of them did not find a significant association. Four studies presented a confounding effect of age, all of them considered age linear in the final statistical model. Two studies did not find an association between age and burnout, one found a positive and one a negative association.

Conclusion ICT use in occupational setting is associated with burnout. ICT use may create problems which lead to work overload and finally burnout. Confounding effect was discussed specifically in four publications, but effect modifying effect was not considered. Making the case that there is an effect modification of age on ICT use and burnout, none of the studies looked at it. Given similar studies on stress we might expect that at younger age (<35) there is only a small or no association between ICT use and burnout. The middle age group (35–45) there is a clear positive association between ICT use and burnout, which disappears once again in the older age group (>45). More research is necessary to consider age as effect modifier. Furthermore, age needs to be considered as categorical variable in occupational burnout analyses.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.468

P9-17

Parental supervision and alcohol use among Brazilian adolescents: Analysis of data from the National School-based Health Survey 2015

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Objective To evaluate the relationship between parental supervision and sociodemographic factors and alcohol use by Brazilian adolescents.

Methods This is a cross-sectional study with data from National School-based Health Survey (PeNSE) 2015, which included 16,608 adolescents aged
13 to 17 students from Brazilian public and private schools. Variables related to alcohol use, sociodemographic factors and parental supervision were evaluated. In order to analyze the relation between sociodemographic variables and parental supervision with use of alcohol among adolescents, we use Prevalence Ratios stratified by sex.

**Results** We observed that 61.4% of adolescents had taste alcohol, 27.2% had a drunken episode in their lifetime, 9.3% have had problems with alcohol and 29.3% reported alcohol use in last 30 days. The lack of parental supervision was associated with increased use of alcohol. The proportion of alcohol use was also higher for girls and also among those who were older than 16 years, worked, did not live with one or both parents and lived in the South, regardless of sex.

**Conclusion** Our results showed early experimentation with alcohol and the occurrence of problems due to the use of this substance among adolescents. In addition, the lack of children monitoring by parents and guardians, shows risk of alcohol use in this age.

**Keywords** Adolescent; Alcohol drinking; Parent–child relations; Socioeconomic factors

**Disclosure of interest** The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.470

**P9-18**

**Effect of the implementation of a fast-track on emergency department length of stay and 30-day readmission**

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**Objectives** We aimed to evaluate the effect of the implementation of a fast-track on emergency department length of stay (LOS) and 30-day readmissions.

**Methods** Difference-in-differences analysis. We observed the change in mean Length of Stay (LOS) before and after the implementation of a fast-track in Troyes Hospital. The fast-track is a dedicated healthcare pathway for patients with small injuries or other benign health problems for whom an early discharge can be envisioned. Regional trends were taken in account using data from a control hospital, the Manchester Hospital situated in Charleville-Mézières.

**Results** The fast-track was implemented on January 13, 2016, the Emergency department of Troyes hospital registered 53,768 stays in 2016 and 57,965 in 2017 (+7.8%). During the same period, Charleville-Mézières (CM) hospital registered 42,325 and 43,951 entries respectively (+3.7%). The mean length of stay decreased by 12.3 minutes in Troyes, whereas an increase of 2.1 minutes was observed in Charleville-Mézières (Difference-in-differences: 14.4; 95% CI: 20.3–8.6; P < 0.0001). The mean time to physician assessment was 136.7 minutes in Troyes before the intervention and 106.1 minutes after the intervention. In Charleville-Mézières, the corresponding times were 48.3 and 52.1 minutes (Difference-in-differences: 34.4 min; 95% CI: 35.9–32.8; P < 0.0001). In Troyes, before the fast-track was implemented, an estimated 10.7% of entries were 30-days readmissions. There was a small but statistically significant (P < 0.0001) increase in this proportion after the intervention (11.6%). However, a monthly analysis of the readmission rate showed a decreasing trend starting after the intervention.

**Conclusion** The implementation of a fast-track was associated with a decrease in mean LOS. Further studies are needed to help appraise the causes of variability in emergency department LOS and their connections to quality indicators.

**Disclosure of interest** The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.471
P9-21
Patterns of household physical activity and risk of mortality in Korea
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Introduction  Physical activity (PA) has been established as a lifestyle factor, which reduces various chronic diseases and mortality risks. However, most of studies have focused on the leisure time PA as the main interest. Household physical activity (HPA) such as washing clothes by hand, cleaning, dish-washing and gardening could also contribute to achieving recommended level of PA. This study aimed to examine patterns of HPA and association between HPA and the hazard of mortality in Korea.

Methods  A total of 42,328 men and 83,371 women who were aged from 40 to 69 years old and enrolled in the Health Examinees (HEXA) study from 2004 to 2012 were included in this study. Information of four types of HPA, which are washing clothes by hand, cleaning, dish-washing and gardening, and regular exercise including frequency per week and duration were collected by interviewer-administered self-reported questionnaire. Total MET-hour per week of HPA was calculated by weighted MET for each type of HPA and adding them up. Sex-specific categories according to the level of participation in HPA were defined; nonparticipation, participation but not enough, less than recommended amount, and recommended amount. 

Results  Women spent much more time to doing HPA than men. Both men and women were more likely to participating in HPA as being unemployed or house wives, never smoker, having more than median calorie intake, and doing sufficient regular exercise. Men who were more educated or living alone participated more often in HPA, while women participated less in HPA as being more educated or living alone. During the 5.2 years of mean follow-up, 1240 men and 767 women died. HPA was associated with decreasing risk of death; HR (95% CIs) for category 2 vs. category 1 = 0.87 (0.77–0.98) and HR (95% CIs) for category 3 vs. category 1 = 1.00 (0.86–1.19), however, significant association was shown in the non-exercise group; HR (95% CIs) for category 3 vs. category 1 = 0.82 (0.70–0.96). Although the inverse association between HPA and mortality was observed in both men and women, statistically significant association was shown only for men.

Conclusion  HPA significantly reduced risk of mortality in middle aged Korean adults, especially in men. Even though the men never participated in exercise, participation in HPA could decrease the risk of death. This study suggests that HPA could provide further health benefit apart from the regular exercise.

Disclosure of interest  The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.474

P9-22
Efficiency of an interactive program for enhancing patient reporting of adverse drug events in primary care
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Introduction  Adverse drug events (ADE) are frequent in primary care. They could often be prevented and their complications avoided. One of the main causes is that patients rarely know how to detect ADE. Another cause is inadequate communication between patients and physicians. If patients were effectively trained in identifying and reporting ADE, this should enhance ADE management (and avoid consequences on patient’s health). The aim of the InPAct study was to assess an interactive program promoting patients to be active in ADE identification and their reporting to their general practitioners (GP), in order to enhance ADE management in primary care. We focused on patients treated by anti-hypertensive drugs, mainly prescribed in primary care and known to be often responsible for ADE.

Methods  We conducted a cluster randomized controlled stepped wedge trial, with eight clusters of GP. The InPAct program was implemented in the clusters in random order along five successive three-month periods. The program featured:

- a patient booklet including information on cardiovascular risks and management of antihypertensive drugs, care plans and patient ADE report forms;
- standardized training of physicians in how to present the booklet to the patient. The primary outcome was the active reporting of ADE by patients to their GP within three months of inclusion, after the identification of the ADE by the patients themselves. Total ADE identification (i.e. ADE identified by physician or patient, independently of patient active reporting to their practitioner), knowledge of patient about cardiovascular risks and management of antihypertensive treatments and patient satisfaction about their care management by their general practitioner were evaluated as secondary outcomes. The effect of the intervention was quantified and tested using a mixed logistic model to integrate cluster and time effects.

Results  We analyzed data for 1095 patients included by 60 different GP belonging to the 8 clusters. Multivariate analyses showed that InPAct program efficiently enhanced active reporting of ADE by patients to their GP (OR = 3.5, 95 CI [1.2–10.1], P = 0.01). The anti-hypertensive prescription status (initiation, modification or renewal) was strongly associated with patient active ADE reporting and total ADE identification. Moreover, patient satisfaction about their care management by their GP was higher in the intervention group, as the communication or the given information by the practitioner were concerned.

Conclusion  The InPAct intervention constituted an original program that was intended to improve ADE management in primary care by enhancing patient involvement in their own care. Finally, the InPact intervention was efficient not only to enhance patient ADE identification associated with an active reporting, but also total ADE identification and communication between patients and their practitioners. Our study suggests that a better communication between patients and GP could improve patient safety in primary care.

Disclosure of interest  The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.475
P9-24
Frequency and characteristics of cancer screening and follow-up in general practice: A French nationwide cross-sectional study

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Purpose General practitioners’ (GPs) roles about cancer are poorly documented. We therefore wished to describe cancer screening and follow-up activities carried out in general practice.

Methods We used data from a French nationwide, multicenter, cross-sectional study, which described the distribution of health problems managed in general practice, along with the reasons for the encounter and the processes of care. We retrieved all the situations involving cancer screening and management from coded data and specific verbatim.

Results Among 20,613 consultations recorded, 580 included cancer screening (2.8%) and 475 cancer follow-up (2.3%). The most frequent procedures performed for cancer screening were colorectal cancer screening tests (38.6% of screening procedures), genetic examination (18.2%), cervical smear (16.8%), mammography (14.5%) and PSA test (9.3%). The most frequent cancers managed by GPs were breast (44.9%) and colorectal cancer (10.5%) in female patients, and prostate (37.3%) and skin cancer (10.3%) in male patients. The most frequent processes of care performed in cancer follow-up were medical examination (26.2% of care processes), drug prescription (19.8%), patient education/listening (12.6%), administrative procedures (8.7%) and discussion of test results (6.7%). Patients with cancer follow-up had on average 2.4 other health problems managed during the consultation. Patients screened and followed-up for cancer were less often low income patients (2.4% vs. 4.5% and 0.4% vs. 4.5%, respectively).

Conclusions At least five percent of French general practice consultations include preventive or curative management of cancer and its comorbidities. GPs should pay special attention to reducing gender and economic health inequalities regarding cancer screening and follow-up.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.477

P9-25
Assessment of gender related differences in management of stroke: Evaluation of clinical practices in a French registry

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Introduction The management of stroke is a public health priority in France. Patients require emergency medical care and rapid implementation of reperfusion strategies to improve prognosis and reduce disability. Stroke is the leading cause of death in women, the third in men. We aimed to compare the management of stroke and outcome among women and men, in a cohort of acute ischaemic stroke (AIS) patients treated with intravenous tissue plasminogen activator (tPA).

Methods We analysed data from a prospective AIS thrombolysis registry approved by ethical authorities. They are collected in standardized medical records and consistency is checked by clinical research associates. Data concerns pre-hospital management, therapeutical decisions, management delays, complications, status at final discharge and follow-up at three months. A total of 2790 patients received tPA between 2010 and in the six stroke units of the RESU-Val network (Rhône Valley, France); 1275 women (45.7%) and 15,152,016 men (54.3%).

Results Women were older than men at admission time (median age: respectively 77 [66; 84] vs. 71 [61; 80] years old, P < 0.0001) and presented more proximal occlusions (43.69% vs. 38.88%, P = 0.0113). The delays symptom-admission were longer for women compared to men (median: 89 [62; 120] vs. 83 [60; 113] minutes, P = 0.0200), even when first alert was managed by medical dispatch center (P = 0.0240). The delays admission-imaging and admission-thrombolysis were not different among patients managed in stroke unit. There was no difference between the percentage of women versus men who underwent fibrinolysis in the 60 min following admission (59.37% vs. 61.45%). Women and men were equally treated by mechanical thrombectomy (10.2% vs. 11.62%).

National Institute of Health Stroke Scale (NIHSS) was not different at discharge (median: 2 [0; 7] vs. 2 [0; 6]) although women presented higher score at admission (11 [6; 17] vs. 9 [5; 16], P = 0.0007). At 3 months, the NIHSS was higher among women (1 [0; 4] vs. 0 [0; 2], P = 0.0319). In-hospital mortality and cumulated mortality at 3 months were not statistically different between women and men (6.04% vs. 4.88% and 13.18% vs. 12.21%).

Conclusions Since the last years, the increasing use of technical reperfusion strategies - such as thrombectomy - and an organized access to the right pathway of care have tended to standardize treatment of AIS. Despite a later pre-hospital management and more severe presentation at admission, the comparison of the main key management of stroke does not differ among women and men and does not lead to excess mortality among women. For further investigation, we need to analyze the relationship between the pre-hospital delays and behavioral disparities.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.478

P9-26
Association between trends in hospital length of stay and risk of readmission after surgery

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Introduction Medical and surgical innovations have allowed hospitals to shorter length of stay (LOS) under financial constraints. It remains unclear whether hospitals with uncontrolled LOS reduction may expose patients to unsafe care. We aimed to determine if there was an association between trend in hospital LOS and patient’s risk of readmission over time.

Methods We selected all patients who underwent elective colectomy or urgent hip fracture repair in French hospitals between 2013 and 2016. For each procedure, hospitals were categorized in three groups according to potential variations in their median length of index stays over study period as follows: major decrease, moderate decrease, or no decrease. Three cohorts of patients were then designed by matching these groups of hospitals two-by-two, based on a propensity score approach taking into account potential confounding factors related to patients and hospital characteristics. In each cohort, outcomes were compared between hospitals groups at 1, 3 and 6 months. Potentially avoidable readmission for...
severe adverse event was modelled using Fine and Gray’s approach with competing risk of death, while number of days in all acute care hospitalizations over study period was analyzed using generalized estimating equations (GEE) Poisson regression. Clustering of patients in matched pairs was taken into account. **Results** We considered 98,713 patients in 540 hospitals for colectomy and 206,812 patients in 414 hospitals for hip fracture repair before matching. After colectomy, trend in hospital LOS over time was not associated with risk of readmission, except for patients operated in hospitals with a moderate decrease in LOS whose experienced a lower risk at 3 months compared to those operated in hospitals with no decrease (hazard ratio [95% CI]: 0.85 [0.78–0.93]). After hip fracture repair, patients operated in hospitals with major decrease in LOS compared to those operated in hospitals with no decrease had a higher risk of readmission at 1, 3, and 6 months (1.37 [1.18–1.59], 1.23 [1.10–1.37], 1.22 [1.11–1.33], respectively). For the two procedures, major or moderate decrease in hospital LOS over time compared to hospitals with no decrease were associated with fewer number of days in acute care hospitalizations at 1, 3 and 6 months (P < 0.001). **Conclusion** Reduction in LOS over time in French hospitals was not associated with worse patient outcomes after colectomy, whereas a higher risk of severe adverse event was observed after hip fracture repair in hospitals with major LOS decrease. For both procedures, clear relationship was found between reduction in LOS and lower consumption of hospitalization days in acute care. **Keywords** Hospital length of stay; Patient readmission; Surgery

**Disclosure of interest** The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.479

**P9-27**

*Changes in the “healthy soldier effect” by time since start of service in the Royal Norwegian Navy*

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**Introduction** A healthy soldier effect (HSE) in terms of lowered mortality is often seen in cohorts of deployed and non-deployed soldiers when they are compared to the general populations. The HSE is mainly due to selection on good health, which takes place before and during military service, a demand to stay fit during service, and, in some countries, probably also better access to medical services during and after service. This effect was also present in a peacetime cohort of 28,300 military men who served in the Royal Norwegian Navy after the Second World War. We have extended the follow-up of this cohort with an attempt to investigate changes over time in HSE.

**Methods** The cohort consists of 28,351 military men – commissioned officers, non-commissioned officers and petty officers, and enlisted personnel – who served in the Royal Norwegian Navy at some time between 1950 and 2004. The cohort members were born between 1883 and 1984, median was 1953 [interquartile range (IQR) 26 years]. Information on date and underlying cause of death was retrieved by linkage to the Norwegian Cause of Death Registry. The registry is regarded as complete back to 1951. All cohort members were followed for the incidence of death from first day of recorded service in the Navy but no earlier than 1 January 1951, until emigration, death or end of follow-up, which was 31 December 2015. Median age of the cohort members was 21.2 years (IQR: 79–25) at start of follow-up. We calculated standardized mortality ratios (SMRs) for all-causes combined, for neoplastic and non-neoplastic diseases separately, and for external causes based on the entire follow-up and for successive intervals of each person’s follow-up period (0–9, 10–19, 20–29, 30–39, 40–49, and 50+ years) since study entry.

