association between risk of reporting mental illness in 2011 and employment trajectory of local authority of residence by 2011, (after controlling for individual risk factors and for neighbourhood deprivation in 2001, before the onset of the recession).

Conclusion Various personal, family and neighbourhood factors are associated with self-reported mental illness. Allowing for individual/family factors and local deprivation, people in local authorities where employment rates remained higher during the recession had lower risk of reporting mental illness, especially in the highlands and Islands of Scotland. Further research is being carried out to explore these relationships (eg controlling for migration and other possible area level determinants of mental health). The research underlines the importance of maintaining mental health services across Scotland during the recession to protect mental health and control inequality.

P7 THE IMPACT OF REGIONAL EMPLOYMENT LEVELS DURING THE GREAT RECESSION (2008 TO 2013) AND WORKLESSNESS ON THE HEALTH OF THE WORKING-AGE POPULATION: CROSS-NATIONAL ANALYSIS OF 16 EUROPEAN COUNTRIES

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Background Studies from single countries suggest that local labour market conditions, including rates of employment, tend to be associated with the health of the populations residing in those areas, even after adjustment for individual characteristics including employment status. The aim of this study is to strengthen the cross-national evidence base on the influence of regional employment levels and individual worklessness on health. Our objectives are to investigate whether higher regional employment levels are associated with better health over and above individual-level employment. This could be due to pathways such as weakening community cohesion, increasing place-based stigma and declining regional income.

Methods Individual-level data (n=20 485 aged 15 to 64 years) were taken from 16 countries in the European Social Survey (2014/15) and regional employment rates extracted from Eurostat. Health outcomes included self-reported heart or circulation problems, high blood pressure, self-rated health, depressive symptoms, obesity and allergies (as a falsification test). Our exposures of interest included worklessness, defined as individuals who did not report being in paid work. At the regional level we included the average employment rate of those aged 15 to 64 years from 2008 to 2013. We calculated multilevel Poisson regression models for the binary outcomes (calculating the incidence rate ratio (IRR)), which included individuals nested within NUTS regions and linear multilevel regression models for continuous measures, controlling for potential confounding variables.

Results Between 2008 and 2013 the employment rate declined the most in Spain and increased the most in Germany. Increased average regional employment rates were associated with better health outcomes: heart/circulation problems IRR=0.970 (95% CI 0.950 to 0.990); high blood pressure IRR=0.981 (95% CI 0.965 to 0.997); poor self-rated health IRR=0.974 (95% CI 0.956 to 0.992); obesity IRR=0.971 (95% CI 0.960 to 0.982); depressive symptoms b=0.992 (95% CI 0.987 to 0.997), allergies IRR=0.995 (0.977 to 1.013). Individual worklessness was associated with all health outcomes, most strongly with poor self-rated health. In models including both individual worklessness and the average regional employment rate, the latter remained associated only for obesity.

Discussion Lower regional employment levels and worklessness are associated with adverse health outcomes across European countries. When accounting for both individual- and regional-level employment variables, a separate association between the regional employment level was suggested for obesity. The key strength of our study was the use of comparable cross-national data that integrated individual- and regional-level variables, but is limited by the use of self-reported data. Further exploration of potential causal mechanisms is needed.

P8 INVESTIGATING EPIGENETIC DIFFERENCES IN RESPONSE TO SHIFT WORK: FINDINGS FROM *UNDERSTANDING SOCIETY* (UK LONGITUDINAL HOUSEHOLD SURVEY)

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Background Shift work is a feature of many occupations and has been associated with a range of adverse health outcomes, including obesity, diabetes, depression and cancer. The main proposed mechanism linking them is a disruption in circadian rhythms, particularly among night shift workers. DNA methylation may serve as a biomarker for circadian disruption and a potential mechanism by which shift work influences disease risk. In the context of a longitudinal study, we aimed to investigate whether shift work is associated with DNA methylation.

Methods Methylation profiling was performed using Illumina EPIC micro-arrays on whole-blood DNA samples, obtained from British Household Panel Survey (BHPS) participants of *Understanding Society* from 2010–2012. BHPS comprises a clustered random sample of households recruited in 1991, with all members followed annually. After pre-processing, 1175 samples and 857,071 CpG sites remained for investigation. Shift work variables were derived from 17 time points between 1991 and 2009: ever (n=359), current (n=88) and long-term (^{3} 3 years) shift work (n=154) (night and rotating). Epigenome-wide association analysis was performed using multivariable regression with adjustment for age, sex, batch and blood processing day. Further models were adjusted for cell-type composition and socio-economic variables. Methylation age was also estimated based on the Horvath epigenetic clock and the impact of shift work on 'epigenetic age acceleration' (EAA) was investigated.

Results In epigenome-wide association analysis, 50 CpG sites were associated with shift work with a nominal p-value$<1 \times 10^{-5}$ across the 9 main analyses, with the strongest signal of association at cg12880856 (*PPARG*) identified in relation to