

Health & mortality abstracts

Strand organiser: Dr. José Manuel Aburto (University of Oxford, London School of Hygiene & Tropical Medicine)

1.30pm Monday 5 September: Environmental exposures, behaviours and health

The long-term effect of air pollution on mortality by ethnicity in Scotland: A 16-years follow-up cohort study (2002-2017)

Mary Abed Al Ahad¹, Urška Demšar¹, Frank Sullivan², Hill Kulu¹; ¹School of Geography and Sustainable Development, University of St Andrews, ²School of Medicine, University of St Andrews

Research on air pollution, health and mortality is often characterised by spatial-temporal limitations related to ecological bias, spatial-autocorrelation, and between-within (spatial-temporal) causality measures. Research on the long-term (10+years) effect of air pollution on mortality by ethnicity is also lacking in Europe. Using cohort data on 202,200 individuals aged 17+ (2002-2017; N=2,821,300 person-years; n=42,400 total-deaths) from the “Scottish-Longitudinal-Study (SLS)” linked to annual NO₂, SO₂, PM₁₀, and PM_{2.5} pollution data at the residential postcodes level, our study applies a between-within longitudinal design to investigate the association of 16-years exposure to air pollution and all-cause and cause-specific mortality by ethnicity in Scotland. Cox Proportional-Hazard models with age as timescale were used to assess the association between air pollution and all-cause, cardiovascular, respiratory, cancer, mental/behavioural disorders, and other-causes mortality. All models accounted for spatial-autocorrelation of air pollution between neighbouring postcodes using Local-Geary’s C score. Results showed higher hazard-ratios for all-cause, cardiovascular, respiratory, cancer and other-causes mortality with increasing concentrations of air pollutants. Mortality from mental/behavioural disorders was only associated with SO₂ pollutant (HR=1.047; 95%CI=1.020-1.074). Decomposing air pollution into between (16-years average pollutant-concentration between postcodes) and within (annual deviation of pollutant-concentration from the 16-years average within each postcode) effects, revealed significant between but not within effects for all pollutants on mortality. Thus, the effect of air pollution on mortality is a spatial-oriented one and causality cannot be claimed for this association. Analysis by ethnicity did not reveal differences in the effect of air pollution on all-cause and cause-specific mortality between not-white versus white individuals.

Email: maaa1@st-andrews.ac.uk

Under the weather: The effects of outdoor work on health for postal workers and metropolitan policemen, 1860-1908

Joe Chick; Kings College London

While very different occupations, Victorian and Edwardian postal work and policing shared some of the same physical and mental demands. London postal workers and Metropolitan policemen worked outdoors in all weather, breathing the capital’s air, and surrounded by its busy traffic. The duties were physically demanding and had long hours, often involving night work. During the nineteenth century, a pension scheme was introduced for both sectors, combined with medical examinations to judge eligibility for retirement with a pension. This paper uses these pensions records, alongside death certificates and the annual reports of the Metropolitan Police Commissioners and the Post Office’s Chief Medical Officer, to compare health and sickness trends between the two occupations. Across the nineteenth century, increasing attention was paid to the impact of work on health. Professions that posed a significant risk of physical injury, such as mining and factory work, received particular attention. There were also comments by contemporaries on the health repercussions of more day-to-day activities, even if working conditions could be slow to respond to these concerns. Through an examination of pension records, it is possible to uncover the health conditions that led to early retirement among postal workers and policemen. Whereas much scholarship has explored causes of death, these records shed light on the less studied topic of lifetime health.

Email: joseph.chick@kcl.ac.uk

Mortality trends due to substance abuse in high-income countries

Adarsh; Max Planck Institute for Demographic Research; University of St. Andrews

Since the late 1900s, there has been a significant rise in substance abuse mortality in many of the high-income countries. While a bulk of research has been done on drug-related mortality, it has mainly focused around the opioid crisis in the USA and the stagnation of life expectancy. This study tries to situate the substance abuse mortality across high-income countries, shows how the mortality trends vary across countries with type of substance used and attempts to show an underlying cohort phenomenon driving the substance abuse behaviour both in consumption and subsequent deaths. Data from World Health Organization and Human Mortality Database (HMD) were combined to get age standardized mortality rates for the period of 1990-2016 to compare and group 28 high-income countries of interest based on their geographical location and cultural similarities. Mortality smoothing was done using p-splines and data from Human Cause of Death database was used for cross validation in select cases. Results show that there has been a consistent increase in drug related mortality in anglophone countries over time. Whereas the alcohol related mortality is dominated by eastern European countries. Isolating Scotland from other territories of United Kingdom shows underestimation in existing literature as it shows distinct and increased mortality trends irrespective of substance type. A Lexis surface-based visualization shows cohort driven patterns which challenges the general idea of substance abuse mortality being a period phenomenon. The results can be further developed for APC using suitable constraints and tested for suitable demographic variables.

