women 0.86–0.89; men 0.91–0.94), depression (OR's women 4.40–6.82; men 5.25–9.26), BMI (OR's women 1.11–1.16; men 1.10–1.15) and smoking status (OR's ≥ 20 cigarettes per day women 3.07–7.22; men 2.13–4.54) were associated with fair/poor SRH. No interactions were found between country and grip strength (OR's women 0.95–1.03; men 0.99–1.05) or depression (OR's women 0.63–1.39; men 0.50–1.22) but were found for BMI (OR's women 0.89–0.98; men 0.87–0.97) and smoking (OR's ≥ 20 cigarettes per day women 0.12–0.34; men 0.20–0.55). The interaction between country and BMI reduced when the analysis was restricted to those with a BMI less than 30 (OR's women 0.93–1.07; men 0.90–1.05).

Conclusion Our findings agree with previous research that SRH captures general physical and mental health similarly across countries. We may need more caution comparing SRH across countries when considering other aspects of health. We find that cardiovascular risk has different associations with SRH in England and Japan, possibly reflecting differences in cultural norms and different stages in their obesity and tobacco epidemics.

P81 FORECASTING TRENDS IN DISABILITY IN ENGLAND AND WALES TO 2030: A MODELLING STUDY

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10.1136/jech-2017-SSMAbstracts.182

Background Reliably estimating the future burden of disability in our ageing societies is crucial. However, previous forecasts failed to consider the potentially significant impact of trends in disease incidence, both up and down. Our aim is thus to forecast the future disability burden in England and Wales to 2030, while taking into account ongoing trends in CVD and dementia incidence.

Methods We developed and validated the IMPACT-Better Ageing Model. Using evidence-based age-sex- and year-specific transition probabilities, this probabilistic model tracks the England and Wales population aged 35–100 years through ten health states (notably CVD, cognitive impairment, disability, dementia and death). We projected continuing declines in dementia incidence, CVD incidence and mortality rates through to 2030 (based on ELSA analysis and consistent with cohorts elsewhere). We then estimated future disability prevalence, distinguishing four types of disability: CVD-related, dementia-related, CVD and dementia-related and Non-CVD/Non-dementia disability.

Results England and Wales will continue its transition towards a much older population structure. Between 2015 and 2030, the number of people aged over 65 years will increase by approximately 33.2% (95% uncertainty interval 32.2%–34.1%) while the very old population (over 85) will increase by some 68.3% (63.2%–73.0%)

The standardised prevalence of disability among adults aged over 65 years will stay constant at around 21.4% (21.2%–21.6%). However, the number of people living with disability will rise by 40.1% from 2.3 million to 3.2 million.

In 2030, Non-CVD/Non-dementia related disability will account for approximately two-thirds of disabled people aged

65–84, (the absolute numbers increasing in approximately 52% from 2015). Dementia-related disability will also increase by some 51% (44.4%–58.8%). Conversely, CVD-related disability will decline by approximately 27% (22.2%–30.0%).

Among the very old aged over 85 years, 40% of the cases of disability in 2030 will be attributable to dementia, representing a 113.4% (102.6%–123.6%) increase since 2015. Non-CVD/Non-dementia disability will rise even more, by approximately 159.2% (148.4%–169.1%). However, CVD-related disability cases, will increase by just 2.8% (–1.4%–7.0%).

Conclusion The number of older people with care needs will expand by approximately one third by 2030, mainly reflecting population ageing rather than higher prevalence rates of disability. This will pose a substantial societal challenge and increase the need for cost-effective long-term care in all its forms: institutional, home-based and informal.

Future research on the potential benefits of effective prevention strategies might therefore concentrate on the shared determinants of these non-communicable diseases.

P82 AN ILLUSTRATION OF THE ANALYTICAL CHALLENGES DUE TO MATHEMATICAL COUPLING IN HEALTH GEOGRAPHY RESEARCH

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10.1136/jech-2017-SSMAbstracts.183

Background It has been acknowledged that the use of ratio variables is problematic in regression analysis where ratios comprise common components and are present in both the dependent and independent constituents of the model, e.g. regression analyses of ratio variables with common population denominators. However, such ratio variables are ubiquitous in health research and their resultant mathematical coupling (MC) has not been investigated extensively in relation to studies in health geography, where common population denominators are frequently encountered. It is common, for instance, that area level measures for health outcomes are considered in relation to area levels of mortality and/or indicators of social deprivation, where the common denominator is the area population. Our study seeks to illustrate this issue and examines the implications of this form of MC from a causal inference perspective.

Methods We examine the impact of MC amongst ratio variables in regression analyses using simulated data based on the correlation structure and distribution of variables derived from the UK census. Specifically, we consider the proportion of limiting long term illness (LLTI) in relation to mortality rates and the Townsend Material Deprivation Score (constructed from percentages of the population of an area that are experiencing pre-defined properties). Simulations are constructed under the null hypothesis, i.e. there is no impact of an area measure of deprivation on the relationship between mortality and proportion of limiting long term illness. A causal framework is introduced utilising directed acyclic graphs (DAGs) to assess variable relationships and to suggest analytical strategies that mitigate any problems arising due to MC.

Results We show that artefactual relationships arise in the regression analyses of composite proportions due to MC: area measures of deprivation appear to influence the relationship