

(95% UI: -5000 to 39,000), 32,000 (95% UI: 9,500 to 56,000) and 17,000 (95% UI: -7200 to 37,000) respectively. Compared to the baseline, no scenario was more cost-effective nor reduced health inequalities; in all cases the probability of becoming cost-effective or equitable did not reach 80%.

**Conclusion** Results suggest the intervention has the potential to reduce T2DM incidence but requires substantial participation and increased long-term effectiveness. The effects in other NCDs, cost-effectiveness and health inequalities were uncertain. Whilst reduction in T2DM is encouraging, a combination of high-risk and structural policies is needed to reduce the health inequalities gap and address the NCDs crisis, which is urgently overdue.

OP12

### PROJECTING THE BURDEN OF CARDIOVASCULAR DISEASE AND DIABETES IN GERMANY: NATIONAL TRENDS AND REGIONAL INEQUALITIES

<sup>1,2</sup>Karl Emmert-Fees\*, <sup>3</sup>Shammi Lumar, <sup>4</sup>Chris Kyridemos, <sup>1,2</sup>Michael Laxy. <sup>1</sup>Institute of Health Economics and Health Care Management, Helmholtz Zentrum München, Neuherberg, Germany; <sup>2</sup>Associate Professorship of Public Health and Prevention, Technical University of Munich, Munich, Germany; <sup>3</sup>Department of Public Health and Primary Care, University of Cambridge, Cambridge, UK; <sup>4</sup>Department of Public Health and Policy, University of Liverpool, Liverpool, UK

10.1136/jech-2021-SSMabstracts.12

**Background** Although age-adjusted mortality rates of coronary heart disease (CHD), stroke and type 2 diabetes mellitus (T2DM) are declining in many industrialised countries, the burden of these diseases may increase due to population aging. In Germany 33% of the population is expected to be older than 60 years by 2035 with differences between East and West Germany. Forecasting the burden and regional inequalities of CHD, stroke and T2DM is vital for efficient health policy planning. This study aimed to 1) project mortality of CHD, stroke and T2DM by sex and age for the German population age 30 and older from 2018 to 2035 and 2) analyse regional inequalities in mortality between East and West Germany.

**Methods** We used population count estimates, cause-specific death counts (based on ICD-10-GM) from 1998 to 2018 and population projections to 2035 provided by the German Federal Statistical Office. Cause-specific mortality rates were forecast until 2035 for each sex, region and 5-year age category using a functional demographic model. The model was calibrated using a root mean squared error approach based on the last five observed years of data and validated graphically. Uncertainty was computed as 95%-confidence intervals (CI). Age-sex-standardised mortality rate ratios (MRRs) between East and West Germany were estimated using direct standardisation with the 2018 German population as the standard population. Projected death counts were calculated by multiplying mortality rates with projected population counts. We used R v4.0.3 with the packages demography v1.22 and forecast v8.13.

**Results** We found that annual mortality from CHD in Germany is projected to decrease by 36.52% (~23200 deaths, 95%-CI: 14400–30800) for men and 31.70% (~22400 deaths, 95%-CI: 10000–32200) for women by 2035. Mortality from stroke and T2DM is projected to increase by 21.03% (~6200 deaths, 95%-CI: -15000–59300) and 29.68% (~4200 deaths, 95%-CI: -1200–12000) for men and decrease by 40.30% (~16300 deaths, 95%-CI: 11600–

20200) and 14.03% (~2300 deaths, 95%-CI: -3700–6500) for women, respectively. Age-sex-standardised MRRs show that mortality from these causes is higher in East Germany. By 2035, inequalities are projected to narrow for CHD and T2DM, the latter potentially being reversed, and remain constant for stroke. The model performed well in validation analyses.

**Conclusion** Our projections suggest considerable future decreases in CHD mortality for both men and women in Germany. Deaths from stroke and T2DM are projected to increase for men, while decreasing among women. Inequalities between East and West Germany are expected to decline but largely persist throughout the projection period.