Email: adarsh@demogr.mpg.de

The right place: Housing conditions, environmental inequalities and risk of suicide in Belgium.

Joan Damiens, Université Catholique de Louvain

The objective of this research is to estimate the association between environmental quality (in terms of housing conditions, of neighbourhood quality and the relative housing quality compared to the neighbourhood) and suicide risk in Belgium. Based on the coupling of the Belgian Census of 2001, the National Register and the death certificates, housing and neighbourhood quality scores were calculated thanks to Principal Component Analysis. Logistic regression models estimated the risk of suicide of the 25 to 69-year-old adults living in Belgium, according to the housing scores deciles, the neighbourhood score deciles and the relative housing quality, compared to the median housing score of the statistical sector. Results show a lower suicide risk for the population living in high-quality housing, compared to the population living in poorer housing conditions, for both sexes, after controlling for age, household composition, nationality, educational level and occupation. No association was visible between the satisfaction over neighbourhood amenities or services and suicide risk. For men only, presenting a lower housing quality score compared to the average standards of the neighbourhood is associated with a higher risk of suicide, even if, at the national level, the housing score is high. This article confirms a negative association between housing conditions and mortality by suicide. This relation might also depend on the social comparison between neighbours: living in a place that is comfortable, but not as comfortable as the neighbourhood standards, is associated with a higher suicide risk than fitting in the housing quality norm of the neighbourhood.

Email: joan.damiens@uclouvain.be

4.45pm Monday 5 September: Early life health and mortality

The inclusion of stillbirths in demographic estimates of child mortality

Payal Hathi; University of California, Berkeley

Similar factors cause both early neonatal mortality and stillbirth, and most stillbirths are preventable. Yet, stillbirths are not counted in current summary measures of mortality, such as life expectancy and child

mortality. This is paradoxical and mischaracterizes overall population health challenges because it implies that a population in which many babies are stillborn is equally healthy as one in which those same babies survive. In this article, I discuss common arguments against including stillbirths in current measures of mortality. Using stillbirth data from reproductive calendars in Demographic and Health Surveys across 42 countries in Asia, Latin America, and Africa, I calculate “stillbirth-adjusted” infant and neonatal mortality rates to show the substantial portion of early-life mortality that does not traditionally get counted. These findings have implications for population theory, forcing us to reconsider underlying assumptions in demographic measurement. They also allow for a more complete assessment of the health of societies.

Email: phathi@berkeley.edu

Do municipal contexts matter for adolescent mental health? Evidence from Norwegian Ungdata survey
Baeksan Yu¹, Tilmann von Soest², Ragnhild Bang Nes¹; ¹Norwegian Institute of Public Health; University of Oslo, ²University of Oslo.

Background: Despite growing concerns about socio-economic gaps between regions in many developed nations, little attention has been paid to how municipality characteristics influence adolescent mental health. Moreover, research on how risk factors for mental health problems are interacting with such contextual-level factors is scarce. In the present study, we leverage rich Norwegian datasets in a multilevel fixed-effects framework to improve our current understanding of contextual factors in adolescent mental health development. This study is the first that provides longitudinal within-associations between municipal factors and adolescent mental disorders, with large scale data. Methods: We use data from the nationwide Norwegian Ungdata surveys linked to the Municipality-State-Reporting database KOSTRA (2014-2019, N = 278,764). Ungdata is designed to conduct youth surveys at the national and municipality levels in Norway. We examine the relationships between municipal factors and both adolescent depressive symptoms and self-esteem in a three-level hierarchical linear model framework, exploiting within-variations of municipal characteristics. Such a within-municipality approach is particularly valuable to identify the nature of the association between municipality level variables and adolescent well-being, because it disentangles stable between-municipal differences from within-municipal effects. Results: Our study contributes to an emerging adolescent mental health research that looks beyond the individual level to examine the contextual determinants or social structures of mental health outcomes. We show that municipal contexts (e.g., levels of safety and youth culture), beyond individual factors, may play important roles in promoting adolescent mental health, even in the contexts characterized by low inequality and high redistribution.

Email: baeksan.yu@fhi.no

Adolescent mental health: Are there differences between adolescents conceived naturally and through Medically Assisted Reproduction?

