numeracy at year 5. This could be due to improved T1D management in South Australia

RF02   **EXPLAINING THE FALL IN CORONARY HEART DISEASE MORTALITY IN THE REPUBLIC OF IRELAND BETWEEN 2000 AND 2015 – AN IMPACT MODELLING STUDY**

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Aim To investigate the proportional contributions of coronary heart disease (CHD) determinants to the observed CHD mortality rates in Ireland between 2000–2015.

Methods The validated IMPACT model on CHD mortality, which has been developed with the purpose of merging epidemiological data that is available for each country, was utilized for the estimations. Data on population statistics, CHD patient numbers, treatment uptakes and population trends on key risk factors (eg. smoking, total cholesterol, hypertension, obesity, DM and physical inactivity) were sourced from national registries, hospital administration systems, national health surveys, large cohort studies, international registries and meta-analyses. CHD Deaths Prevented or Postponed (DPPs) were used as outcome measurement.

Results CHD mortality in Ireland fell by 56% (4060 fewer deaths), faster in women than in men (63% vs 53%), in the period 2000–2015 in those aged 25–84 years. Improvements in CHD risk factors, ie decrease in smoking prevalence (5%), population systolic blood pressure (-25%) and mean cholesterol serum levels (-11%), contributed to 30% of the decline with 785 DPPs in men vs 425 in women. In women, both systolic blood pressure reductions and cholesterol reductions contributed equally (200 DPPs each), and decreased smoking prevalence contributed to 80 DPPs. Likewise, DPPs in men followed a similar trend (SBP - 825; total cholesterol- 250; and, smoking-110).

Improvements in cardiological treatments, specially in secondary prevention and heart failure treatments, contributed to approximately 60% of the observed decline (1620 DPPs in men and 825 in women). Both males and females benefitted the most DPPs from improvements in secondary prevention (850 and 355 DPPs, respectively). These gains were offset by increases in physical inactivity (2%), diabetes prevalence (6%) and BMI (4%). Overall, improvements in CHD treatments were more beneficial to men whilst better risk factor contribution were higher in women. Advancements in CHD treatments were more beneficial than risk factors in all age groups. These proportions remained relatively consistent across a wide range of assumptions and estimates in a sensitivity analysis except for physical inactivity which has transcended the null line.

Conclusion The CHD mortality decline has continued between 2000–2015 of which 90% can be explained by improvements in cardiological treatments and population risk factors with the IMPACT modelling study. However, worsening trends in diabetes prevalence, obesity and physical inactivity have reversed the gains. Investments in improving CHD death determinants and targeted policies are necessary to sustain a further decline in CHD mortality rates in Ireland.

RF03   **ESTIMATING THE OCCURRENCE OF DIABETES AT THE END OF LIFE USING MULTIPLE CAUSE OF DEATH DATA LINKED WITH PRIMARY CARE, HOSPITAL CARE AND MEDICATION PRESCRIPTION DATA**

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Background Cause-of-death statistics underestimate the end-of-life occurrence of many diseases, including diabetes. Our aim is to estimate the end-of-life occurrence of diabetes by combining multiple cause of death data with register data covering primary care, hospital care and medication prescriptions. We investigate the added value of each medical register and assess the extent to which reporting of diabetes as a cause of death is associated with disease severity.

Methods Our study population consisted of all deaths in the Netherlands (2015–2016) included in the Dutch primary care database (NIVEL-PCD; N=18.162). The proportion of deaths with diabetes (type I or II) within the last two years of life was calculated using cause of death and medical register data in isolation and combined. We assessed whether the proportion of diabetes reported in the causes of death registries varied according to disease severity as defined by medication prescriptions.

Results Of all deaths, 2.2% had diabetes reported as the underlying cause of death, while 7.7% of the death certificates mentioned diabetes. Primary care registration yielded the highest rate in isolation (27.1%), followed by the medication (22.4%) and the hospital-any diagnosis (17.1%) data, while hospital-main diagnosis was limited (1.1%). According to all data sources combined, 28.7% of the study population had diabetes at the end of life. Of all deaths among those who were prescribed insulin (indicating severe diabetes), 11.9% had diabetes recorded as the underlying cause of death and 35.8% of the death certificates mentioned diabetes as a cause of death. For patients using oral antidiabetic medication, these proportions were only 5.7% and 24.2%, and for patients not using antidiabetic medication 4.2% and 16.7%.

Conclusion More than one fourth of the Dutch population has diabetes at the end of life. Only a minority of this end-of-life diabetes occurrence is recorded as a cause of death, even for persons with severe diabetes. In the Netherlands, combining primary care data with multiple causes of death allows to find most cases with diabetes at the end of life.

RF04   **RISK OF BREAST CANCER AND OCCUPATIONAL EXPOSURE TO ORGANIC SOLVENTS: RESULTS OF THE CECILE STUDY, A POPULATION-BASED CASE-CONTROL STUDY IN FRANCE**

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Background Breast cancer is the leading cause of cancer death in women worldwide. Besides reproductive and hormonal

breast cancer risk factors which are hardly modifiable, the identification of occupational or environmental risk factors may be a key to prevention. It has been suggested that exposure to organic solvents in the workplace may play a role in the etiology of breast cancer. However, most epidemiological studies on solvents in female breast cancer have reported inconsistent results.