## Wednesday 15 September

### Children, 13.00 – 15.25

OP13

### EARLY CHILD DEVELOPMENT AT 2–5 YEARS PREDICTS COGNITIVE OUTCOMES AT 6–9 YEARS IN LAO PDR: A CASE FOR POPULATION MONITORING USING THE EARLY HUMAN CAPABILITY INDEX IN LOW AND MIDDLE INCOME COUNTRIES

<sup>1,2</sup>Alanna Sincovich\*, <sup>1,2</sup>Tess Gregory, <sup>1,3</sup>John Lynch, <sup>1,2</sup>Sally Brinkman. <sup>1</sup>School of Public Health, University of Adelaide, Adelaide, Australia; <sup>2</sup>Telethon Kids Institute, University of Western Australia, Adelaide, Australia; <sup>3</sup>Population Health Sciences, Bristol Medical School, University of Bristol, Bristol, UK

10.1136/jech-2021-SSMabstracts.13

**Background** Beyond effects of linear growth on cognitive development, research has seldom focused on children's developmental trajectories in low and middle income countries. This is limited by a lack of suitable measurement tools. Global commitment to tracking early child development, as outlined by the Sustainable Development Agenda, has spurred efforts to address this challenge. The early Human Capability Index (eHCI) has been shown to be a feasible and valid population monitoring measure across diverse contexts. This study investigated the comparative ability of the eHCI and direct assessment of children's development at 2–5 years in predicting cognitive outcomes at 6–9 years.

**Methods** We used data collected as part of the Early Childhood Education Project, financed by the World Bank Group, in Lao PDR. Baseline data collected commenced in 2015. The sample was drawn from 376 villages in Northern Laos selected on the basis of poverty level. In each village, 20 random households with at least one child aged between 2–5 years were selected. In 2020, children within the age range of 6–9 were surveyed again. The study population included all children for whom data were collected at both time points (n=5,269). Four measures of children's development were used in this study; eHCI overall development, and direct assessment literacy, numeracy, and executive function. The eHCI, collected via caregiver report, includes 56 items designed to measure early child development across 8 domains. Children's literacy, numeracy, and executive function were measured via 92 direct assessment items. Receiver Operating Characteristic (ROC) curves, C-statistics and 95% confidence intervals were estimated to determine the ability of scores at time 1 to predict poor scores at time 2.

**Results** The eHCI overall development score had the largest C-statistic when predicting all three cognitive development measures. For example, when predicting direct assessment numeracy at 6–9 years, eHCI overall development at 2–5 years had the strongest predictive ability (AUC 0.71, 95% CI 0.69–0.73), followed by eHCI numeracy (AUC 0.68, 95% CI 0.65–0.70) and direct assessment numeracy (AUC 0.67, 95% CI 0.65–0.70).

**Conclusion** Child development at 2–5 years, as measured by the eHCI, was able to predict poor cognitive outcomes at 6–9 years in Lao PDR. Findings indicate we need not rely on costly, individual level direct assessment of early child development. Rather, an adult-reported tool such as the eHCI can be used to identify where supports and greater investments are required to promote children's later outcomes.

**OP14 FUNDING FOR PREVENTATIVE CHILDREN'S SERVICES AND RATES OF CHILDREN ENTERING CARE: A NATURAL EXPERIMENT USING LONGITUDINAL AREA-LEVEL DATA IN ENGLAND**

<sup>1</sup>Davara Bennett\*, <sup>2</sup>Calum Webb, <sup>1</sup>Kate Mason, <sup>1</sup>Daniela Schlüter, <sup>1</sup>Katie Fahy, <sup>1</sup>Alexandros Alexiou, <sup>1</sup>Sophie Wickham, <sup>1</sup>Ben Barr, <sup>1</sup>David Taylor-Robinson. <sup>1</sup>Department of Public Health, Policy and Systems, University of Liverpool, Liverpool, UK; <sup>2</sup>Department of Sociological Studies, University of Sheffield, Sheffield, UK

10.1136/jech-2021-SSMabstracts.14

**Background** Children in state care face a range of adverse health outcomes, throughout the life course, relative to the general population. In England, over the last decade, the rate of children entering care has increased. The rate of change differs markedly for older and younger children, who may experience very different preventative services. Policies trailing the 2008 recession have led to inequitable reductions in spending on these services. Our aim was therefore to assess the impact of cuts to prevention on rates of preschool children and adolescents entering care between 2012 and 2019.