**Results** The cohort members were followed up to 65 years, with an average of 38 years. A total of 5586 deaths and 1.08 mill. person-years were accumulated during follow-up. When considered for the full study period, we observed significant mortality reductions for all causes combined, external causes, and non-neoplastic diseases, while the mortality reduction for neoplasms was only bordering on statistical significance. While all-cause mortality deficit fell with time since study entry, a statistically significant deficit was observed for all successive intervals of follow-up time. SMR rose from 0.52 during the first 10 years of follow-up to 0.93 for the period after 50 years since study entry. Low mortality from non-neoplastic diseases gave the strongest contribution to the overall HSE, as the SMRs for this category gradually increased from one-third to four-fifths of the national rates from the first to the last follow-up interval. For neoplastic diseases, the change over time in relative mortality was less linear. For these diseases, there was a statistically significant mortality deficit only for the first and third follow-up intervals. In subsequent intervals, neoplastic mortality rates were similar to reference rates. External cause mortality rose to reference rates after 50 years.

**Conclusion** The healthy soldier effect eroded gradually with increased follow-up, but was still present throughout the (up to) 65-year long follow-up. The effect was strongest for non-neoplastic diseases, lasted up to 50 years for external causes and was relatively short for cancers.

**Disclosure of interest** The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.480

**P9-28**

*Association of lifestyle and socioeconomic factors with duration and intensity of physical activity assessed using 7-day 24 h-accelerometry*

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**Background** Duration and intensity of physical activity (PA) are independent protective factors for chronic diseases. Knowing factors associated with duration and intensity of PA might help tailor preventive measures aiming to reduce chronic disease risk. However, previous studies mainly relied on self-reported PA, which is prone to bias, and provides only limited information on PA intensity. The aim of the present study was to examine factors associated with objectively assessed duration and intensity of PA by accelerometry.

**Methods** In a multicentric, nationwide pretest of the German National Cohort, PA of 262 men and women aged 20 to 69 years was assessed by 7-day 24 h-accelerometry using hip-worn triaxial accelerometers (ActiGraph GT3X+). Time in overall PA (cut point: ≥ 79 counts per minute, cpm) and proportion of time in overall PA spent in low, moderate, and vigorous activity were determined based on the triaxial vector magnitude cpm (cut points: 79–2690, 2691–6166, and > 6167 cpm, respectively). Further, participants underwent a personal interview and anthropometric measurement following standardized protocols. In cross-sectional analyses, factors potentially associated with overall PA and PA intensity were studied in a multivariable linear regression model including sex, age, body mass index (BMI), waist circumference (residually adjusted for BMI), smoking status, alcohol consumption, university entrance qualification, employment status, net household income, marital status, diabetes, dyslipidemia, and study center. It was also tested for sex differences.

**Results** On average, participants were 417 min/d overall active, with 79%, 19%, and 1% of their active time spent in low, moderate, or vigorous activity, respectively. Regarding overall PA, persons having versus not having a university entrance qualification were 36 min/d (95% confidence interval; 13, 59) less active. Similarly, persons reporting to be unemployed versus full time employed were 66 min/d (35, 98) less active. Regarding PA intensities, per 5-years higher
Antimicrobial resistance: Knowledge towards antibiotics in a Mexican population

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Introduction  The increasing prevalence rate of resistant and multiresistant bacterial strains to antibiotics is a threat to public health and requires a rapid multifunctional answer. It has been reported that globally, more than 50% of the medicaments are prescribed, dispensed or sold inappropriately. The use of antibiotics over the last 75 years has caused a selective pressure over the bacteria that is characterized by the competition between resistant and sensitive strains. There have been identified risk factors that are related to the misuse and overuse of antibiotics, like sociodemographic characteristics and psychological aspects of the individuals that have not been explored objectively due to a lack of valid and reliable instruments for their measurement.

Objective  To validate a questionnaire for the evaluation of the levels of knowledge related to the use of antibiotics in a Mexican population.

Materials and methods  Analytical cross-sectional observational study. The questionnaire was developed in a previous study by Lim et al. This consisted of 12 items to evaluated knowledge (1 = no, 2 = not sure, 3 = yes) regarding to the antibiotics. The direction of the measure was positive, the higher score corresponded to a higher level of knowledge. These are preliminary results and correspond to the pilot-test of 30 respondents. The validation of the instrument was done by Rasch analysis, the Chi 2 and statistical residuals were estimated to measure the adjustment to the model. Unidimensionality and local independence were evaluated by principal component analysis of the residuals. Internal consistency was evaluated with Cronbach Alpha. Also, was evaluated the presence of Differential Item Functioning (DIF) by age and gender. The software Rumn2030 and the SPSS were used for the analyses.

Results  The participants presented an average age of 32 years ± 12.6 and 53% were women. The items presented a good fit to the Rasch model (Chi 2 = 12.8; P = 0.3795) as well as unidimensional and local independence (number of significant t-tests of 3%). The reliability was of 0.63 and the presence of DIF was not observed. The statements on role of antibiotics showed the highest inappropriate response, where most of the respondents did not know that antibiotics would not work against viral infections (70%) and that could also cause side effects (87%). The knowledge score ranged from 0 to 12 points, with a mean of 7.03 ± 2.6.

Conclusions  The instrument showed good psychometric properties. The low scores of knowledge about antibiotics suggest that misinterpretations on the use of these medicaments were prevalent, which could influence the production of antibiotic resistance. The application of this questionnaire will allow the objective identification of “high-risk groups”, which will be the target population for future educational campaigns, to reduce the knowledge gaps on the general population as an effort against antibiotic resistance.

Disclosure of interest  The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.481
P9-31
Experimention and use of tobacco in Brazilian school adolescents: Association with mental health and family context
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Summary
Objective To study the association between aspects of mental health and the family context with tobacco experimentation and consumption among Brazilian schoolchildren.

Methods A cross-sectional study using data from the National Survey of Schoolchildren Health in Brazil conducted in 109,104 schoolchildren from the ninth year of elementary school on the day shift of public and private schools in all the capitals of the Brazilian states and the Federal District. Descriptive analysis of variables, bivariate and multivariate analyzes were performed with logistic regression estimates, adjusted for socioeconomic variables, obtaining OR and 95% CI.

Results Among the participants, 52.2% were female. It was verified that the experimentation of cigarette at least once in the life was informed by 20.9% of the students. Adolescents who experienced more often feelings of loneliness (OR: 2.07; 95% CI: 1.98–2.16), difficulty sleeping (OR: 2.37; 95% CI: 2.52–2.48) and lower social interaction (OR: 1.27; 95% CI: 1.26–1.32), were more likely to smoke, regardless of socioeconomic status. The schoolchildren of parents or caregivers (OR: 2.39; 95% CI: 2.29–2.49) who do not know what their children do in their free time (OR: 1.52; 95% CI: 1.46–1.59) were associated with more frequent cigarette smoking.

Conclusion It was evidenced an association between the aspects of mental health and the family context with the experimentation and consumption of tobacco in adolescents enrolled in Brazil. These associations are independent of school type, sex and skin color. It is important that programs for the prevention of tobacco use in adolescence emphasize these findings.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.485

P9-33
Sexual and reproductive health of Brazilian adolescents: National school health survey (PENSE) 2009, 2012 and 2015
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Background Sexual and reproductive healthcare for adolescents has faced some obstacles and challenges. The young population has a significant burden of disease related to unplanned pregnancy and births, as well as, sexually transmitted infections (STIs), including human immunodeficiency virus/human immunodeficiency syndrome (HIV/AIDS), maternal death and abortion. Some factors, such as lack of information about their health, difficult access to contraceptive methods, low schooling and income, violence and sexual abuse, gender inequalities, among others contribute to the persistence and increase of these problems among adolescents. The objective of the study was to analyze indicators of sexual and reproductive health of adolescents based on data from the National School Health Survey (PENSE) in 2015, comparing them to those of 2009 and 2012.

Methods Cross-sectional study, which has analyzed data from 9th graders - PENSE 2015, 2012 and 2009. Prevalence was estimated with the respective 95% confidence intervals (95% CI) for indicators of sexual initiation, condom use at the last sexual intercourse, have received counseling regarding pregnancy prevention, sexually transmitted infections (STIs) prevention and free condoms availability in all three editions of the survey. Prevalence of all 2015 indicators were also estimated stratifying them by sex, administrative dependence of the school and region. Pearson’s Chi2 test was used to evaluate statistical differences. The complex sample was used to obtain population estimates using the Stata Survey module, version 14.0.

Results Prevalence of sexual initiation decreased from 30.5% in 2009 to 27.5% in 2015, as well as for condom use, from 75.9% to 66.2% in the same
period. There was a decrease in the orientation of prevention of pregnancy in public schools, from 81.1% to 79.3% and of free condom in private schools, from 65.4% to 57.3%. There was a higher prevalence of use of methods other than condoms and a threefold higher prevalence of previous pregnancy among public school students (9.4 vs. 3.5%, P < 0.002). About 30% of the adolescents reported combined use of condoms and another method, setting up double protection, and 19.5% did not use any method. All indicators of sexual and reproductive health analyzed in 2015 had differences according to sex (P < 0.0001). It was observed that boys presented higher prevalence of sexual initiation, number of partners and less condom use, as well as received less guidance on prevention of these events than girls. North, Northeast and Central–West regions presented the worse indicators performance.

**Conclusion** There was a decrease in sexual initiation and condom use among adolescents, greater vulnerability to STIs among boys, and pregnancy among adolescents in public schools. We also noticed a worse performance of the indicators in the North, Northeast and Central West regions, reinforcing the need to invest in sexual and reproductive education, considering the peculiarities of this population, with more attractive and empathic strategies. It is worth noting that the school is an essential locus for the transfer of contents about sexual initiation, condom use, STI prevention, among others. Thus, there are no spaces for setbacks, nor the restriction of these themes for religious reasons, or gender bias.

**Keywords** Sexual and reproductive health; Adolescents; Health indicators; Contraceptive methods; Public health policies

**Funding** Ministry of Health, Brazil.

**Disclosure of interest** The authors declare that they have no competing interest.

**Acknowledgements** Malta DC thanks the National Council for Scientific and Technological Development (CNPq), Brazil, for the productivity grant; Machado IE also thanks the CNPQ for the postdoctoral fellowship; Paula TF thanks the Brazilian Federal Agency for the Support and Evaluation of Graduate Education (CAPES) for the master’s degree social demand.

https://doi.org/10.1016/j.respe.2018.05.486

**P9-35**

**Frequent binge drinking during the 18–25-year-olds: A risk of adulthood alcohol dependence?**

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**Introduction** Alcohol addiction in adult life is one of the most investigated long-term consequences of adolescence alcohol consumption but few studies focus on casual inferences of binge drinking behaviour in young adulthood on adulthood itself. The purpose of this study is to identify the binge drinking between 18 and 25 years as a risk factor of alcohol dependence at 25–45 years.

**Methods** A case control study in a population of 25–45 years was carried out in France. The cases were alcohol dependent (AD) patients diagnosed by a physician and included in an hospital department of addictology. The controls were non-alcohol dependent (NAD) with the AUDIT test inferior to 8. A self-anonymous questionnaire collected at-in-person interview during a medical consultation for the cases and with an online questionnaire for the control. Socio demographics data, family alcoholism history, frequency of binge drinking and occasion (with friends, family or lonely), and alcohol consumption between 18 and 25 years were collected. Binge drinking (5 or more drinks per drinking on any occasion) were classified as follows: more than twice a month as frequent, once a month or less as occasional and none binge drinking as never.

**Results** A total of 199 adults of 25–45 years were included: 83 cases (72 males and 11 females) and 116 controls (72 males and 44 females). The mean age was 34.6 years (standard deviation: 5.1). The prevalence of the frequent binge drinking during the 18–25 years period were 75.9% in AD and 35.3% in NAD (P < 10−4). Alcohol consumption during the 18–25 years period (except binge drinking) was frequent for 37.3% of AD and 4.3% of NAD (P < 10−4). The age of the first alcohol drink (15.1 years) did not differ between AD and NAD. The age of the first drunkenness was 16.6 years in the AD and 17.8 years in the NAD (P = 0.04), 20.5% of AD have a maternal alcoholism history (6.1% of NAD) and 42.2% of AD have a paternal alcoholism history (17.4% of NAD) (respectively P = 0.002 and P < 10−4). After multivariate analysis, alcohol dependence in adulthood was associated with frequent binge drinking during 18–25–years-old [AOR = 3.1; 95% CI (1.3–7.3), gender [male AOR = 2.7; 95% CI (1.0–7.5)], and paternal alcoholism [AOR = 4.6; 95% CI (2.0–10.5)]. Frequency of alcohol consumption during 18–25 years-old was not associated. Among frequent binge drinker, the lonely binge drinking during 18–25 years-old was more frequent among the AD (27.0%) than among the NAD (7.3%) (P = 0.01).

**Discussion** A new knowledge was highlighted about the association between frequent binge drinking during the 18–25 years-old and the alcohol dependence.
in adulthood. Prevention and caution about binge drinking during pre-adulthood, specially the lonely binge drinking, should be implemented to avoid acute consequences as injuries and death but also long-term consequences as alcohol dependence.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.488

P9-37 Impact of the ESDM on the development of children with ASD in a European French-speaking population: First results of the intervention implementation
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Introduction Early intervention for autism spectrum disorder (ASD) in the European French-speaking countries is heterogeneous and poorly evaluated to date. Early intervention units applying the Early Start Denver Model (ESDM) for toddlers and young children with ASD have been created in France and Belgium to improve this situation. It is essential to evaluate this intervention for the political decision-making process regarding ASD interventions in European French-speaking countries. We selected the implementation of a 12-hour ESDM intervention for children with ASD over a 2-year period as part of the IDEA trial. This ESDM intervention can be complex to implement. It is subject to many organizational constraints. It relies on a strong involvement of both ESDM professional teams and parents to implement this individual intervention adapted to each child. It is therefore important at this stage of the IDEA study to evaluate the ESDM intervention implementation.

Methods The IDEA trial is an ongoing multicentre, randomised controlled trial, using a two-stage Zelen design. Children included are aged 15 to 36 months, diagnosed with ASD and with a Developmental Quotient (DQ) of 30 or above on the Mullen Scale of Early Learning (MSEL). We use a stratified minimisation randomisation at a ratio 1:2 in favour of the control group. The sample size requires is 180 children (120 in the control and 60 in the intervention group). The intervention evaluated was a 12-hour per week ESDM by trained therapists (10 hours in the centre and 2 hours in the toddlers’ natural environment). The control group receives care available in the community. Our aim was to evaluate the ESDM intervention implementation for children in the intervention group, by evaluating the number of sessions and the number of hours ESDM conducted and analyzing reasons for absence and organization of centers.

Results To date, 131 children have been included: 88 randomized children in the control group, 43 randomized in the intervention group. At inclusion, children’ characteristics in the intervention group were mean age 29.8 months, the level of behavioral change and severity of autistic symptoms at ADOS score of 7.6 (max score 10.0) and developmental quotient at Mullen score of 45.9 (max score 59.1). ESDM intervention sessions were completed for 65% of the children. Seventy-five percent of the reasons for cancellation were related to the organization of ESDM professional teams (holidays, training/absences of professionals). The average number of intervention hours delivered was of 8 hours per week. The average number of hours delivered increased (from 6.6 hours to 9.6 hours per week) during the months of ESDM intervention implementation, suggesting a gradual implementation.

Conclusions The evaluation of the intervention implementation showed that children received on average 4 hours less ESDM intervention than initially planned by the protocol. The reasons for canceling sessions related to families are limited (25%), which shows a strong motivation and involvement on their part.

The results highlight the factors limiting the ESDM intervention implementation (necessary adaptation period, organizational constraints of the professional teams).

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.490

P9-38 Infant crying, parental stress and attachment: A structural equation modelling approach
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Introduction Excessive infant crying is a common concern for parents and has been associated with child behavioral problems, parenting stress, and postnatal depression. This study explored the relationship between perceptions of excessive infant crying at six months, maternal attachment at six months, and mother’s parenting stress at 24 months.

