

two-sample Mendelian randomisation (MR) analysis; an instrumental variable approach more robust to bias from confounding and reverse causation.

Methods Individual level data from UK Biobank (N=217 013) was used for multivariable analyses and one-sample MR. Summary statistics from genome-wide association studies were used in two-sample MR.

The total effect of education on risk of coronary heart disease (CHD), CVD (all subtypes), myocardial infarction (MI) and stroke (all measured in odds ratio, OR) was assessed using multivariable regression and univariable Mendelian randomization (MR).

The degree to which this effect is mediated through BMI, SBP and smoking respectively (the indirect effect and proportion mediated) was estimated using the product of coefficients method, where the effect of education on each mediator, and each mediator on each outcome was assessed using multivariable regression and Network MR. The joint contribution of all three risk factors was assessed via the difference method, using multivariable regression or multivariable MR.

Results Each additional standard deviation of education (3.6 years) associated with 13% lower risk of coronary heart disease (OR 0.87, 95% confidence interval [CI] 0.84 to 0.89) in observational analysis and 37% lower risk (OR 0.63, 95% CI 0.60 to 0.67) in MR analysis. As a proportion of the total risk reduction, BMI mediated 15% (95% CI 13% to 17%) and 18% (95% CI 14% to 23%) in the observational and MR estimates respectively. Corresponding estimates for SBP were 11% (95% CI 9% to 13%) and 21% (95% CI 15% to 27%), and for smoking, 19% (15% to 22%) and 34% (95% CI 17% to 50%). All three risk factors combined mediated 42% (95% CI 36% to 48%) and 36% (95% CI 16% to 63%) of the effect of education on CHD in observational and MR respectively. Similar results were obtained for risk of stroke, MI and all-cause CVD.

Conclusion BMI, SBP and smoking mediate a substantial proportion of the protective effect of education on risk of cardiovascular outcomes. Intervening on these would reduce cases of CVD attributable to lower education. However, more than half of the protective effect of education remains unexplained.

OP19 WILL SOCIAL CARE NEED MORE RESOURCES? A MODELLING STUDY OF HEALTH AND SOCIAL COSTS IN ENGLAND AND WALES FOR ALTERNATIVE FUTURE CARDIOVASCULAR DISEASE SCENARIOS

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Background Cardiovascular disease (CVD) contributes to dementia and disability risk. It also affects the cost of care. The English NHS long-term plan targets preventing 150,000 CVD events from 2019–2029. However, after decades of declines in CVD mortality in England, CVD mortality improvements have slowed since 2011, which may indicate a slowdown in incidence reduction from around 2006. Therefore, there is uncertainty about how CVD burden and

associated health and social care costs might evolve in the next decade.

Methods Simulations for people aged 35–100 in England and Wales were carried out using the IMPACT Better Aging Model (BAM), an open-cohort, stochastic Markov model which synthesises observed trends in CVD incidence and mortality, dementia and disability in the English Longitudinal Study of Ageing (ELSA) and national ONS data. The synthesised trends were projected to 2029.

We modelled undiscounted health and social care costs and quality adjusted life years (QALYs) for 2019–2029 under two scenarios:

1. Basecase – age-specific CVD incidence continue to decline, following the long-term trends;
2. Age-specific CVD incidence do not decline after 2006, following recent trends.

Healthcare costs were based on hospital episode statistics (HES) data, matched to ELSA participants and calibrated to Office for Budget Responsibility healthcare cost estimates. Age-related social care costs were estimated using reported social care contact hours from ELSA combined with PSSRU unit costs. Utility weights for QALYs were from EQ-5D MEPS catalogue and Health Survey for England.

Results In the basecase scenario 1, median healthcare costs (2019 prices) are projected to increase by ~12% between 2019–2029, from £93.0bn to £104.6bn per year. Social care costs are projected to increase by ~27%, from £8.0bn to £10.2bn per year.

In the CVD flat-lining scenario 2, median healthcare costs increased by ~15% from £95.3bn in 2019 to £109.6bn in 2029, and social care costs increased by ~30% from £8.2bn in 2019 to £10.7bn in 2029.

When compared with scenario 2, the basecase scenario would generate ~200,000 additional QALYs/year by 2029, which, valued at UK Treasury rate, would be worth some £12billion per year.

Conclusion This study projects future health and social care costs resulting from the recent slowdown in CVD incidence and mortality declines. We predict that social care costs will grow twice as fast as healthcare costs over the next decade, regardless of future improvements. Total funding policy therefore need to be urgently addressed, which may prove politically challenging.

OP20 CARDIOVASCULAR DISEASE BIOMARKER PROFILES AMONG HARMFUL AND HAZARDOUS DRINKERS: A CROSS-SECTIONAL STUDY FROM NORTH WEST RUSSIA

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Background Heavy alcohol drinking is increasingly recognized as a risk factor for cardiovascular disease (CVD), although the mechanisms underlying this are not well understood. Moderate alcohol consumption is associated with changes in many blood biomarkers of cardiometabolic risk. There are however few studies of the impact of harmful and hazardous drinking on

CVD biomarkers. We conducted a study in Russia to explore the association between levels of heavy alcohol consumption on biomarkers of cardiac damage.