**Methods** Our outcomes were annual rates of children entering care across 150 English local authorities (LAs) (2012–19) for those aged 1–4, and young people aged 16–17. For the younger age group, count data were drawn from the Department for Education 'children looked after data return'. For the older age group, a Freedom of Information request yielded count data excluding unaccompanied children seeking asylum, whose care status will be largely unaffected by changes in our exposure of interest. Our exposure was age-relevant Children's Services prevention spend (2011–18), taken from LA expenditure outturns. Regression models were used to quantify, within LAs, associations between changing prevention spend and changing rates of children entering care the following year, while controlling for employment and child poverty rates. Models were estimated using the 'panel' package, R version 3.6.3.

**Results** We found no association between changing prevention spend and changing rates of 1–4 year olds entering care. However, spending reductions were associated with rising rates for adolescents. We estimate that every £10 per child decrease in prevention spend was associated with an additional 1.9 per 100,000 children aged 16–17 entering care the following year (95% CI 0.7, 2.9). According to our model, between 2012 and 2019, approximately 1 in 25 care entries in this age group were linked to the cuts.

**Conclusion** This study offers evidence that rising rates of older children entering care were partly driven by cuts to prevention services. These children face significant health and social risks in adulthood. Policies to tackle adverse trends in adolescent care entry should promote reinvestment in youth services, placing ordinary help on a robust statutory footing. We did not find comparable evidence for the younger age group, for whom rising poverty may be more important risk factors for care entry. Limitations, including issues relating to aggregate data, data quality and specification of causal lags, are assessed.

**OP15 HOUSING DISADVANTAGE IN CHILDHOOD AND HEALTH: A SYSTEMATIC REVIEW**

Yuxi Li\*, Rebecca Bentley, Ankur Singh, Ludmila Fleitas Alfonso. Melbourne School of Population and Global Health, The University of Melbourne, Melbourne, Australia

10.1136/jech-2021-SSMabstracts.15

**Background** Housing has been recognised as one of the most important determinants of health. While there is evidence that housing disadvantage can influence social and behavioural outcomes for children, little is known of the contribution of these pathways to children's health and wellbeing. This review aims to provide a synthesis of evidence from longitudinal cohort and interventional studies linking experiences of disadvantaged housing in childhood to health outcomes

**Methods** A literature search was performed on four databases including Medline (Ovid), EMBASE (Ovid), PsycINFO (Ovid), and Web of Science from 2000 to 2020. Peer-reviewed longitudinal studies assessing the association between housing disadvantage (physical quality, affordability, and instability) in childhood and subsequent physical and mental health were included. The methodological quality of selected studies was appraised using the ROBINS-I (Risk Of Bias In Non-randomised Studies - of Interventions) tool. A narrative synthesis was developed due to study heterogeneity.

**Results** Forty-five cohort studies met the inclusion criteria. The majority of the studies was evaluated to have a moderate risk of bias. The most studied housing exposure was residential mobility, followed by overcrowding and housing tenure. Other exposures examined in the set of eligible studies include housing facilities (e.g., ventilation, toilet), inadequate heating and self-rated housing condition. Most studies assessed multiple health outcomes, including mortality, respiratory health, substance misuse, subjective measures of health, diagnosed mental disorders, cardiovascular diseases risk factors, and healthcare utilisation. Across the studies, while many relationships remained mixed, consistent evidence of detrimental impact was identified between: poor housing conditions and mortality and self-rated health; inadequate heating and respiratory illness; poor ventilation and all-cause mortality; frequent residential moves and psychiatric mortality and morbidity. Little evidence is found between overcrowding in childhood and health outcomes.

**Conclusion** Evidence from longitudinal studies indicates that poor housing experience in childhood may impact health later in life. The findings confirm that housing as a key social determinant of child health, and interventions designed to mitigate housing disadvantage may have significant health gains across the life span.