Methods Data from a randomized controlled trial of a five-year early intervention program targeting children’s school readiness skills in a disadvantaged area of Ireland were used. Participants were enrolled between 2008 and 2016 into three groups: high support, low support, and no treatment. The present study included all families present in the trial at 24 months. Infant crying was assessed at six months using a maternal reported measure of duration of infant crying. Maternal attachment was assessed at six months using the Condon Maternal Attachment Scale. Parenting stress was assessed at 24 months using the child-rearing stress subscale from the Parenting Stress Index. Structural Equation Modelling was used to explore the direct and indirect effects of infant, maternal, and environmental characteristics, and perception of infant crying on parental stress, focusing on the mediating role of attachment.

Results One hundred and ninety-nine families were included. Excessive infant crying at six months had a statistically significant indirect effect [standardized coefficient: 0.06; 95% confidence interval (95% CI) 0.01, 0.11], mediated by maternal attachment, on parenting stress at 24 months, leading to a significant total effect (0.15, 95% CI: 0.03, 0.27). Vulnerable attachment style (0.24, 95% CI: 0.11, 0.37), previous mental health (0.17, 95% CI: 0.05, 0.28), low father’s education (0.12, 95% CI: 0.01, 0.24), and father’s involvement with child (0.13, 95% CI: 0.02, 0.24) were associated with higher levels of parenting stress at 24 months. Being married (−0.15, 95% CI: −0.27, −0.04) and maternal attachment (−0.34, 95% CI: −0.46, −0.22) were associated with less parenting stress.

Conclusions Attachment could be systematically assessed among mothers who report excessive infant crying. Additional support could be proposed to mothers with low maternal attachment, without neglecting support for all parents.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.491
Validation of the short-form Generalized Self-Efficacy scale (GSE-6) in rehabilitation

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Introduction
Self-efficacy (Bandura, 1997) plays a key role in psychological models explaining and predicting health behaviors (Schwarzer et al., 2011). This includes physical activity, nutritional behavior and substance consumption, which are addressed, for example, in interdisciplinary multimodal rehabilitation. The General Self-Efficacy Scale (GSE) is the most widely used instrument to assess this construct and is available in over 30 language versions (Schwarzer and Jerusalem, 1995). However, for economic reasons, it is not always possible to use the GSE in studies or clinical routine. Therefore, the short form GSE-6 was proposed, which consists of six out of the original ten items (Romppel et al., 2013). However, there is no validation except for the cited study, which was applied to a sample of the general population and patients with heart failure, only. Hence, the aim of this work is to determine psychometric properties and the validity of GSE-6 among rehabilitation patients.

Methods
The basis of the reported analysis is a nationwide study in Germany with 2530 insured persons of the Federal German Pension Insurance (Brünger et al., 2016; Brünger and Spyra, 2017). Patients were asked to fill in a questionnaire prior to their rehabilitation. In addition, mental impairment (PHQ-4), depression and anxiety (HADS), impairment due to pain (PDI), health behavior (IRES), social support (IRES), and subjective work ability (WAS) were assessed. The sampling was stratified according to the nine disease groups most common. Psychometric properties were calculated by comparing the short and the original version (GSE-6/GSE). By analogy with the original version, the value range of GSE-6 was transformed to 10 to 40 points. The concurrent validity is reported with Spearman correlations to the other impairments and resources mentioned. Multigroup confirmatory factor analyses (CFA) including gender, age and diagnosis groups demonstrate the factorial validity of both scales.

Results
Mean sum scores of the short and the original version were quite similar: GSE-6 28.1 (SD: 6.0) points; GSE 27.8 (SD: 6.0) points. In 92.9% of the rehabilitees, the GSE-6 sum score diverged by the GSE sum score with a maximum of ±2 points. Soil effects existed for 2.6% of the rehabilitant patients in GSE-6 (GSE: 2.2%), ceiling effects for 0.5% (GSE: 0.4%). The mean discriminatory power of the items ranged from rix = 0.70 in GSE-6 to rix = 0.74 in GSE. The internal consistency according to Cronbach’s alpha was 0.89 for GSE-6 and 0.93 for GSE. GSE-6 and GSE were correlated with r = 0.98. The correlations of GSE-6 and GSE to other impairments and resources were in a comparable range: depression (τ = 0.61, τ = 0.62), anxiety (τ = 0.56, τ = 0.57), mental impairment (τ = 0.56, τ = 0.58); social support (τ = 0.41, τ = 0.42); impairment due to pain (τ = −0.40, τ = 0.40); subjective ability to work (τ = 0.37, τ = 0.37) and health behavior (τ = 0.30, τ = 0.31). Stratified analyzes by gender and diagnosis groups provided comparable results. Multigroup CFA confirmed the one-dimensional structure of both scales independently of gender, age and diagnosis group.

Conclusions
There were only minor differences when using the GSE-6 compared to the original version. The psychometric properties are slightly less favorable on the short scale - as expected due to the lower number of items - but are also at a high level. Thus, an application of the short version in rehabilitation across all major diagnosis groups seems possible without relevant losses compared to the original version. In the future, it allows for a 40% reduction in time compared to the original GSE version and may facilitate the assessment of self-efficacy in studies and for screening purposes in clinical routine.

Disclosure of interest
The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.492

Mortality in a Tunisian intensive care unit

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Introduction
Nosocomial infection (NI) constitute a major public health problem. It was extremely frequent and serious, especially in the intensive care unit (ICU). Thus, ICU-NIs increased patient mortality. The objective of this study was to determine rates and predictive factors of ICU mortality in a Tunisian University Hospital.

Methods
We conducted a nested case-control study in a 630-beds public University Hospital in Eastern Tunisia. Cases and controls enrollment was based on data collected prospectively by an ICU-wide active surveillance of NI conducted over 12 months: from July first, 2010, through June 30, 2011. Patients admitted to the ICU were included in the study if they stayed in the ICU for more than 48 hours.

All analyses were performed with SPSS for Windows, version 19.0.

Results
Overall, 301 patients were enrolled from ICU. The mean age was 44.8 ± 21.3 years. The mean of length of stay in ICU was 12.7 ± 4. The crude ICU mortality rate was 20.6% (62/301). It was 35.8% for patients who acquired at least one NI during their stay in ICU and 16.2% for those without any NI, yielding an overall crude excess mortality rate of 19.6% (OR = 0.9, 95% CI: 1.6 to 5.3). Overall, 62 case patients were compared to 239 control patients (total) for the final analysis. Logistic regression model demonstrated 5 independent predictive factors of ICU: age older than 65 years (OR: 5.78 [95% CI: 2.03–16.05] P = 0.001), duration of intubation 1–10 days (OR: 6.82 [95% CI: 1.90–24.45] P = 0.003), duration of intubation > 10 days (OR, 11.11 [95% CI: 2.85–43.28] P = 0.001), duration of central venous catheterization (CVC) > 1 day (OR: 6.85 [95% CI: 1.71–27.45] P = 0.007) and duration of CVC > 7 days (OR: 5.55 [95% CI: 1.70–18.04] P = 0.004).

Conclusion
In this series of ICU patients, duration of intubation and CVC had higher ICU mortality. It could be explained by the frequency of infectious complications that have been generated and the fragility of the clinical condition. So, the implementation of infection control programs could be result in significant reductions in mortality rates in the ICU.

Disclosure of interest
The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.494

High eating self regulatory skills predicts lower weight gain and healthy dietary intake among first year undergraduate students

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Introduction
There is consistent evidence that suggests first year students are at risk of weight gain, but the reasons for this vulnerability are still unclear. Given the dramatic changes in routine, environment and social life experienced by first year undergraduate students, some level of self-regulatory skills may be required to keep healthy habits and/or build new ones due to disruptions of old habitual behaviours. The new environment may also increase demands on self-regulation to inhibit impulses towards food temptations, since students may be exposed to a high level of unhealthy food options at university. Therefore, this study aimed to examine relationships between eating self-regulatory skills, weight and dietary behaviours over 6 months in a UK cohort of undergraduate students.

http://dx.doi.org/10.1016/j.respe.2018.05.492
Methods First year undergraduate students from 13 universities situated across London were invited to complete an online survey at the beginning of the academic year (September/October 2015). At 6-month follow-up participants were invited to complete the online survey for a second time. Eating self-regulatory skills at baseline were assessed using a valid 5-item scale. Weight changes over 6 months were calculated for absolute weight in kg and categorised into two groups: ≥ 5% or < 5% initial body weight. Dietary changes over 6 months were assessed via valid food frequency questions. Participants were classified as maintaining or achieving a high intake of sweet and salty snacks vs. not, and as maintaining or achieving a low intake of sweet and salty snacks vs. not, and as maintaining or achieving a low intake of sugary drinks vs. not. Paired t-test was used to explore change in weight and Chi² tests were used to assess differences in dietary behaviours over the 6 month period. Linear and logistic regressions were performed to explore the effect of baseline eating self-regulatory skills on weight and dietary changes. Ethical approval was granted by the University College London Research Ethics Committee.

Results A total of 481 students took part in the study. A mean weight change of 0.661 kg (sd = 3.83, P = 0.0006) was observed, but the range of weight change varied widely (−11.3 kg to 26.2 kg). Among students whose weight increased over 6 months (N = 127), the mean weight gain was 3.30 kg (sd 3.16) and around −11.3 kg to 26.2 kg). Among students whose weight increased over 6 months (N = 127), the mean weight gain was 3.30 kg (sd 3.16) and around −11.3 kg to 26.2 kg). Students with higher baseline eating self-regulatory skills were more likely to maintain or achieve a higher fruit and vegetable intake (OR = 1.9, P = 0.001) and a lower sweet and salty snack (OR = 1.9, P = 0.001) intake over the 6 months. Higher baseline eating self-regulatory skills were also related to lower weight changes (β=−0.15, P = 0.018) and decreased likelihood of gaining 5% initial body weight (OR = 0.52, P = 0.006) at 6-month follow-up. Additionally, self-regulatory skills moderated the relationship between baseline BMI and weight changes (β=−0.25, P ≤ 0.001) and between baseline BMI and 5% weight gain (OR = 0.82, P = 0.008).

Conclusions Starting university with higher eating self-regulatory skills may help students to maintain or achieve a healthy diet and protect them against substantial weight gain, especially among students with higher BMIs. Weight gain prevention initiatives that include eating self-regulatory skills training should be tested.

Disclosure of interest The authors declare that they have no competing interest.

P9-44

Prevalence and associated factor of Internet addiction among population-based sample of secondary school students in rural community, Thailand

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Introduction On September 26, 2016, the Normandy regional health agency was reported about an outbreak of acute gastroenteritis among 20 residents and 4 staff members in a nursing home. Onset of symptoms occurred between September 25 and 26, 2016. A foodborne outbreak was initially suspected to be the source of contamination of the cases as the initial environmental investigation found a sample of “mixed porc” meal served on September 24, 2016 positive for Norovirus type II. In total, the outbreak lasted 3 weeks. During the 3rd week of the outbreak, further epidemiological and environmental investigations were launched in order to identify factors associated with a prolonged transmission of Norovirus.

Methods A case of gastroenteritis was defined as a resident or a staff member with symptoms of diarrhea and/or vomiting that occurred between October 17, 2016 and October 12, 2016. A retrospective cohort study was conducted among staff and residents in order to identify risk factors associated with a prolonged transmission of norovirus. A standardized questionnaire collected information on risk factors of norovirus infection during the outbreak period including sociodemographic characteristics, type of diet and place of lunch, score of dependency, type of accommodation, type of employment (staff) and type of symptoms. Risk factors of gastroenteritis were searched using a logistic regression (P < 0.05) model. Microbiological investigations of resident stools (n = 5) and further food samples were undertaken on the 3rd week of the outbreak. The premises were inspected and professional practices were reviewed.

Results In total, 49/89 (55%) “resident” cases and 9/85 (11%) “staff” cases were identified between September 17, 2016 and October 22, 2016. The occurrence of a peak of cases on September 25 and 26 with a 20% attack rate motivated the reporting of the outbreak to the health agency. However, the retrospective epidemiological investigations showed the occurrence of previous unreported cases, including an index case in a staff with onset of symptoms on September 17, 2016. No further food sample other the “mixed pork” served on September 24, 2016 came back positive for Norovirus. The analyses of the supplier’s batch however, tested negative for Norovirus. Three stool samples from residents were positive for Norovirus type II over the outbreak period. In multivariate analysis, the only risk factor for contamination was a high dependence score (GIR < 4), (OR = 2.1 [95% CI = 1.05–4.07]). The review of practices by the hygienist showed that the application of barrier measures was not optimal (misuse of gloves kept between 2 residents, non virucidal products,…).

Conclusion Norovirus outbreak are common in nursing home during the autumn–winter season. The introduction of the virus in the premises probably occurred through a sick staff who was not reported. The lack of reporting of index cases, in addition to a poor application of barrier measures, explains the persistence of gastroenteritis cases via cross-transmission, favored by the large dependency of residents. The training of professionals in timely recognition and reporting of gastroenteritis cases and proper application of control measures remains challenging in such setting.

Disclosure of interest The authors declare that they have no competing interest.
to identify potential risk factors for internet addiction.

Results A total of 4986 undergraduate students were enrolled into the study. Of those 1559 (33.2%) had internet addiction. Addicted Internet users were younger, more likely to be males and failed the exam compared to non-addicted Internet users. Internet addiction was significantly associated with failed exam (OR = 1.25), online sex seeking (OR = 1.74), school bullying perpetrator (OR = 1.49), alcohol used (OR = 1.49), recreational drug used (OR = 1.87), depression (OR = 1.68), anxiety (OR = 1.66), stress (OR = 1.80), and type of school (private/public school) (OR = 1.75) after controlling for gender, school victimization, family restriction internet use, cyber victimization, and cyber perpetrator.

Conclusion Internet addiction is a new public health concern of young adults. We found the high prevalence of internet addiction among secondary school students in rural community of Thailand. It is found to associate with various risky behaviors and psychological symptoms. Results from this study can be used to help educational agencies and mental health organizations create policies and design programs that will help in the prevention of internet addiction in adolescents. Strategies should address this phenomenon with attention to specific needs of gender while managing psychological disturbances.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.497

P9.45

Prevalence and associated factors of Internet gaming disorder among secondary school students in Chachoengsao Province, Thailand

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Introduction According to the APA, Internet gaming disorder is an emerging disorder that warrants further research. Studies on Internet gaming disorder has revealed its association with psychiatric symptoms such as depression, anxiety and stress. The risk factors have also been identified such as being male. Despite the studies conducted in various countries, research on internet gaming disorder among the Thai population is still scarce. This study aimed to estimate the prevalence and associated factors of internet gaming disorder among Thai secondary school students.

Methods This cross-sectional study was conducted during December 2017–January 2018 among 12 secondary schools in Chachoengsao province, Thailand. Participants completed a self-administered standardized questionnaire consisting of 4 sections; General characteristics, Internet gaming disorder, Mood disorder screening (depression, anxiety and stress), Cyberbullying and Traditional bullying. A multivariate logistic regression analysis was used to identify significantly associated factors of Internet gaming disorder.

Results Out of 5497 participants the prevalence of IGD-20 positive is 5.4%. The significantly associated factors of Internet gaming disorder identified are male gender (OR = 1.4), not living with both parents (OR = 1.75), use of online dating (OR = 1.533), being bullied at school (OR = 1.514), depression (OR = 1.922), anxiety (OR = 1.616) and stress (OR = 3.566) after being adjusted for age, gender, family composition, failure of an exam, limit of internet use, use of online dating, bully perpetration, bully victimization, cyber bully perpetration, cyber bully victimization, suicidal ideation, use of alcohol, depression, anxiety, stress and type of school.

Conclusion Although the prevalence of Internet gaming disorder among Thai secondary school students may not be high when compared to other countries, the global trend shows a continuous increase in prevalence. Therefore, preventive measures should be taken. Interventions should be targeted particularly at those with increased risk of developing the disorder.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.498

P9.46

Assessing the performance of ongoing national indicators on healthcare quality and safety: Development of the quid method and results on ten indicators

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Introduction Since ten years, quality indicators (QIs) are mandatory measured in all French hospitals. They are used for hospital quality improvement, public disclosure and regulation goals. After a decade of use, the Ministry of Health and the French National Authority for Health set up a task force to evaluate these QIs. The goal was to provide a decision aid to the Ministry and HAS in terms of suppressing or maintaining their use, or modifying their content. As there was no available integrated tool, the task force started with the development and test of a tool during the year 2015. This tool aimed at evaluating all components of their performance (measurement feasibility, metrological performance and relevance for users) of QIs according to each of the three goals. The objective was to define an operational and structured method allowing the overall appraisal of ongoing national QI in healthcare, to apply it on ten indicators and to study its impact.