Methods The Know Your Heart study recruited and medically examined a random sample of 2354 participants from the general population of Arkhangelsk city (NW Russia) plus 271 participants from the Regional Psychiatric hospital alcohol treatment facility with a primary diagnosis of alcohol problems. Measurements were made of (i) high sensitivity Troponin T (hsTroponinT), a marker of cardiac damage, (ii) N-terminal pro-B-type natriuretic peptide (NT-Pro-BNP), a marker cardiac wall stretch, and (iii) high sensitivity C-reactive protein (hsCRP), a marker of systemic inflammation. Their concentrations were compared between the patients from the alcohol treatment facility and the general population sample divided according to levels of harmful/hazardous drinking. The associations between heavy alcohol use and log-transformed biomarkers were estimated using multivariate linear regression models adjusted for directed acyclic graphs specified minimal sufficient set of confounders: age, sex, smoking and education.

Results Those in the alcohol treatment facility had the highest levels of all three biomarkers relative to non-hazardous drinkers in the general population: hsTroponinT was elevated by 10.3% (95%CI: 3.7%, 17.4%), NT-Pro-BNP - by 46.7% (95%CI: 26.8%, 69.8%), hsCRP - by 69.2% (95%CI: 43%, 100%). NT-Pro-BNP was also elevated, but to a smaller degree, for harmful drinkers in the general population - by 31.5% (95%CI: 3.4, 67.2). A trend test across categories of drinkers was significant for NT-Pro-BNP and hsCRP with concentration of biomarkers going up with higher levels of alcohol exposure ($p < 0.001$).

Conclusion The key finding is that NT-Pro-BNP was raised in both patients in the alcohol treatment facility and among harmful drinkers in the general population. This biomarker of pathological wall stress is a predictor of CVD events. This consistent finding in the two groups supports the hypothesis that heavy alcohol drinking has an adverse effect on cardiac structure and function and may thus lead to increased risk of CVD. However, the importance for CVD of the marked elevation of hsCRP in the alcohol treatment group is less clear.

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OP21 COGNITIVE PERFORMANCE AND HISTORY OF MULTIPLE HEALTH CONDITIONS IN OLDER ADULTS

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Background Multimorbidity, defined as the coexistence of two or more health conditions, is becoming the norm in our ageing population. Research to date has highlighted that individuals with multiple health conditions are at greater risk of disability and mortality, but also of cognitive impairment and dementia. Most of research to date on multimorbidity and cognitive performance is cross-sectional or with limited history information of the health conditions. The present study aims to explore the association between cognitive performance and previous history of health conditions over 24 years.

Methods The sample consisted of 4858 respondents of the Health Retirement Study (HRS), which is a US nationally

representative survey that focus on adults aged 50 and over. Data was extracted from 12 consecutive waves from 1998 to 2014. Data from health conditions included self-reports for hypertension, diabetes, arthritis, stroke, cancer, lung and heart diseases and psychiatric problems. Duration of the health condition was categorized as more than 10 years, between 4 and 10 years, less than 4 years and no condition. Cognitive status was assessed using a summary index of cognitive functioning which includes measures of memory, working memory, speed of mental processing, knowledge, and language. ANOVA and post hoc tests were performed to explore the association between cognition and the duration of each health condition independently. Multiple linear regression analyses were performed to explore the association between multiple health conditions and cognitive performance.

Results The results showed significant independent associations between cognitive performance in 2014 and each health condition independently, except for cancer [$F(1,4) = 2.60$; $p = 0.51$]. When all the health conditions were considered together in the regression models, we found that cognitive performance is negatively associated with high blood pressure and stroke (independently of the duration of the condition), long-term diabetes and lung diseases (i.e., for more than 10 years) and recent cancer (i.e., in the last 4 years).

Conclusion Our results confirm that cognitive performance is significantly lower in older adults with multiple health conditions. Moreover, our findings highlight that considering the duration of the health condition is key for identifying patients at greater risk of cognitive impairment. Specifically, individuals at greater risk of cognitive impairment are those who have been diagnosed with hypertension or suffered a stroke at any given time, long-term diabetes or lung diseases, and recent cancer diagnoses. Public health makers should develop specific policies for cognitive screening in individuals with these health conditions.

OP22 SHOULD BALANCE SCREENING FOR FALL RISK BEGIN EARLIER IN LIFE? EVIDENCE FROM A BRITISH COHORT STUDY

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Background Falls in older adults precipitate hospitalisation, frailty and premature mortality and are a growing health concern. The standing balance test is a simple, cost effective tool used to screen for fall risk in adults aged 65+, however the association between standing balance and fall risk has not been examined in individuals younger than 65. To assess whether balance tests could be utilised to screen for fall risk at younger ages, we investigated if balance at ages 53 and 60–64 was associated with prevalence and frequency of subsequent falls.

Methods Data from the MRC National Survey of Health and Development, a British birth cohort study, were utilised ($n = 2571$). Standing balance time (eyes closed) was assessed at ages 53 and 60–64 (max: 30 seconds). Fall history within the last year was self-reported at ages 60–64 and 68 and categorised to indicate fall prevalence (yes, no) and frequency (0, 1–2, 3+). Binary and multinomial logistic regressions were used to assess associations of balance time (per 1 second increase)