Methods We examined the risk of breast cancer related to lifetime exposure to chlorinated, petroleum-based and oxygenated solvents in the CECILE study, a large population-based case-control study carried out in France (2005–2007). 1230 women with breast cancer and 1315 population controls were included. Data collected included sociodemographic characteristics, medical and family history, anthropometric measurements, reproductive history, lifestyle habits, and lifetime occupational history. All jobs were coded using the International Standard Classification of Occupations (ISCO 1968) and the Classification of Activities in the European Community (NACE 1991). Exposure to five chlorinated, five petroleum and five oxygenated solvents was assessed using job-exposure matrices, which assigned indices of exposure (probability, frequency and intensity) for each job. A Cumulative Exposure Score (CES) taking into account probability, frequency, intensity and duration of exposure was calculated for each subject. Odds ratio (ORs) and their 95% confidence intervals (95% CI) were estimated using unconditional logistic regression adjusting for potential confounders. Analyses were stratified by the menopausal status.

Results Significantly increased ORs were found in premenopausal women with high probability of exposure to alcohols (1.50; 1.05–2.14) and diethyl ether (1.97; 1.00–3.88). Premenopausal women with the highest CES of oxygenated solvents had an OR of 1.70 (1.09–2.64) (OR=1.67; 1.10–2.52 for alcohols, 1.80; 0.95–3.42 for diethyl ether); the highest CES of chlorinated solvents was associated with an OR of 2.14 (0.86–5.30). In premenopausal women, a duration of exposure to oxygenated solvents ≥25 years with a probability of exposure ≥80% significantly increased the risk of breast cancer (OR=2.62; 1.27–5.40 for all solvents, 2.72; 1.30–5.70 for alcohols, and 2.79; 0.67–11.6 for diethyl ether). No association was observed for oxygenated, petroleum-based or chlorinated solvents in postmenopausal women.

Conclusion These findings suggest a role of occupational exposure to oxygenated solvents, notably to alcohols and diethyl ether, in the occurrence of breast cancer in premenopausal women. Our results highlight the importance of timing and duration of exposure for the study of occupational exposure to solvents in breast cancer risk.

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Background Healthy life expectancy (HLE) is an important indicator of population health. Although the distribution of risk factors within populations has shifted during the past few decades (e.g., smoking rates have declined in developed countries), little is known if these changes affect population HLE. Our study aimed to estimate the impact of distribution shifts in a population's cardiovascular risk factors on HLE in Japan.

Methods Data for analysis were obtained from NIPPON DATA90, a nationwide cohort study of over 9,000 Japanese people initiated in 1990. Using activities of daily living scores, we estimated the HLEs of study participants aged ≥60 years at the baseline survey. We examined shifts in the following three risk factors: systolic blood pressure (SBP), body mass index (BMI), and smoking status. All HLE calculations were performed using maximum likelihood approach with interpolated Markov chains (iMaCh 0.98r7). First, risk factor-specific HLEs were calculated using multistate life tables. A total of 24 combinations of cardiovascular risk factors were estimated. Next, we calculated the population's baseline HLE (Scenario 0) using the weighted average of the risk factor-specific HLEs. The averaging weight was derived from the multivariable distribution of baseline data from NIPPON DATA90. Finally, scenarios were set to investigate the impact of distribution shifts in risk factors. In Scenario 1, the distributions of SBP and BMI were reduced by 4.0 mmHg and 2.0 kg/m^2, respectively. In Scenario 2, we added the condition to Scenario 1 that all current smokers who wanted to quit smoking (men: 25%, women: 40%) were successful in quitting.

Results The analysis was performed using 6,676 participants (2,840 men and 3,836 women). The baseline HLE at age 60 years (Scenario 0) was 20.02 years in men and 24.32 years in women. After the shift in risk factors, the adjusted HLE at age 60 years in Scenario 1 was 20.12 years in men and 24.45 years in women, and the corresponding HLE in Scenario 2 was 20.46 years in men and 24.53 years in women. When compared with the baseline HLE, Scenario 1 presented a gain of 0.10 years in men and 0.14 years in women, and Scenario 2 presented a gain of 0.43 years in men and 0.21 years in women.

Conclusion We examined the impact of distribution shifts in SBP, BMI, and smoking status on population HLE in Japan, and found that smoking cessation substantially extended HLE.

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Background Management of paediatric chronic pain (CP: pain >3 months' duration) is challenging and associated with significant comorbidities. Although large numbers of children may be affected, this population in England has not been well-described. In addition, despite partial provision of specialist NHS CP services, referral pathways are not well-established; children may therefore be receiving suboptimal interventions and access to CP services may be inequitable. We examined the characteristics and service utilisation of all children attending specialised CP services in England to inform commissioners and service providers.