Methods The national expert group was constituted by clinicians, epidemiologists, health care facility managers, quality managers, sociologists and patients’ representative:

step 1: a search for similar experiences in other countries;
step 2: a literature review to identify relevant assessment criteria and methods;
step 3: a consensus method between the members of the group to select the criteria: Using a modified Rand/UCLA Appropriateness Method, the appropriateness of these criteria was checked for evaluating the indicators according to each of the three goals. The group extracted a list of criteria for each goal. Each criterion was assessed using a quantitative approach or a qualitative approach;
step 4: test and implementation of the method on 10 national QI to identify operational issues in the implementation of the method: The indicator’s results collected the previous years were analyzed; the scientific soundness of the indicator development was reviewed; field hospital workers (doctors, nurses, managers), health authorities employees and patients were interviewed. All these data results were discussed by the task force, summarized and displayed on spider charts presenting standardized scores. This integrated tool was tested on ten national process QIs;
step 5: assessment criteria of impact of the work: implementation of the recommendations by the Ministry and HAS.

Results Twelve were selected as appropriate for the evaluation of QIs for regulation use: relevance (importance of the quality characteristic captured for the healthcare system; benefit/ability to take decision based on the results; potential risks/side effects), feasibility (understandability and Interpretability of the indicator and its results; barriers to implementation due to data collection effort; delays related to data production), scientific soundness of the indicator development (indicator evidence; validity; risk adjustment) and current metrological performance (indicator expression can be influenced by providers; discriminatory power; dynamics of change). Among these, 11 were selected for hospital improvement and 7 for public disclosure.

The tool was applied on 10 process QIs. We proposed to suppress four of them and to modify or suspend the six others. The four QIs were suppressed, and the others have been or are currently in a process of modification.

Conclusion By combining qualitative and quantitative evaluations, the QUID instrument offers a solid method for thoroughly appraising each indicator. The value of the QUID method was supported by the clear-cut conclusions on 10 QIs and subsequently by the decisions of the Ministry and the HAS to follow the recommendations. More research is needed to finalize the tool on other types of indicators.
**P9-48**

**Effect modification of the treatment efficacy by comorbidity using “real-life” data from a French cohort of patients treated for DLBCL**

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**Introduction**

Comorbidity management is set to play an increasing role in modern health services due to the population ageing and the increasing incidence of cancer. Previous work suggested that cancer incidence, detection, treatment and evolution may be influenced by comorbidity. Study focusing specifically on whether and how these influences take place are still rare. This can be explained by the difficulty of apprehending patients care trajectories to control for adequate confounders and disentangle statistical association from causal relationships. The present study aims at testing for the effect modification of the chemotherapy efficacy by comorbidity among patients treated for diffuse large B cells lymphoma (DLBCL).

**Methods**

We used data from the AMARE cohort, which is a prospective cohort of DLBCL patients in the Midi-Pyrénées region (South-West biggest region in France). Patients diagnosed between May 2006 and February 2017 and treated in the main centres of the region were included ($n = 732$). For each of the chemotherapy protocol received by the patients we built two models to estimate the effect of the treatment: model 1 with treatment only, and model 2 with treatment by comorbidity level. We used inverse probability of weight (IPTW) to control for confounders in the estimation of the treatment effect in each model. Models were compared using Bayesian Information Criteria (BIC). Comorbidity was measured using the Charlson Comorbidity Index (CCI) with the weights corrections proposed by Quan et al. in 2011 and coded in three categories (score $= 0$, score $= 1$, score $\geq 2$). Treatment efficacy criteria was the complete response at the end of the treatment.

**Results**

Regarding RCHOP 21, we observed that this treatment increased the probability of complete response independently of comorbidity. No modification effect by comorbidity was found for this protocol. However, we found that RCHOP 14 increased the probability of complete response only among patients without comorbidity indicating a modification effect for this protocol.

**Conclusion**

These preliminary results suggest that comorbidity may influence chemotherapy efficacy in different way depending of its effect on the choice of treatment strategy. Work is still underway to test for intermediate factor, which may explain the influence of comorbidity on treatment effect. We are giving a special attention to dose concession and toxicity.

**Disclosure of interest**

The authors declare that they have no competing interest.

**Acknowledgement**

This work is supported by the French National Cancer Institut (INCA, grant No. SHSESP17-059).

https://doi.org/10.1016/j.respe.2018.05.501

**P9-49**

**Mindfulness and anxiety symptoms in pregnant women**

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**Objectives**

Anxiety has been associated with a range of physical and emotion changes during pregnancy. The current study investigated the association between anxiety symptoms and mindfulness in low-risk pregnant women.

**Methods**

Pregnant women ($n = 283$) completed the structured questionnaires at the prenatal care clinic in a university hospital. Mindfulness awareness and anxiety symptoms were respectively measured using the Mindful Attention Awareness Scale and State Anxiety Inventory (SAI).

**Results**

The mean age of participants was 32.5 years [standard deviation (SD) 4.3] and most of the women were primiparas. The mean scores of anxiety symptoms were 39.1 (SD 10.8), while the average of mindfulness awareness was 68.9 (SD 9.2). 28.9% of pregnant women reported high level of anxiety symptoms (SAI $> 45$) during pregnancy. Compared to the participants with low anxiety, pregnant women with high level of anxiety tend to have lower mindfulness score ($P < 0.0001$). The mindfulness correlated negatively with anxiety symptoms ($P < 0.0001$).

**Conclusions**

The present study provides initial evidence regarding mindfulness awareness and anxiety symptoms in pregnant women. Future research addressing the mindfulness and anxiety is of importance in perinatal mental health.

**Keywords**

Mindfulness; Anxiety symptoms; Pregnant women; Mindfulness awareness

**Disclosure of interest**

The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.502

**P9-50**

**Impact analysis of clinical scenarios on patient safety culture in obstetrical environment: An intervention study in Sousse, Tunisia**

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**Introduction**

According to the World Health Organization (WHO), every year millions of people are exposed to adverse events (AEs) resulting from medical devices. A growing body of evidence supports their rate is associated with healthcare professionals’ attitudes toward safety. The purpose of the study was to evaluate the impact of training on patient safety culture of midwives in obstetrical unit.

**Material and methods**

We have proceeded to a prospective intervention study in 2016 with one group, which included midwives practicing in the delivery room in the department of obstetrics-gynecology, in university hospital Farhat Hached, Sousse, Tunisia. A French version of “Hospital Survey on Patient Safety Culture” (HSOPSC) was used for measuring safety culture. The training program consisted of two workshops with scenario’s analysis. The questionnaire was used before and after the two training sessions.

**Results**

Sixteen volunteer midwives were included. The comparison of the total scores’ section (mean of the percentage of positive responses to sections’ items), at pre- and post-training, showed a significantly increased score regarding the section D from 7 ± 0.8 to 9 ± 1 ($P = 0.017$). However, the score of section F decreased significantly from 34 ± 11.5 to 26.5 ± 12 ($P = 0.03$). In addition, the level of the Dimension 2 “Frequency of event reporting” enhanced significantly.
from 0.3 to 1/3 (P = 0.025) and only item C5 “In the department, we discussed errors’ prevention methods” had a significant increase in the number of positive responses, from 2 to 9 (P = 0.016).

**Conclusion** Our study has shown that training can improve the culture of safety. However, the magnitude of impact varies among different safety culture sections and dimensions. In other hand, we observed poorly developed dimensions of safety culture.

**Disclosure of interest** The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.503

**P9-51**

Psychosocial characteristics and complications in outpatients in a French University Hospital

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**Background** The objectives were to describe outpatients’ psychosocial characteristics and to identify the prevalences of unanticipated hospital admission immediately following outpatient surgery and of severe complications in outpatients at one month after ambulatory surgery.

**Methods** A prospective cohort study was conducted during one month in Rouen University Hospital in January 2017. An anonymous questionnaire was administered in outpatients before hospital discharge. After another month after discharge, data regarding unanticipated hospital admission (primary endpoint) and readmission for complication related to ambulatory surgery and risk factors of readmission depending on psychosocial level (secondary endpoint) were collected from patient medical records. Data included demographic and psychosocial characteristics information on surgery and anesthesia.

**Results** A total of 598 outpatients were included during a month, which represented 85.7% of the outpatients of the hospital unit. The mean age was 50.8 years old (SD = 19.8), the sex ratio male/female was 0.68. Among the outpatients, 93.8% had an ASA Physical Status of I or II. There were 23.5% ophthalmic surgeries, 19.0% gynecological surgeries, 17.7% orthopedic surgeries, 8.3% plastic surgeries; 47.5% of operations were carried out under general anesthesia and 16.6% under regional anesthesia. Twenty percent of outpatients lived alone and 2.6% lived alone and socially isolated; 1.6% of outpatients returned home as a pedestrian and 3.4% used public transportation; 13.7% of outpatients were 2.6% lived alone and socially isolated; 1.6% of outpatients returned home as a pedestrian and 3.4% used public transportation; 13.7% of outpatients were 16.6% under regional anesthesia. Twenty percent of outpatients lived alone and 2.6% lived alone and socially isolated; 1.6% of outpatients returned home as a pedestrian and 3.4% used public transportation; 13.7% of outpatients were 16.6% under regional anesthesia. Twenty percent of outpatients lived alone and social isolated; 1.6% of outpatients returned home as a pedestrian and 3.4% used public transportation; 13.7% of outpatients were

**Conclusions** In our study, the prevalence of unanticipated hospital admission and readmission was low and comparable to the literature. In this work, the psychosocial level was not a risk factor of unanticipated hospital admission or readmission after ambulatory surgery.

**Disclosure of interest** The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.504

**P9-52**

Burn out in University students: An international study

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**Background** The objects were to determine the prevalence of burn-out (BO) and to identify associated comportment risk factors in university students in four countries.

**Methods** In 2015, a cross-sectional study was conducted in four universities in four countries: Constantine (Algeria), Rouen (France), Miskolc (Hungary) and Cluj-Napoca (Romania). An anonymous self-questionnaire collected various information: sex, age, university curriculum, behavior risk, and such risk of eating disorder and use of neuro-enhancement substances for exam preparation. BO level was measured using the Maslach Burnout Inventory with 3 levels: low, moderate and high level. Stress level was measured using Cohen’s Stress Scale.

**Results** A total of 1983 students were included (932 in France, 647 in Hungary, 222 in Romania and 182 in Algeria). The prevalence of high level BO was 29.7% in Algeria, 17.9% in France, 12.6% in Hungary and 21.7% in Romania. The prevalence was in found in medical students. In the four countries, the mean stress level ranged from 13.5 (SD = 2.1) in France to 16.8 (SD = 6.9) in Algeria. High BO was significantly associated with to be a medical student (AOR = 2.23, 95% CI = 1.87–2.76), to have financial difficulties (AOR = 1.69, 95% CI = 1.18–2.45) and regular physical activity (AOR = 0.61, 95% CI = 1.24–1.84).

**Conclusion** Prevalence of BO, especially in medical students was high in different in sociocultural context. The BO could have critical professional and personal consequences in medium- and long-term. To address this highly prevalent new challenge, educators must first develop greater awareness and understanding of BO. Medical students appear as a particular risk population. Individual as well as institutional interventions should be targeted to prevent burnout among university students, especially in medical students. Public health interventions should be taken to encourage identifying vulnerable students. Future researches are needed to develop practical ways to identify students at risk, prevent and reduce student distress. Such programs are vital to ensuring the well being of students. Educational and public health interventions focusing on BO prevention and management and generating wellness among student population are highly recommended.

**Disclosure of interest** The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.505
Session 10—Epidemiology, biostatistics, modelling and big/open data and e-Health (electronic)

P10-1
Monitoring vaccination coverage by electronic immunization registry in medium-sized city, Brazil
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Introduction Electronic immunization registries (EIR) enable real-time monitoring of vaccination data and they are important for surveillance, disease control and relevant databases for research. While EIR has been used for decades in high-income countries, there are few experiences in middle-income countries. In Brazil, the EIR of the National Immunization Program has been implemented only from 2014. However, there were already some local initiatives, and the EIR of the city of Araraquara (SP) (Juarez System) is the oldest one. The Juarez System has individual vaccination data since 1986 and it is linked with the entire municipal healthcare network, which is responsible for feeding the system. It is an important tool to ensure high vaccination coverage in this city by identifying and calling children that are missing vaccination. Analyzes of inconsistencies are performed routinely in order to obtain high accuracy data. In addition, this EIR integrates in a single environment data of vaccination, notification of diseases, healthcare, laboratory and pharmaceutical assistance. The objective of this study was to analyze trend of vaccination coverage in Araraquara (SP), Brazil, using data from Juarez System, in 2000–2016 when the Brazilian Immunization Program introduced several vaccines in the basic schedule.
Methods This is an ecological time series study. We analyzed data from 51,241 individuals born in 2000–2016 registered in the Juarez System. Araraquara is a medium-sized Brazilian city, with a population of 230,000 inhabitants and Human Development Index of 0.815. Immunopreventable diseases were controlled since decade of 1990 in this city. We evaluated vaccination coverage (number of vaccinated children/number of children registered in the system) per year of birth. We analyzed coverage of vaccination until 12 months for Bacillus Calmette–Guerin (BCG), hepatitis B, poliomyelitis, tetanus, diphtheria and pertussis (TDP), rotavirus, pneumococcus, meningococcus, yellow fever, hepatitis A and measles, mumps, and rubella (MMR) vaccines. We used the Prais–Winsten method for linear regression, with a significance level of 5%.
Results Vaccination coverage was quite high. Almost all of them were above 95% in 2016. MMR, yellow fever and hepatitis A vaccination coverage were 92.3%, 93.5% and 89.1%, respectively, for 2015’s birth cohort. BCG, TDP, poliomyelitis and hepatitis B vaccination coverage have increased about 0.5% per year. Rotavirus vaccination coverage has increased 1.2% (95% CI: 0.6–1.9%) per year since 2007. Yellow fever vaccination coverage has increased 2.5% (1.3–3.7%) per year since 2009. Pneumococcus, meningococcus and hepatitis A vaccination coverage remained stationary (P > 0.05). Data quality indicators showed that about 99.5% live births of Araraquara are registered in Juarez System and there is a low proportion of duplicate records (0.45%).
Conclusions This study showed the potential of an EIR in the assessment of vaccine coverage in a medium-sized city of middle-income country. The improvement of the vaccination schedule over 17 years with the introduction of 10 new vaccines did not affect vaccination coverage trend and they are still increasing. Then, the control of immunopreventable diseases in Araraquara (since the 1990s) could be attributed not only to the good organization of the immunization program, but also to the good performance of the EIR, which ensures the adequate monitoring of vaccine coverage and calls for vaccination. In this way, the confidence and, consequently, the population’s adherence to the immunization program are strengthened. Certainly, the Juarez System had its role in assisting the articulation of vaccination and surveillance activities, and offers a suitable database for research.
Disclosure of interest The authors declare that they have no competing interest.
https://doi.org/10.1016/j.respe.2018.05.507

P10-2
Potential selection effects when estimating associations between the infancy peak or adiposity rebound and later body mass index in children
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Aim Lots of research has been conducted to identify early life factors or growth characteristics in infancy and childhood related to an unfavorable weight development. For instance, a late age at infancy peak (IP), an early age at adiposity rebound (AR) as well as body mass index (BMI) at IP and AR were shown to be positively associated with later adiposity status. The present study aims to investigate the usefulness of the IP and AR in comparison to other measures of BMI growth as indicators of later weight status. For the first time, the selection effect possibly occurring when excluding children with non-identifiable IP or AR will be explored.

Methods Identification and Prevention of Dietary- and Lifestyle-Induced Health Effects in Children and Infants (IDEFICS)/I. Family is an ongoing cohort study conducted in eight European countries with 16,229 children participating in the baseline survey in 2006/2007 [1]. In a subset of 4744 children with at least four repeated measurements of height and weight in the age interval from 0 to 8 years (37,998 measurements in total; survey data supplemented with records of routine child visits), fractional polynomial mixed-effects models were used to derive individual BMI trajectories. Based on these trajectories, age and BMI at IP and AR, BMI values and growth velocities at selected ages as well as the area under the BMI curve were estimated. The BMI growth measures were standardized and related to later BMI z-scores (mean age at outcome assessment: 9.2 years).

Results Age and BMI at IP and AR were not identifiable in 5.4% and 7.8% of the children, respectively. These groups of children showed a significantly higher BMI growth during infancy and childhood. In the remaining sample, BMI at IP correlated almost perfectly (r ≥ 0.99) with BMI at ages 0.5, 1 and 1.5 years, whereas BMI at AR correlated perfectly with BMI at ages 4–6 years (r ≥ 0.98). In the total study group, BMI values in infancy and childhood were positively associated with later BMI z-scores where associations increased with age. Associations between BMI velocities and later BMI z-scores were largest at ages 5 and 6 years. Results markedly differed for children with non-identifiable IP and AR, demonstrating a selection effect.

Conclusions IP and AR may not be estimable in children with higher-than-average BMI growth. Excluding these children from analyses may result in a selection bias that distorts effect estimates. BMI values at ages 1 and 5 years might be more appropriate to use as predictors for later weight status instead.

Disclosure of interest The authors declare that they have no competing interest.
P10-3 Population estimation in camp of displaced persons, through counting of dwelling by satellite earth observation. Ngala, Borno State, Republic of Nigeria

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Introduction Knowledge of the size of the population during humanitarian emergency and/or development interventions is essential because it allows for better planning of assistance (food and non-food distribution, vaccination campaigns, etc.). Classical methods are based on the estimation of the target population from existing documents and data (census reports, list of households, etc.). But some contexts do not allow to have these documents to do this work. As a result, emergency response standards are used or individual counts are necessary and difficult to implement. For this reason, during a recent humanitarian emergency assistance to the internally displaced persons camp in Ngala (Borno State, Nigeria), we decided to combine the counting of dwelling done from satellite picture (Earth Observation) with a field survey, using different statistical methods to estimate the population size.

Methods Since September 19th 2016, the Swiss section of Médecins Sans Frontières (MSF-OCG) supports the population of the camp of Internally Displaced Persons in Ngala (Borno state, Nigeria). A rapid survey organized in October 2016 show a very high mortality rates twice above emergency threshold, the mortality rate was below emergency threshold during a survey organized in February 2017 showing an improved situation. However, considering the population size of the camp estimated by MSF team at this date, the number of medical consultations and the number of person hospitalized was below what was expected. MSF teams questioned the actual size of the camp, then, we proposed and used this method to estimate the population size. Based on a satellite picture taken on December 31st, 2016, dwellings inside the camp were counted and classified in 3 categories (4724 White tents, 4592 Brown dwellings, 2582 Tukuls). We organized a survey on February 17th, 2017 to estimates the average number of people who slept under a shelter the night preceding the survey for each category. We sampled 600 shelters divided in 30 clusters. Each starting point of each cluster was chosen by spatial randomness, the shelters were then selected by proximity. We collected for each cluster the number of people who slept inside the night before the survey, the colour and the material of the roof. Because we did not find any obvious correspondence between classification by field observation and by earth observation, we tried different hypothesis. We applied 3 distinct statistical methods to calculate our estimates and its confidence intervals.

Results We collected information on 600 shelters. Fifty-six percent of the shelters had a white roof. Inside shelter with white roof the average number of occupants was 3.04 (95% CI: 2.81–3.28 design effect: 1.6) while it was 2.51 (95% CI: 2.26–2.76 design effect: 0.9) for non-white roof shelter. From the 4 different hypothesis and 3 statistical methods we used our estimates of the total population size of the camp range from 32,413 to 33,433, and the minimum lower bound of the confidence interval is 29,043 while the maximum is 36,058.

Conclusions We have estimated a population of 32,513 people who have slept in the camp the night preceding the survey (95% CI: 30,106–34,920). This estimation fall below previous estimates. Although it does not include the population living in large buildings (less than 2000 according to MSF teams). We were able to do this estimate by the combination of earth observation and field surveys; this was done in a short timeframe with limited resources. The methods can still be simplified. We suggest reducing to two types of shelter and a smaller sample could reach the expected accuracy.

Disclosure of interest The authors declare that they have no competing interest.

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P10-4 Congestive heart failure: Epidemiology and burden for the health system looking at real life data. Follow-up of a population cohort between 2011 and 2016

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Introduction The current Health Information Systems offer an opportunity to implement advanced methodology to generate evidence within the context of the healthcare activity. This evidence could complement that of the clinical trials, often challenged due to poor external validity. This use of real world data (RWD) has also its limitations, mainly due to selection bias, confusion, and the comprehensiveness and quantity of the data itself. Congestive Heart Failure (CHF) is one of the most prevalent and lethal diseases in Europe. It is currently increasing in frequency and complexity and, therefore, the burden over the Health System is also growing. These elements make CHF a good touchstone to learn to manage these data and to explore its epidemiological and predictive possibilities. Our objectives are to describe:

–the clinical and demographic characteristics of the population diagnosed of CHF over a 5-year period (2011–2015);

–the epidemiology of the disease;

–the burden on the health system in terms of use of services.

Methods Subjects: people of 40 years or older, alive after a first hospitalization by CHF in the public hospitals of the Basque Country population (2,100,000). Sources of data: business Intelligence Platform, which includes all the information collected in hospitals, primary care, emergency rooms, day-hospitals of the Basque Health Service. Also, mortality data and socioeconomic data provided by the Basque Health Department. The variables we looked for were: demographics; use of health services during the 12 months previous to the index event; comorbidity at baseline (Charlson Index); socioeconomic status; mortality, no programmed hospitalizations - including potentially preventable hospitalizations - during one year after the index event. Analysis: descriptive, variation estimators (systematic coefficient of variation - SCV), rates of events, temporal trends. Analyses were conducted using the R version 3.3.2.

Results Baseline characteristics: 15,489 patients were included in the cohort, 7679 (49.6%) men and 7810 (50.4%) women. Women were older than men (82 ± 9 vs. 77 ± 11), but the Charlson index was greater in men (3.5 ± 2.1 vs. 2.8 ± 1.7 in women). Among the patients, 5640 (36%) had been hospitalized during the previous year. Among the patients, 4354 (28%) were in hospital and received a cardiovascular disease (CVD) diagnosis, other than CHF. Among the subjects, 12,755 (82%) had had a consultation in an outpatient clinic and in 6381 cases (41% overall) the consultation was made by a cardiologist. Finally, the person in the cohort visited their general practitioner an average of 14 (sd = 11) times and the nurse an average of 16 (sd = 13) times. Epidemiology: as of 31 December 2015, the number of cases with the disease registered was 15,152 (prevalence in > 40 years = 1.2%). During the five years under study, the age-standardized incidence of first hospitalizations by CHF varied between 2.2 and 2.4 per thousand persons/year (women) and between 3.6 and 3.8 per thousand persons/year (men), without an identifiable temporal pattern. Regarding the geographical areas of the Basque Country, the variation was small (SCV < 0.10 in all the years). Burden of the disease to the health system: 365 days after the discharge, 3864 (25%) patients had died - 820 (5%) within the 30 first days. Another 7899 had been hospitalized 14,744 times: 4714 (32%) due to CHF; 1976 (13%) due to other CVD; 8054 (55%) due to other diagnosis unrelated to CVD. Of these hospitalizations, 5143 were labelled as potentially preventable: 43% (CHD); 25% (CVD-no CHF); 33% (no CVD hospitalizations).
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simulations

climate change: Complex network

Change of influenza pandemics because of climate change

F. Coelho a

of the 2016 Zika epidemic in Rio de Janeiro

Estimating underobservation and the full size

https://doi.org/10.1016/j.respe.2018.05.510

P10-6

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S424

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.512

P10-7

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Introduction Airborne influenza virus transmission is depending on climate. Infected individuals are able to travel to any country in the world within one day. In this study we combine these two insights to investigate the influence of climate change on pandemic spreading patterns of airborne infectious diseases, like influenza. Well-known recent examples for pandemics are severe acute respiratory syndrome (SARS, 2002/2003) and H1N1 (Influenza A virus subtype, 2009), which have demonstrated the vulnerability of a strongly connected world.

Methods Our study is based on a complex network approach including the following datasets:

−global air traffic data (from openflights.org) with information on airports, direct flight connections, and airplane types;

−global population grid [from Socioeconomic Data and Applications Center (SEDAC), NASA];

−WATCH-Forcing-Data ERA-Interim (WFDEI) climate reanalysis data (1980–2015) and RCP6.0 climate projection data (2016–2040); temperature, specific humidity, surface air pressure, water vapour pressure.

We use the dependency between water vapour pressure and influenza transmission rate to give every location around the globe a unique transmission rate time series from 1980 until 2040. Local disease development is simulated with a stochastic SEIR compartmental model. All individuals (including infectious ones) are able to migrate from location to location via air traffic to simulate global dissemination of the virus.

Results Our results show which regions are most vulnerable to climate change in terms of influenza pandemics towards key target locations (defined by highest degree, highest population, highest betweenness centrality). Furthermore, we point out the influence of climate change on pandemics from 1980 until 2040. A significant trend in the pandemic rate of spreading can be seen on a global scale. Climate change causes an influenza pandemic to proceed 5 days slower (global average) in the year 2040 compared to the year 1980. This trend varies from country to country. For example, pandemics originating from Chad show an accelerated (6 days faster) spread.

Conclusion The presented results focus on the effect that climate change has on spreading patterns of airborne infectious diseases. The change from 1980 until 2040 of important influencing variables like population distribution, varying air traffic, vaccine research, hygiene, and healthcare are neglected to separate the impact of climate change.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.513

P10-8

Evaluation of the impact of terminating the reimbursement of a therapeutic class of drugs on the French health system: The example of symptomatic slow-acting drugs for osteoarthritis (SYSADOAs)

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Introduction The French social security has had a balanced budget as a recurring objective for several decades, with a specific target on the National Health Insurance (NHI) branch. Over the past several years, efforts have intensified, with a continuing policy on decreasing drug prices, developing ambulatory care to limit hospitalizations or reducing the reimbursement of some specialists. Decreasing the reimbursement rate of drugs reduces, as a direct effect, the prescription and delivery of the targeted drugs. However, the substitution effect in favor of still reimbursed drugs should not be forgotten, because it could minimize the intended effect in economic terms as well as in terms of public health. The recent French decision to terminate the reimbursement of Symptomatic Slow-Acting Drugs for Osteoarthritis (SYSADOAs) is an interesting case study for the impact of terminating the reimbursement a drug from a collective perspective. The aim of the present study was to investigate prescription substitutions in favor of analgesics and non-steroidal anti-inflammatory drugs (NSAIDs), both in terms of volumes and costs, as well as the occurrence of their potentially associated adverse effects (AEs) using a methodology based on access to national administrative databases.

Methods To quantify these effects in the most exhaustive manner, French medico-administrative databases were used (EGB - general sample of beneficiaries; PMSI - program for medicalization of hospital information systems). Three study periods were considered to cover a potential historical bias: the primary period was defined around the date of reimbursement termination (2015/03/01), considering one year both pre and post cutoff; the secondary period was defined...
in the same manner around the date of the reimbursement rate decrease (35% to 15% on 2011/12/01); a control period was considered with a cutoff date (2009/03/01) chosen to reduce seasonal variations impact as comparator of the primary period. We defined the population on each of these periods on two criteria: they were at least 40 and had had at least one SYSADOA delivery in the year prior to the cutoff. We considered subgroups on the delivery persistence and prevalence. We performed comparisons for the following events, quantified in volumes and in costs: NSAID deliveries, analgesic deliveries, hospitalizations for cardiovascular or gastric causes, or for renal insufficiency, and surgery for arthritis.

Results The analyses concerned respectively 19,345, 20,066, and 16,200 patients in the control, secondary and primary periods. Among the patients, 4345 were present in all 3 periods. The classification of patients according to delivery persistence remained stable over the three periods. We observed a decrease of incident patients. The volume of NSAID deliveries decreased over the three periods from a total of 40.5 ($\pm$ 76.3) defined daily dose (DDDs) per patient in 2008 to 29.6 ($\pm$ 66.4) DDDs in 2015. The number of analgesic DDDs increased constantly over the three study periods, from 70.2 ($\pm$ 108.9) DDDs in 2008 to 76.9 ($\pm$ 123.1) DDDs in 2015. Regarding the costs, there was an overall decrease over the three study periods of the amount reimbursed by NHI for all deliveries and for hospitalizations. The effects being quantitatively comparable in all three periods, it was not possible to conclude from these data that terminating the reimbursement of SYSADOAs had an impact on the French NHI.

Conclusion The information available in medico-administrative databases makes it possible to study the impact of a change of policy in the reimbursement schemes by allowing the constitution of large representative cohorts at the national level. However, our results underline how the measured effects were restricted to those impacting NHI: OTC deliveries or out-of-pocket expenses were not evaluable with these data sources alone. Thus, the impact in terms of public health can only be partially measured.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.514

P10-11

Study of the impact of climate change on the spatial distribution of dengue cases in Rio de Janeiro

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Introduction There is evidence that the distribution of dengue cases is correlated with environment variables such as temperature, precipitation and others. This study aimed to select the best variables for modelling the number of dengue cases in Rio de Janeiro city, and used data from 2015 to 2016 as comparison for results.

Methods The number of cases was obtained by the Brazilian health system and the variables were mined from public satellites data, separating Rio de Janeiro city in 21-pixel blocks in image data. The data gathered from 2015 to 2016 was divided in 8-day periods, where the mean of each variable in this period was stored. The study made a comparison using the following variables and their respective lags in time: NDVI, day temperature, night temperature, precipitation, population size, latitude and longitude. The comparison between them was made using the one who fitted more a Generalized Autoregressive Log-linear Model with a negative binomial family to predict the dengue cases.

Results The most significant predictors inside the model were temperature at night, precipitation three weeks before, and dengue cases from one week before. Using only these three variables and an intercept, the model showed an error mean of 0.3% and a standard deviation of 11% in a prediction against real value comparison.

Conclusions This work is a first approach to understanding the determinants of dengue and only using public data. The next steps will be to extend both the temporal and spatial reach of the analysis.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.517

P10-12

Time trend in the prevalence and correlates of refractive error among military conscripts between 1990 and 2013 in Austria, a descriptive study

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Introduction Refractive error is one of the most important causes of correctable visual impairments. The corrections of refractive error are associated with considerable economics and healthcare burden. In addition, uncorrected refractive error is prevalent and induces productivity loss. The prevalence of refractive error in Austria has not been studied. Using data from Austrian conscripts, we quantified the time trend in the prevalence of myopia and hyperopia over 24 years period. We also explored sociodemographic correlates of refractive error over time in our sample.

Methods All Austrian men are obligated to serve military with compulsory medical investigations at conscription between 17 and 18 years of age. Medical investigations data from 1990 to 2013 were obtained from the Austrian military and used for the current analysis. Non-cycloplegic refractions were measured by an autorefractometer. Data on sphere and cylinder of left eyes were used to calculate the spherical equivalent (SE) using the standard formula [SE = sphere + cylinder/2, unit diopters (D)]. Myopic refractive errors were defined as low (−2.0 to < 0 D), medium (−6.0 to −2.0 D), and high (≥ −6.0 D). Hyperopic refractive errors were defined as low (> 0 to < 2.0 D), and high (> ≥ 2.0 D). Data on following correlates were retrieved: education, height, body mass index (BMI), provinces and smoking status. Education were classified into four categories: lower than 9 years of compulsory school; completed compulsory school; graduated from professional training or served an apprenticeship; had a general qualification for university entrance. Height was classified into three groups using the 10th and 90th percentiles: < 169 cm, 169–186 cm, and > 186 cm. BMI was classified into three groups using the 10th and 90th percentiles: below 10th percentile (< 17.5 kg/m²); 10th to 90th percentiles (17.5–24.9 kg/m²); and above 90th percentile (≥ 25 kg/m²). Data on conscripts’ residences was collected and presents nine provinces in Austria and classified to Vienna and non-Vienna provinces. Finally, smoking status was classified to smokers and non-smokers. Aggregated descriptive of refractive error were calculated using frequencies and percentages by 2 years interval and categories of correlates.

Results Data on 1,048,240 young men were used for analyses. The overall prevalence of myopia increased over 24 years (18.0% to 24.6%), driven by the increases in low (10.8% to 13.9%) and medium myopia (6.6% to 9.9%). The overall prevalence of hyperopia, lower than that of myopia, appeared to slightly decline (4.5% to 3.7%). We observed consistent associations of education, height, BMI and smoking status with myopia prevalence over time. Conscripts with higher education, taller than 187 cm, being smokers, with BMI below 10th percentile (< 19.1 kg/m²) were more likely to have myopic refractive errors. The association between provinces and myopia prevalence differed by time. In 1990, the myopia prevalence in Vienna province was 26.6%, apparently higher than that in non-Vienna provinces (16.5%). This prevalence gap, however, was gradually closing over 24 years, with 28.8% myopia in Vienna province and 23.9% in non-Vienna provinces by 2013. Despite the low prevalence of hyperopia, we observed suggestive associations of height < 169 cm, BMI above 90th percentile, and being non-smoker with higher prevalence of hyperopia.

Conclusions To the best of our knowledge, this analysis is the first to report population-based prevalence of refractive errors in Austrian young men, and the largest study ever conducted worldwide. The greatest burden of refractive errors in this population is due to myopia, particularly low and medium myopia.
The prevalence of myopia has been steadily increasing over the last 2.5 decades, suggesting the need of preventive measures to curb this trend. This requires future research investigating the impact of modifiable factors on myopia development and progression in specific populations.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.518

P10-13
I-LAB: Connecting clinical laboratories to infectious diseases surveillance systems
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Introduction Improving systems for epidemiological surveillance of infectious diseases in West Africa is a well-recognized priority for global health. Standard surveillance reporting procedures within the region typically involve paper-based notifications sent by clinical laboratories to district and/or provincial centres, which are then aggregated and transferred to Ministries of Health for analysis and production of monthly consolidated reports. The quality and relevance of such reports are often compromised by the fact that many laboratories submit incomplete data, fail to submit reports in a timely manner, or completely neglect to submit reports. Traditional manual data entry is laborious, prone to human error, results in lengthy delays, and is not well-suited for timely, automated early warning systems. Development of innovative mobile eHealth tools is viewed as a key strategy for helping countries meet the requirements of the International Health Regulations (IHR). The District Health Information Software (DHIS2) is an open-source software platform for reporting, analysis and dissemination of data that has now been adopted in more than 60 countries as an integral part of national health information systems. Here, we showcase successes of DHIS2 adoption in the clinical laboratories of Senegal. Using this open-source platform, laboratories across the country have been able to enter data via a mobile phone or computer, which are then captured on a centralized internet server with the capacity to rapidly produce reports.

Methods In 2014, Senegal’s Ministry of Health (MoH) identified 11 notifiable diseases to be included in pilot implementation of the DHIS2 electronic surveillance system. Training on DHIS2 reporting done by Laboratory Directorate was initiated in 118 of 120 targeted clinical laboratories, operating at all levels of the healthcare system (i.e. in health posts, community centres, district hospitals, and referral centres). Laboratory personnel were trained to use the system autonomously, and two representatives from the Senegalese MoH were designated as coordinators of the DHIS2 system. The MOH continues to provide ongoing support to participating laboratories for both users and supervisors responsible for managing the system.

Results As of December 2017, 118 laboratories have been trained in the use of the tool, and 91 (82%) laboratories utilized the software to transmit complete weekly reports. Among those laboratories transmitting complete data, 94 (80%) were doing so without any external prompting or support. The weekly reports comprise information on clinically suspected cases as well as diagnostic methods used for confirmation/elimination. Approximately 35 laboratories have capacity for microbial culture, and 24 of these conduct routines antimicrobial susceptibility testing; culture results and resistance profiles are systematically captured in DHIS2 when available with a dedicated monthly report.

Conclusions Thanks to these improved e-health tools, the frequency and reliability of laboratory-based surveillance data has greatly increased and enabled improved reporting on disease trends from the Senegalese Ministry of Health to the World Health Organization (WHO). Ongoing challenges for implementation include ensuring sustained Internet access from all sites, and meeting continued training needs to address frequent turnover of laboratory personnel. Based on this success, the system has been extended to new applications. A comprehensive mapping of laboratory resources in the network, including inventories of equipment, numbers of trained personnel, and diagnostic capacity has been developed and is used today by the MoH to define the national laboratory strategy. This laboratory-based surveillance system will accelerate the reaction time and contribute to the global health security; furthermore, the Senegalese experience could be replicated in other countries to improve overall surveillance capacity.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.519

P11-2
Impact of the French Agency for the Safety of Medicines and Health Products communication on sodium valproate prescription in women of childbearing potential age
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Introduction Sodium valproate (VPA) is one of the most prescribed teratogenic drugs in treating epilepsy [1,2] or bipolar disorder [3,4]. French Agency for the Safety of Medicines and Health Products (ANSM) started in December 2014 a huge information campaign about the risk of using VPA in women of childbearing potential age [5]. The aim of the study is to measure the impact of this information campaign on VPA utilization frequency among women of childbearing potential age.

Material and methods The study included all patients aged 15 to 49 years old, having had at least one delivery of VPA or another alternative drug to VPA recorded in the French national health insurance database (SNIIRAM) from January 2014 to December 2016. The rate of VPA exposure has been modeled (Poisson regression) according to gender and time period (before and after intervention of ANSM), taking into account the pathological context (epilepsy or bipolar disorder).

Results From SNIIRAM, 2, 187,936 patients were included. Among women of childbearing potential age (N = 1, 142, 659) VPA exposure rate decreases immediately after intervention compared to the period before intervention and compared to men [rate ratio (RR) = 0.969; P < 0.001]. This trend was more obvious in patients treated for epilepsy (RR = 0.946; P < 0.001), whereas it was not statistically significant in patients treated for bipolar disorder (RR = 1.001; P = 0.84).

Discussion/Conclusion Even if others risk minimization measures as well as important media coverage comply the 2014 ‘Dear Doctor Letter’, the observed impact is still minor, especially among women treated for a psychiatric disorder. The contra indication in France for VPA use in bipolar disorder in women of childbearing potential age without a reliable contraceptive method should modify this result. Pursuing the analysis would be valuable.

Disclosure of interest The authors declare that they have no competing interest.

References
P11-5

Research in rural regions for rural regions: Temporary study centers as a method to increase response in population-based studies. Results of the German national cohort in Mecklenburg-Western Pomerania

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Background Scientific impact of populations-based cohort studies crucially depends on the participation rates. Response varies widely and is affected by various factors e.g. time and costs involved for study participation. Both of them will usually increase with an increasing distance between study center and place of residence. The study region Mecklenburg-Western Pomerania is the least densely populated region abundant with water and one of the economically weakest states in Germany (area: approximately 23,000 km², population: approximately 1.7 million). Therefore, the present study examines the effect of successive implementation of temporary study centers on response embedded in a rural and sparsely populated region within the setting of the German National Cohort.

Methods The German National Cohort is a population-based, epidemiologic study comprising 200,000 randomly assigned women and men (age range: 20–69 years, baseline: 2014–2019) examined in 18 study centers in Germany. Within the study region Mecklenburg-Western Pomerania, 20,000 participants will be recruited. To address the frictional effect of distance on response, we used geographical data (postal code, district code, city name, and population densities) to determine locations for study centers with an optimal distance and a maximum number of potentially reachable participants. On that basis, we established beside a permanent study center [with whole-body magnetic resonance imaging (MRI)] temporary study centers one by one with equivalent facilities for a standardized data collection, uniquely in the German National Cohort.

Results A total of n = 17,746/20,000 participants were examined so far (nationwide: n = 140,578/200,000). Thereof, n = 8,140/10,000 participants within the permanent study center embedded in the middle of the recruitment region in the city of Neubrandenburg (year 2015–2017), n = 9,606/10,000 participants were examined in one of the three temporary centers successively established in the city of Neustrelitz (n = 3215, year 2014–2016), city of Waren/Müritz (n = 4885, year 2016–2017) and city of Demmin (n = 1506, year 2017–present). Mean distances to the nearest-by study center vary between 23.2 km (permanent center) and 21.3 km (temporary centers). Obtained response varies between 20.7% (permanent study center) and 18.8% (temporary centers). Sampling fractions are high, in several age strata up to 80.0%.

Conclusion In rural, sparsely populated regions of population-based studies, temporary study centers can minimize the response reducing effect of fraction of distance. Therefore, research in rural regions for rural regions will be feasible, despite the particular efforts (personal and financial resources) required for the implementation of such centers. MRI offered in the permanent center, may explain the slightly higher response there than for the temporary centers.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.522

P11-6

The effect of proton pump inhibitors on cognition and brain volume in the Rhineland study

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Introduction Proton pump inhibitors (PPI) are one of the most widely used drug classes in the world. Several studies have found that users of PPIs had an increased risk of cognitive decline and dementia. This could however not be confirmed by others. Protopathic bias, in which early signs and symptoms of the disease influence drug exposure, could be a reason for these conflicting results. Given that alterations in brain volume can be seen years before the occurrence of cognitive symptoms, examining the association between PPI use and brain volume in non-demented persons would eliminate the potential of protopathic bias. Therefore, we aimed to assess the associations between PPI use and cognition and brain volume.

Methods We performed a cross-sectional study based on the first 1306 participants in the Rhineland Study. The Rhineland Study is a population-based cohort study in Bonn Germany that includes people aged ≥30 years. Information on medication use is collected in an interview in which regularly and as needed used medication is registered. PPI use was classified as regular use of PPIs (ATC code A02BC). Participants who reported using PPIs as needed were excluded. We assessed the following cognitive domains: processing speed [Trail Making Test (TMT) A], executive functioning [TMT B – A], working memory [Digit Span Forward], and long-term memory [Verbal Learning and Memory Test (VLMT); delayed loss]. Measures for TMT and VLMT were inverted so that higher values represent better test performance for all tests. All eligible participants were scanned on Siemens 3 Tesla Prisma MRI scanners. We assessed the effect of PPI use on total brain volume, cortical grey matter volume, and ventricle volume. Processing speed and ventricle volume were log transformed. All outcome measures were z-standardized. We examined the association between PPI use and cognition using multivariable linear regression models. Within the first model we only controlled for age (m1: age). Because PPI use strongly increased with increasing age, we included variables that were a determinant for PPI use after controlling for age in the fully adjusted model (m2: age, body mass index, diabetes, hypertension, antithrombotic use, statin use and NSAID use).

We subsequently examined the association between PPI use and brain volume outcomes in the same way but with additional control for head size in all models.

Results We included 1130 participants [mean age 55, standard deviation (SD) 13.5; 57% women; 81 PPI users] to determine the effect of PPI use on cognition. We excluded 176 participants, 25 for missing drug information, 89 for as needed PPI use and 62 for missing cognition data. We observed no effect on processing speed with a mean SD difference [95% confidence interval (95% CI)] for m1 of 0.00 (−0.19; 0.19) and for m2 of 0.02 (−0.18; 0.22). We observed a trend towards a negative effect of PPI use with a mean SD difference (95% CI) for executive functioning, working memory and long-term memory for m1 of −0.18 (−0.40; 0.03), −0.17 (−0.40; 0.05), and −0.29 (−0.51; −0.07) and for m2 of −0.13 (−0.35; 0.10), −0.12 (−0.36; 0.11), and −0.17 (−0.39; 0.06). Effect sizes were comparable to a 5-year increase in age for executive functioning and a 9-year increase in age for working memory and long-term memory. We had MRI data in a subset of 640 participants (mean age 54, SD 13.2; 56% women; 28 PPI users). Brain volume measures were smaller in PPI users compared to non-users, but these effects were far from significant, mean SD difference (95% CI) for total brain volume, cortical grey matter volume, and ventricle volume for m1 was −0.07 (−0.23; 0.09), −0.07 (−0.26; 0.12), and 0.02 (−0.27; 0.31), and for m2 was −0.05 (−0.21; 0.12), −0.03 (−0.23; 0.16) and −0.06 (−0.36; 0.24).

https://doi.org/10.1016/j.respe.2018.05.525
Conclusions  Given our small sample size and relatively young population, these results suggest a possible effect of PPI use on brain structure and function and warrant further investigation in larger samples.

Disclosure of interest  The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.526

P11.7  
Trends of sodium valproate prescriptions in children 0 to 14 years of age between 2010 and 2016: Study from the French National Health Insurance database

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Introduction  French Agency for the Safety of Medicines and Health Products (ANSM) communicates a lot on risks associated with sodium valproate (VPA) in utero exposure [1–3] deciding new VPA prescription and delivery conditions [4]. We aimed to evaluate trends of sodium valproate prescriptions, focusing on young epileptic girls, in whom VPA should not be chosen as a first-line treatment.

Methods  Using the French National Health Insurance Database (SNIIRAM), we conducted a nationwide study from 1 January 2009 through 30 June 2016 including all patients aged 0 to 14 years who had a delivery of an antiepileptic drug (AED) recorded between 2010 and 2016. The proportion of VPA and of each other AED among incident users (first delivery after birth or at least no deliveries of any AED in the previous year) was plotted by age categories and by gender.

Results  In total, 61,259 boys and 52,103 girls fulfilled the selection criteria. In children aged 0–10 years, the proportion of VPA ranged between 40 and 50% in 2010 without a clear difference between genders and then slightly decreased after 2014. By contrast, VPA accounted for only 11% of AED initiations in girls aged 11–14 years in 2016. Between 2010 and 2016, the proportion of levetiracetam (LEV), and lamotrigine (LTG) increased in girls aged 11–14 years. In 2016, VPA indicated for patients with idiopathic and symptomatic generalized epilepsy still remains the first-choice AED, despite its disadvantages, because of its unchallenged efficacy compared to new suitable AEDs such as LTG, LEV. Anyway, prescriptions’ practices have changed over time reflecting published safety evidence.

Disclosure of interest  The authors declare that they have no competing interest.

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https://doi.org/10.1016/j.respe.2018.05.527
Disclosure of interest  The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.528

P11-9
Development of a software based on automatic multi-temporal aerial images classification to assess retrospective environmental exposures to pesticides in epidemiological studies
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Introduction  Environmental exposure to agricultural pesticides (EEAP) resulting from the drift of agricultural pesticides from treated farmland is suspected to be a risk factor for several diseases, including cancers. The long latency period of cancer development, and evidence on the impact of early exposures stress the need for historical exposure information to capture these exposures. Geographic Information Systems (GIS) are increasingly used in environmental epidemiology studies to assess EEAP. Crop acreage proximate to subjects residences has been suggested as a surrogate for EEAP. Retrospective characterization of EEAP is then essential. While Corine Land Cover (CLC) provides land cover data since 1990, earlier data are lacking limiting the capacity to capture the life-course effects of exposure. The use of satellite images or historical aerial images has been suggested. However, characterization of land use from theses images is time and resource consuming. Thereby, this study aim to develop an innovative automated software to analyze the historical monochromatic aerial images in order to reconstruct the historical land cover to characterize EEAP retrospectively.

Methods  To reconstruct land cover from monochromatic historical aerial images, three phases were adopted: firstly, we have collected a new multi-scale multi-date dataset (HistAerial) composed of 4.9 million non-overlapping patches of the French territory between 1970–1990. Three patch sizes (25 × 25 pixel, 50 × 50 pixel; 100 × 100 pixel) were extracted in a supervised manner from 81 historical aerial images by geography experts. The land use of each patch was identified with one of seven classes: orchard, arable, grassland, vineyard, urban, forest and water. Secondly, an extensive comparison study of computer vision methods has carried out. Using six thousand randomly sampled patches per class of the HistAerial dataset, we compared (using top-1 accuracy) the performance of 59 computer vision methods for automatic land use identification, ranging from handcrafted filters like Local Binary Pattern (Ojala, 2001) and its variants, up to fully learned models, such as recent Deep Convolutional Neural Networks (DCNN) models (Simonyan and Zisserman, 2014). Finally, we have collaborated with a computer scientist to design an ergonomic software for the automatic analysis of monochromatic aerial images. This software aims to help geographers to quickly and easily generate a land use with the most efficient algorithms from the ones that have been previously studied.

Results  The handcrafted filters have performed very similarly to the learned DCNNs around 90%. The best classification rate for land cover with the three different sizes of patches and with the different handcraft filter methods varied from 45% to 89%. The most accurate method was a combination of handcrafted filters (89.3%) on 100-pixel patch size. The resulting software has been applied on aerial images representing 1.5 km\textsuperscript{2} areas.

Conclusion  This study has developed a novel software to generate precise retrospective land cover based on state-of-the-art methods in computer vision that will be integrated into a GIS to assess EEAP. It was able to produce realistic historical land cover in about 5 minutes, user interaction included instead of 6 to 10 hours for a train technician with manual crop identification. The availability of an accurate retrospective land cover dataset is a requirement to reliably assess life-course effects of EEAP in epidemiology studies. The performance of developed software to accurately will be assess through comparison with current land cover dataset like CLC. The proposed software will be applied in a French national case-control study investigating the risk of early life exposure to pesticides and risk of testicular cancer later in life.

Disclosure of interest  The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.529

P11-10
The consumption of quinolones in Portugal, 2005–2014
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Background  Inadequate consumption of antibiotics has social costs as well as serious health consequences including lower response to treatments, prolonged illness, increasing number of hospitalizations and higher risk of complications and mortality. Being aware of the evolution of antibiotic consumption and its pattern of use is essential to develop action plans, which may contribute to their appropriate use. The aim of our study was to assess the evolution of quinolones consumption in Portugal, Health Regions and Districts of Portugal, from 2005 to 2014.

Methods  Descriptive observational study using as source of information a database of antibiotics prescription in ambulatory provided by Infarmed, National Authority of Medicines and Health Products. Two methods of consumption evaluation were used: DID, expressed in DDD per 1000 inhabitants per day; and PID, expressed in number of packages per 1000 inhabitants per day.

Results  The quinolone consumption, using the DID method, ranged from 2.42 DID to 2.12 DID, between 2005 and 2014, corresponding to a decrease of 12.35%. At the district level, during the ten years of consumption reporting, it is worth noting the decrease in consumption of quinolones in the vast majority of districts. The district with the greatest consumption reduction was Beja, with a decrease of 28.36% (DID). Regarding the use of the PID method, consumption ranged from 0.315 PID in 2005 to 0.257 PID in 2014, corresponding to a decrease of 18.31%. At district level, all districts decreased consumption in the 10 years under study, with the exception of Portalegre, which had an increase of 5.60%. The district of Beja was the one that showed a greater decrease in the consumption of quinolones (34.44%). In relation to the different generations of quinolones, it was found that the first generation has suffered an important decrease in its consumption (ofloxacin - 73.1%), and the second generation is the most consumed (77%), mainly due to ciprofloxacin and levofloxacin. Ciprofloxacin is the quinolone most consumed, and levofloxacin was the quinolone that presented the greatest increase in consumption.

Conclusion  This study allowed to verify the differences of results, according to different methods. It was concluded that for a good characterization of consumption differences between health regions and districts, it is necessary to use more than one method of study. Despite the decrease in consumption of quinolones, Portugal continues to have a high consumption when compared to other European countries.

Disclosure of interest  The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.530
P11-13
Assessing polypharmacy in the general older population: Comparison of findings from a health survey and health insurance data

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Introduction Polypharmacy (i.e. the use of multiple drugs administered to the same patient) is common in the older population and an important public health problem. Usually polypharmacy measures are based on billing data, and only reimbursed medicines are considered. In Belgium, however, polypharmacy is also assessed through a systematic recording of all medicines used in the past 24 hours among respondents of the national Health Interview Survey (HIS). This method has two major advantages. First, it is based on actual use of medicines, not on the prescription of medicines. Moreover, it also takes into account non-reimbursed medicines, such as e.g. benzodiazepines. The method also has disadvantages. It is based on a population sample, hence a selection bias is possible. Furthermore, the completeness of the information depends on the willingness of respondents to show to the interviewer all medicines that were used in the past 24 hours. Finally, the method does not allow taking into account the chronology and the volume of the use of medicines. In this study a HIS based polypharmacy indicator was compared with a similar indicator based on health insurance data.

Methods Data from the Belgian HIS 2008 were linked with data from the Belgian mandatory health insurance. Only the population of 65 years and older was considered (n = 2722). From both data sources an indicator was created with 3 categories: no polypharmacy (0–4 medicines), polypharmacy (5–8 medicines) and excessive polypharmacy (9+ medicines). Information on the date of dispensary of the medicine, the number of packages supplied, the quantity per package and the daily defined dose were used to define an active medicine in the health insurance database on the date of the interview. To assess the selection bias an indicator was created from a completely random sample of the health insurance (n = 46,376). For each individual in this sample, polypharmacy was calculated at a random date in 2008 in the same way as in the linked HIS sample. Determinants of polypharmacy were explored through a generalized ordered logit model. Agreement between the HIS and the insurance-based indicator was assessed with kappa statistics and a conditional logistic regression model.

Results The insurance-based estimates for polypharmacy and excessive polypharmacy were, respectively, 25% and 4.4% in the HIS sample, and 23% and 4.2% in the random health insurance sample. The HIS based method yielded estimates of respectively 25% and 8.4%. Age, suffering from a chronic disease, region, number of contacts with a general practitioner and a hospitalisation in the past year were significantly associated with polypharmacy, regardless of the measurement method. Educational attainment was only a significant determinant of the HIS based polypharmacy indicator. The weighted kappa, assessing the agreement between the indicators calculated by both methods, was 0.369 (95% confidence interval [95% CI] 0.363–0.397). The odds of classifying excessive polypharmacy and polypharmacy versus no polypharmacy was 1.38 (95% CI: 1.08–1.76) times higher for the HIS than for the insurance-based indicator. For excessive polypharmacy versus polypharmacy and no polypharmacy this was 2.56 (95% CI: 1.55–4.23) times.

Conclusions The HIS based method yielded higher rates of polypharmacy in the general older population than an indicator based on billing data. This higher rate was not the result of a selection bias but could have been due to the fact that the HIS based method also takes into account non-reimbursed medicines. As a HIS based indicator considers medicines that are actually consumed, rather than those that are prescribed, it is a more relevant indicator from a public health perspective. Although the systematic collection of information on medicines that are taken during a national health survey increases the burden of the fieldwork, it is an added value for the assessment of polypharmacy in the general population.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.533

P11-14
Multichannel sequence analysis: An innovative method to study patterns of care pathways. Application to multiple sclerosis based on French Health Insurance data

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Introduction Multiple sclerosis (MS) is a chronic neurological disease starting in young adulthood and leading to disability on the long-term. Persons with MS (PwMS) require multidisciplinary care involving general practitioners (GPs), neurologists as well as specialists of disability symptoms (frequently, physical medicine and rehabilitation physician, urologist, and ophthalmologist). The coordination and succession of these interventions constitute the care pathway of a patient. Even if a care pathway is unique for each patient, patterns of pathway can emerge. Identification of such patterns may be helpful for optimizing comprehensive care for PwMS and understanding variations within practices (if any). There is a current lack of statistical or epidemiological methods allowing for identification of such patterns. Therefore, we propose an innovative method, which is derived from social sciences: the multichannel sequence analysis (MCSA).

Methods An exhaustive study population was formed of the prevalent PwMS in the French national health insurance databases (97% of French population covered), who were alive on January 1st, 2010 (N = 73,619) and who did not die over the 2010–2015 period (N = 69,831). PwMS were identified thanks to a three-criterion algorithm using diagnoses of hospital admissions, MS-specific disease-modifying therapies and MS long disease duration. Because of computational resources, a random sample of 35,000 PwMS has then been selected to apply MCSA. Care consumptions of interest considered on a 6-month time unit basis were: consultations with GPs, private neurologists and specialists of disability symptoms, and length of hospital stay(s) for MS (main or related diagnosis coded G35 according to International Classification of Diseases, 10th version). MCSA permits to consider several dimensions of the individual care pathway simultaneously. Indeed each individual was associated with several distinct but synchronized sequences, the so-called channels, each tapping a distinct aspect (each healthcare professional here) of the global pathway. All multichannel care pathways were compared two-by-two leading to a matrix of dissimilarities, which was then used in a hierarchical agglomerative clustering using Ward’s criterion. The typology was then described based upon the simultaneous interpretation of each channel of the trajectory.

Results The sex-ratio F/M of the study population (N = 35,000) was 2.6 with a median age of 49 years in 2010. In total, the median number of visits with GPs, neurologists, and specialists of disability symptoms were 4.8, 0.2, 0.2 visits per year, respectively. MCSA revealed a 5-cluster typology of care consumption. A first group (n = 3965, 11.3%) corresponded to young patients (median age of 43 years in 2010) having in median 5.3 visits with GPs per year and 6.3 days of hospital stays per year. The 11,690 patients (33.4%) in the second group were older with a moderate contact with GPs (5.2 visits per year). The main characteristic of the third group (n = 11,696, 33.4%) was their routine follow-up by private neurologists (1.8 visits per year in median). The fourth group (n = 2437, 7.0%) included the oldest patients (median age of 55 years in 2010) having a very high contact with GPs (15 visits per year) probably because of comorbidities and a progressive or evolved MS disease. The 5212 patients in the fifth group (14.9%) had a lack of care consumption during the study period with in median 0.9 visits with each specialist considered in the analysis.

Conclusions Using a pioneer and easy-to-use method, this study highlights for the first time five different patterns of care pathways of PwMS in France. To get a more accurate examination of the care pathways, paramedical care (especially nurses and physiotherapists) is going to be included as a channel in the analysis. In our opinion, MCSA is a promising way to study care pathways and deserves consideration in epidemiology.
Disclosure of interest  The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.534

P11-16
Completeness of the Observatory of renal and urothelial carcinoma in adults living in the Bouches-du-Rhône department (France):
Quantitative evaluation by the three sources capture-recapture method, 2013–2014
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Introduction The surveillance of renal and bladder cancers in adults living in the Bouches-du-Rhône department, south of France, (Observatory REVELA 13) was set up in 2012. The aim of this Observatory was to assess data collection through a specialist practitioner’s network and to perform spatial analysis in order to detect clusters of cancers at the district level. Routine data collection relies on data collected during multidisciplinary meetings and centralized by the regional cancer network. After three years, a three-source capture-recapture analysis was performed to assess the completeness of the Observatory before conducting spatial analysis.

Methods The analysis relied on three sources which were: hospitalization data (PMSI), laboratories of pathology and cytology (ACP) and REVELA 13. The analysis was restricted to the cases diagnosed during the period 2013–2014. We used log-linear models to estimate the total number of cases for each cancer. A global approach followed by stratified analyses on age sex and living area were done. R-capture was used to perform analysis.

Results All 29 public and private hospitals sent their data: 24 in the Bouches-du-Rhône department and 5 in the neighbouring departments (Gard and Vaucluse). A total of 8240 cases were reported and then analyzed: 2221 were already registered in REVELA 13 and 3905 did not meet the case definition. After consulting the medical files, only 245 new cases were included for the period. We also received 4390 notifications from 13 out of 17 laboratories contacted. Three laboratories from neighbouring departments refused to participate. Among those notifications, 1872 were already registered in REVELA 13 and 665 did not meet the case definition. After controlling each histological report, 155 urothelial carcinoma and 66 renal cancers were included for the period. The two added sources allowed to include 15% new cases of renal cancers and urothelial carcinoma. The most complete source was the PMSI. The overall estimated number of cases for the three cancers were: 1247 bladder cancers [95% CI = 1.239–1.255], corresponding to a completeness of reporting to REVELA 13 of 83.9% [95% CI = 83.4–84.5], 612 renal cancers [95% CI = 598–625], corresponding to a completeness of reporting to REVELA 13 of 84.0% [95% CI = 82.3–85.9]. Stratified analyses suggested a lower completeness of reporting among elderly people for the urothelial carcinoma. Lower completeness was also observed among women for both cancers but it was not significant. For bladder cancers, area of residence, type of cancer (bladder versus upper urinary tract) and degree of severity were associated to different probabilities of capture. Finally, the completeness of the Observatory after the capture-recapture study was 99% for bladder cancers and 97% for renal cancer.

Conclusion As for cancer registries, the addition of two sources, and more particularly the hospitalization data, has allowed us to improve the completeness of the REVELA 13 Observatory. The contribution of ACP laboratories is less important and is especially useful for retrieving data from non-reporting physicians or those working in several hospitals. The stratified analyses pointed
out the lack of notification for the elderly, women and people living outside the main town of the department. Awareness of urologists about these weaknesses is necessary to improve the reporting of these cases.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.536

P11-17 Double validation of translated questionnaires in international studies L. Tzivian a,∗, N. Karpova b, I. Priede c, d, V. Folkmanis a, J. Weber e, P. Angerer f

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Background Study questionnaires developed in one country can be translated and used for similar studies in other countries. The main problem of this process is that people speaking different languages can understand the meaning of some questions differently due to disparate mentalities and backgrounds. To avoid a misunderstanding, to perform correct conclusions in accordance to the mentality of each country, and to permit the comparison of results in different countries, the intellectual validation of questionnaires is widely used. The main problem of such a validation is its qualitative nature that can be biased by the subjective approach of the investigator. Therefore, there is a necessity of some objective quantitative methods for better assessment of results of validation.

Purpose The objective of the current study was to perform an intellectual validation with subsequent quantitative assessment of questionnaires translated from German to Latvian and Russian in a sample of medical personal in Latvia.

Material and methods We obtained the German version of questionnaires on beliefs about older workers, quality of life, and workability from the main investigator - the Centre of Health and Society, University of Düsseldorf, Germany. Questionnaires were translated into the two languages that are mainly used in Latvia: Latvian and Russian. The analysis of translated versions was performed in two stages: qualitative and quantitative. Four focus groups, two groups for each language, were involved in the qualitative stage. Each focus group contained 4 participants (16 participants altogether, 8 for each language), all with medical education. The mean time of discussion in each focus group was 70 minutes. The interpretation of each question was discussed within focus groups, and for those questions that were interpreted differently (both within and between focus groups) four different variants of understanding were formulated. At the second stage, we performed a quantitative analysis of collected equivocal questions. Forty-five participants, all medical workers, were enrolled in this stage. Each participant marked one of the four variants of questions that were formulated after the qualitative stage - the mostly close for their understanding of the initial question. We assessed the most frequently marked variant and performed χ2 test for differences between participants with different mother tongues.

Results During the qualitative stage, we identified 19 questions that were interpreted differently. In the quantitative stage, we obtained 25 Latvian and 20 Russian-speakers answers on the variant of the question closest to their understanding. In both, Latvian and Russian-speakers’ answers, the same variant was chosen in 10 of 19 questions. Significant differences between Latvian and Russian-speakers was observed in 4 out of 19 questions (χ2 test, P < 0.05), in other questions participants used the same variant regardless the language of translation.

Conclusions Double intellectual validation of questionnaires translated from foreign languages is recommended for better interpretation of the study results.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.539
P11-20
Concurrent use of prescription drugs and herbal medicinal products in patients with diseases of the musculoskeletal system and connective tissue
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Objective The concurrent use of prescription drugs and herbal medicinal products (HMPs) for the management of various disease are increasing. Many HMPs have been used to treat the common health complaints involved the musculoskeletal system and connective tissue. Therefore, we analyzed the extent of concurrent use of prescription drugs and HMPs in patients with diseases of the musculoskeletal system and connective tissue.

Methods This study was conducted using the National Health Insurance Service–National Sample Cohort (NHIS-NSC), which consists of representative anonymized data extracted from national health insurance records pertaining to about 1,000,000 subjects from 2002 to 2013. The insured HMPs were 56 kinds of single herbal extracts and 67 kinds of mixed herbal extracts in Republic of Korea. Continuous variables were summarised by the means (and SDs) and categorical variables were summarised by proportions (%). Univariate and multivariable Statistical significance was defined as P < 0.05. All statistical analyses were performed in Stata MP version 15 (StataCorp LP, College Station, TX, USA).

Results The diseases of the musculoskeletal system and connective tissue accounted for the top 10 ranking concurrent use of prescription drugs and HMPs. The most frequently co-prescribed drugs were Antipyretics (or Analgesics, or Anti-inflammatory) and Ojeok-san (Wuji-san in China, Goshaku-san in Japan). The concurrent use rate in the elderly over the age of 65 is higher than the sum of all under 64-years-old.

Conclusions The concurrent use rate in diseases of the musculoskeletal system and connective tissue was high. Potential herb-drug interaction is a clinical concern, with older people at greater risk. Further studies on the benefit and risk of concurrent use are needed.

Disclosure of interest The author declares that he has no competing interest.

https://doi.org/10.1016/j.respe.2018.05.540

P11-21
Association between cancer and suicide causes of death in death certificates, France, 2000–2013
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Introduction Cancer, by its impact on health, adverse events of treatments, or stigma, can impact quality of life significantly, and promote the onset of suicidal ideations and suicide deaths. The aim of the study was to compare the co-occurrence of suicide and cancer in death certificates, according to cancer localization, and to evaluate, with simulation analyses, to what extent these associations can be extrapolated to the general population.

Methods The study was conducted on the French medical causes of death database. All deaths that occurred in France between 2000 and 2013 were included in the study, except deaths from unknown cause (International Statistical Classification of Diseases ICD-10 code R99), and deaths in individuals aged 14 years and younger. Suicide deaths were identified according to the underlying cause of death diagnosis (ICD-10 codes X60-X84 and Y87.0). Cancers were identified according to the underlying and other causes of death diagnoses (ICD-10 codes C00-C97), taking into account the order in which causes were declared in the death certificate, and then classified in different cancer localizations. Risks of suicide according to cancer localization were compared by logistic regression, adjusting for age and area of death, and stratified by sex. A sensitivity analysis was conducted identifying cancer only from other causes of death (i.e. excluding the underlying cause of death), in order to maximize the comparability between suicides and non-suicidal deaths. Simulation analyses were conducted using French cancer and suicide attempt incidence data to measure the impact of the selection effect, when working on deceased individuals only, on the association between suicide and cancer.

Results In total, 7,375,283 deaths were included in the study, of which 148,095 suicides (109,267 in men, 38,828 in women). Compared to lung cancer, the highest adjusted odds ratios (ORs) for suicide in men were those of prostate cancer (OR = 8.1, 95% confidence interval (95% CI): 7.1–9.0), bladder cancer (OR = 3.5, 95% CI: 2.9–4.2), and larynx cancer (OR = 3.3, 95% CI: 2.6–4.0); the lowest was for central nervous system cancer (OR = 0.3, 95% CI: 0.2–0.5). In women, the highest adjusted ORs for suicide were those of thyroid cancer (OR = 7.1, 95% CI: 2.3–18.1), bladder cancer (OR = 4.7, 95% CI: 2.3–9.4), and larynx cancer (OR = 4.4, 95% CI: 1.6–12.4). When restricting cancer definition to other causes of death (sensitivity analysis), cancers with the highest association with suicide in men were pancreas (OR = 2.1), stomach (OR = 1.8) and prostate cancer (OR = 1.5); liver cancer was associated with the lowest risk of suicide (OR = 0.4). In women, cancers with the highest association with suicide were bladder (OR = 2.2), breast (OR = 2.0), and pancreas cancer (OR = 1.9); liver cancer was associated with the lowest risk of suicide (OR = 0.2). Simulation analyses are in the process of being implemented, but the selection effect seems to bias the associations towards underestimation, the bias increasing with the lethality of the localization concerned.

Conclusions Results were highly sensitive to the source of information used for cancer definition. The analysis based on both underlying and other causes of death for cancer definition was held as the main analysis since it used all the information available. This study was conducted on dead individuals only, and thus, results of this study have to be interpreted in light of this limitation. Biases involved in analyses of multiple causes of death association, as measured in this study, are likely to be generalizable to other studies using this design.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.541

P11-22
Development and validation of the two morbidity indices for health-state severity adjustment, using data from the French National Health Insurance Information
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Introduction Morbidity indices are commonly used for adjustment or stratification on health-state severity, for research purposes and to inform policymakers. The performance of morbidity indices is enhanced when multiple data sources are combined to identify conditions included as predictors and when indices are used for the same outcome and in similar settings as for which they were developed. Most existing indices use a single data source to identify conditions and have been developed to predict a single outcome or subsequently adapted to heterogeneous settings. The French National Health Insurance Information System (“Système National des Données de Santé, SNDs”) provides individual expenditure and morbidity information for each beneficiary of the main health insurance scheme, representing over 57 million individuals (87%
of the French population). Morbidity is measured through a set of standard algorithms combining ICD-10 diagnoses and pharmacy data to identify specific conditions. We used SNDS data to develop and validate two outcome-specific morbidity indices: the Mortality-Related Morbidity Index (MRMI) predictive of all-cause mortality and the Expenditure-Related Morbidity Index (ERMI) predictive of healthcare expenditure.

Methods A cohort including all beneficiaries of the main French health insurance scheme aged 65 years or older on December 31, 2013 (N = 7,672,111) was randomly split into a development population for index elaboration and a validation population for predictive performance assessment. Age, gender, and selected lists of conditions were used as predictors for 2-year mortality and 2-year healthcare expenditure in separate models. Predictors were selected according to face validity of their identifying algorithm, correlation analysis within disease categories, univariate association with each outcome and outcome-specific considerations: number of events for mortality prediction and variance explained for expenditure prediction. To derive a weighted index from the adjusted regression coefficients, we applied a scoring rule where each additional point reflected risk associated with a 5-years age increase. We conducted two series of sensitivity analyses to test the stability of the weights when accounting for effect modification due to age and gender or to associations of conditions. Overall performance and calibration of the MRMI and ERMI were measured and compared to various versions of the Charlson index (CCI). For the MRMI, we assessed discrimination using the concordance statistic (c-statistic, equivalent to the area under the receiver operating characteristic curve). For the ERMI, we measured the percentage of total expenditure variance explained by the index. Calibration was assessed, for both indices, by comparing predictions with observations among individuals with the same index value.

Results The MRMI included 16 conditions weighted 1 to 3. Adjusted odds ratios [95% confidence interval] ranged from 1.34 [1.31–1.37] for depression, 1.36 [1.32–1.39] for Rheumatic or connective tissue diseases, to 3.79 [3.62–3.97] for end-stage renal disease, 4.09 [4.04–4.15] for cancer. The MRMI was more discriminant than the age-adjusted CCI (c-statistic: 0.8252 [95% CI: 0.8244–0.8260] vs. 0.7999 [0.7991–0.8008]) and better calibrated. Age and gender alone (c-statistic: 0.7613 [0.7604–0.7623]) were more discriminant than indices that did not include age (original CCI and cost-adapted CCI). The ERMI included 19 conditions weighted 2 to 16, explained more variance than the cost-adapted CCI (21.8% vs. 13.0%) and was better calibrated. Sensitivity analyses showed that the estimates and resulting weights were stable for both indices.

Conclusions The MRMI and ERMI indices are performant tools to account for health-state severity according to outcomes under study. They also document the differential adjusted effect of conditions on different outcomes.

Disclosure of interest The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.542

P11-24 Spatial variation in deceased organ donation registration in Ontario, Canada

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Introduction The demand for organs for transplantation exceeds supply in almost every country in the world, including Canada. As only a small fraction of deaths are eligible for organ donation due to type of death or the presence of a disease or health condition, there is a need to increase a number of people who may eventually become deceased donors. One of the most promising mechanisms to achieve this goal is to increase organ donor registration rates. In order to improve the registration rate, more information is needed on the nature of regional variation in donor registration rates across Ontario. The objective of this study is to assess the magnitude of regional variation in rates of deceased organ donation registration across Ontario. Given that the rates of organ donation registration may be correlated in different areas, using spatial analysis allows to determine which areas in Ontario have higher (i.e., hot spots) or lower rates (i.e., cold spots) of organ donation registry.

Methods Donor registration information and geographic information for each year from 2006 to 2013 was obtained through two administrative databases from the Institute for Clinical Evaluative Sciences: the Organ Donor Registry (ODR) and the Ontario Registered Persons Database (RPDB). Forward sortation areas (FSA), geographic units based on the first three characters of the postal code, were used to identify geographic units. Organ donor registration rates were computed for each FSA. In total, there were 519 FSAs included. To examine the overall spatial clustering of organ donor registration rates, the global Moran’s I statistic was computed to measure spatial autocorrelation. The local indicator of spatial autocorrelation (LISA), was computed to assess the specific contribution of each FSA within Ontario.

Results Rates of organ donation registry varied across FSAs from 6.27% to 56.59%, with the overall average rate of 27.94%. Assessing for global spatial autocorrelation using Moran’s I indicated significantly positive autocorrelation
Regional disparities of late entry to antenatal care and associated sociodemographic barriers in Burkina Faso

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Introduction Early initiation of antenatal care (ANC) can reduce maternal and neonatal mortality and improve maternal- and newborn health [1]. Understanding the geographic and the sociodemographic barriers to an appropriate utilization of ANC services is needful to identify where greatest scaling-up efforts should be concentrated [2].

Aim The aim of this study was to identify the geographic and the sociodemographic factors associated with a late entry to antenatal care services in Burkina Faso.

Methods The nationwide representative cross-sectional data from the 2010 Burkina Faso Demographic and Health Survey were used to estimate the proportion of women who entered late to antenatal care in the 13 regions of Burkina Faso. A late entry was defined as timing of first antenatal ≥ 3 months, according to WHO guidelines [3]. Logistic regression taking into consideration the complex sample design was used to identify the determinants of late entry to ANC. Adjusted prevalence estimates of late entry to ANC were derived from the fitted logistic models.

Results Overall, among the 9788 women who visited the ANC services, 5644 women (57%, 95% CI: 55% > 59%) entered after 12 weeks of gestational age. The prevalence of women who had a delayed first visit differed substantially across geographic areas ranging from 43% (95% CI: 35% > 50%) in the Centre-Est to 72% (95% CI: 67% > 78%) in the Sahel region. After adjusting for sociodemographic factors, lowest wealth quintiles (OR = 1.66, 95% CI: 1.35–2.06) and lowest education level (OR = 1.88; 95% CI: 1.48–2.39) were significantly associated with a delayed first visit. By contrast, a high media exposure (OR = 1.18; 95% CI: 1.05–1.31) and knowledge about pregnancy complications were significantly associated with a non-delayed first visit.

Conclusion We observed a regional difference and several potential barriers to early use of ANC services. Prenatal care program should take into account the specificity of each region while focusing on women education. Improving access to the media could reduce the late entry to ANC services in Burkina Faso.

Disclosure of interest The authors declare that they have no competing interest.

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https://doi.org/10.1016/j.respe.2018.05.544
P11-28
Is the study of tobacco use in migrants feasible in France? TOBAMIG: A pilot study of tobacco use characteristics and immigration
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Background Immigrants and their descendants represent about 20% of the French population. Little is known about tobacco use characteristics in this group of the population, which may differ from that of natives. This pilot study aimed to provide estimates of tobacco use and to develop an effective approach to investigate tobacco use in migrants in France.

Methods In 2013, a cross-sectional survey was conducted in Lyon (France) among immigrants and their descendants using a face-to-face interviewer-administered questionnaire.

Results Seventy-five eligible participants were interviewed. The results suggest higher tobacco use prevalence than that reported in the general population, respectively 45% and 34%. The pilot demonstrates several challenges in obtaining representative samples of the migrant population.

Discussion Our study indicates an over-exposure of descendants of immigrants to tobacco use compared to natives. This underlines an unequal integration of national preventive measures in this subgroup, which call for research addressing migrants’ tobacco use.

Disclosure of interest The authors declare that they have no competing interest.
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P11-29
Development and performance evaluation of a GIS-based metric to assess exposure to airborne pollutant emissions from industrial sources
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Introduction Few studies have investigated the effect of airborne exposure to dioxins and cadmium (Group 1 carcinogens by the International Agency for Research on Cancer) on breast cancer risk and overall results are inconclusive. Inconsistency across results may be explained by methodological limitations, including lack of historical measurements and residential history information. The multiplicity of exposure sources and the latency between exposure and cancer occurrence represent major challenges and require to precisely characterize the spatial-temporal variability of exposures over large areas and long time-periods. To overcome these limitations, this study aimed to develop and assess the performance of an exposure metric based on a Geographic Information System (GIS) through comparison with a validated dispersion model to estimate historical (1990–2008) industrial dioxin and cadmium exposures.

Methods We carried out a detailed retrospective inventory of dioxin and cadmium emitting sources from 1990 to 2008, through national databases and contact with facility operators. A careful collection of technical characteristics of sources and activity rate allowed us to estimate annual dioxin and cadmium emissions of each source using default emissions factors from the literature. The location of each facility was precisely geocoded and together with the emission estimates used as input data for the GIS-based metric. Based on the review of the literature, we identified relevant parameters to be included into the GIS-based metric: emissions’ intensity and location, subject’s residence-to-source distance, wind direction and speed, exhaust smoke velocity and stack height. To identify the most relevant combination of parameters, we compared agreement of categorical dioxin exposure classification of study subjects, between the GIS-based metric and a referent dispersion model (SIRANE) in three selected areas (rural, urban and urban-costal) and for three distinct years (9 scenarios). The agreement was estimated by calculating weighted kappa statistics (wK) and coefficients of determination (R²). During the calibration phase, we identified the combination of parameters that provided the best agreement with dispersion model results across the nine scenarios. The performance of the final GIS-based metric equation was tested for a new set of subjects’ localisation (n = 450) and for the estimation of cadmium exposure.

Results Between 1990 and 2008, we inventoried and estimated emissions of respectively 2620 and 2700 sources of dioxins and cadmium, respectively. Over this period, 82% of sources were positioned at the stack, 13% at the centroid of the building and 5% at the parcel. The agreement between the GIS-based metric and the dispersion model for dioxin exposure varied from “substantial” to “almost perfect”; median wK = 0.78 (1st quintile = 0.72, 3rd quintile = 0.82) and median R² = 0.82 (1st quintile = 0.71, 3rd quintile = 0.87). We observed similar performances for cadmium. The final metric combined residential distance to facilities, wind direction and proportion of the year blown and technical parameters of the facilities. Weighted kappa were systematically below 0.55 when no meteorological parameters were integrated into the GIS-based metric.

Discussion We developed and evaluated a GIS-based metric in order to estimate the retrospective airborne dioxin exposure of participants of a cohort-nested case-control study. This combination of parameters showed reliable estimates in comparison to an atmospheric dispersion model across different scenarios. This metric was used to estimate historical dioxin exposure in an epidemiological study on breast cancer risk. The GIS-based metric also provided reliable estimates for cadmium exposure from industrial sources and may be able to assess exposure to other air pollutants with similar properties and behavior than dioxins and cadmium (i.e. heavy metals, PM10, etc.), in particular when monitoring data are lacking.

Disclosure of interest The authors declare that they have no competing interest.

P11-30
A tool for evaluating scientific independence, integrity and transparency in observational studies of vaccine effectiveness
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Introduction Observational studies are widely used to evaluate the impact of vaccines. They are being conducted by a variety of institutions and collaborations, including public–private partnerships (PPPs). The European Union promotes PPPs through the Innovative Medicines Initiative (IMI): examples of its vaccine-related IMI PPPs include the ADVANCE and DRIVE consortia (respectively, Accelerated Development of VAaccine benefit–risk Collaboration in Europe & Development of Robust and Innovative Vaccine Effectiveness). However, practices and attitudes towards PPPs in the public health field differ, and concerns over their scientific independence have been put forth. While there have been efforts to evaluate and strengthen the methodology and reporting of observational studies, clear and comprehensive guidelines on how to evaluate their scientific independence, integrity and transparency (especially in the presence of diverse governance and funding models) are lacking.
Methods  A review of existing guidelines touching upon the topics of scientific independence, integrity and/or transparency in the context of observational studies was performed (consisting of a literature search and screening of the reference lists of retrieved documents). Key indicators of scientific independence, integrity and transparency were identified with the focus on relevance and measurability. Based on these, a checklist for evaluating individual studies and study protocols has been compiled.

Results  Several guidelines include recommendations on topics related to scientific independence, integrity and transparency that can be applied to observational studies of vaccines’ impact. The ADVANCE Code of Conduct was selected as the pivotal reference as it already considered relevant guidelines during its preparation; examples of these include the International Epidemiological Association’s Good Epidemiological Practice (GEP) and the European Network of Centres for Pharmacoepidemiology and Pharmacovigilance (ENCePP) Checklist for Study Protocols. We present an overview of the various definitions and principles, as well as a checklist-based tool for evaluating the scientific independence, integrity and transparency of observational studies. The tool can be applied by independent reviewers to assess studies retrospectively as well as by study teams to inform the planning of new ones.

Conclusions  Questions of scientific independence, integrity and transparency are central in evaluating evidence from observational studies of vaccines. Our tool aims to provide a systematic way to address these topics; the next step will be to validate it in relation to existing protocols.

Disclosure of interest  The authors declare that they have no competing interest.

https://doi.org/10.1016/j.respe.2018.05.550
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