Alice Goisis, Maria Palma; University College London

The number and proportion of children conceived through Medically Assisted Reproduction (MAR) is steadily increasing yet the evidence on their mental health is inconclusive. We use the U.K. Millennium Cohort Study (N=9,897 individuals, of whom 298 were conceived through MAR) to investigate whether adolescents conceived through MAR are more likely than their naturally conceived peers to experience mental health problems, and whether this association is confounded and/or mediated by their family characteristics. We relied on mental health indicators at age 17 using validated scales of psychological distress (Kessler, self and parent reported SDQ) and cohort member’s report on self-harm and suicidal attempts. To investigate mental health in broader terms, we also investigate substance abuse and antisocial behavior. The unadjusted analyses show that adolescents conceived through MAR have similar mental health outcomes to naturally conceived children. After adjustment for family socio-demographic characteristics and parental mental health MAR adolescents showed similar outcomes to naturally conceived adolescents in the self-reported measures but differences arose in their parental reports, with parents who conceived through MAR reporting their children had 0.31-1.48 higher scores in total difficulties, emotional symptoms, conduct and peer problems from the Strengths and Difficulties Questionnaire scales, i.e. had worse mental health outcomes than parents who conceived naturally. These findings highlight the importance of socio-demographic selection in explaining the

differences between MAR- and naturally conceived adolescents, and the relevance of obtaining a comprehensive understanding of the association by using reports not only from cohort members but also from their parents.

Email: maria.palma@ucl.ac.uk

Does a mother's empowerment matter for her child's survival? Evidence from the Ghana Demographic and Health Surveys

Josephine Akua Ackah¹, Rebecca Sear¹, Alba Lanau², Georges Reniers¹; ¹Department of Population Health, London School of Hygiene and Tropical Medicine, ²Center for Demographic Studies, Universitat Autònoma de Barcelona

Despite the efforts put forward to enhance the status of Ghanaian women in the past decades, studies that test whether a mother's empowerment matters for her child's survival have been inadequate. Furthermore, it is unknown whether the associative effect has changed over time. The study addresses these gaps using data from the three recent rounds of the Ghana Demographic and Health Surveys (2003, 2008 and 2014). Measures of empowerment used were women's decision-making, control over income and attitude to wife beating. Kaplan Meier (KM) survival estimates, log-rank tests and piecewise constant hazard models were used in analyzing the data. Interactions between the year of survey and empowerment indicators were used to test changes over time. Findings show lower risks of death for infants whose mothers had joint control over income, however, this was observed only for the 2008 and 2014 GDHSs. For women that had full control over their earnings, the mortality risks for their children were not different from those who had no control. There was also not a clear-cut pattern supporting higher justification of violence and higher child mortality risks. Additionally, between 2003 and 2014, there weren't statistically significant changes in the associative effects of women's decision making and attitude to violence on child survival. Further research is needed to understand contextual issues underpinning the observed results. In addition, interventions to enhance women's economic independence while promoting education and advocacy against domestic violence could be streamlined to capture socio-cultural and household dynamics to improve child survival.

Email: josephine.ackah@lshtm.ac.uk

9.00am Tuesday 6 September: Health conditions over the life course

Disability among UK adults, 2004-30: the role of housing tenure.

Michael Murphy; London School of Economics & University of Helsinki

Housing tenure has received little attention in discussions around population health. However, substantial differences exist between different housing tenures. In the UK, at age 60, over 60% of social renters report themselves as disabled compared with about 25% of owner occupiers and 35% of private renters (ONS Annual Population Survey (APS) for period 2004-2019, N = 1.8 million). Moreover, differentials between social sector renters and owner-occupiers have been increasing over time especially since 2010. Multivariable analyses To assess the relationship between housing tenure to disability, we fitted logistic regression models with housing tenure, demographic controls and variables identified as being associated with population-level disability: highest educational level (HiQual), occupationally defined socio-economic class (NSEC); economic activity; and partnership/marital status. We concentrate on those around the age of retirement, ages 60-69 using APS waves 2015-2019 only due to changes in data collected (N= 78,000). We use the "best" category as standard: Owner-occupied (Tenure); Managerial and professional (NSEC), Tertiary (HiQual); Partnered. The odds ratio for social renters relative to owners is considerably greater than for the other variables included, confirming a strong robust relationship with disability. [Supporting Charts given in Supplementary document] We present additional analyses using predictive margins. While the other variables included show the expected relationship with disability within each tenure group, these differentials are considerably smaller than those between tenure groups. We conclude by making forecasts of disability by tenure groups up to 2030 and discuss the implications of these findings in the light of housing and demographic trends

Email: m.murphy@lse.ac.uk

Only children's adult health

Jenny Chanfreau, Alice Goisis; University College London

Existing research has found that only children – here defined as individuals growing up without siblings – may be at risk of adverse health outcomes. Evidence from Sweden has documented elevated mortality, including mortality attributable to circulatory disease, among individuals without sibling. Meanwhile, other research has shown that the socio-economic profile of only children differs cross-nationally, suggesting that relative to those with siblings the outcomes of only children may also vary across contexts. We contribute to the literature by investigating health outcomes in the UK, a context where there is little existing evidence on only children's health in adulthood. With a focus on heart problems and measures related to elevated risk of cardiovascular disease in middle adulthood, we compare the outcomes of only children and those with siblings for three British cohorts born 1946, 1958 and 1970. Preliminary results indicate that the health outcomes of adult only children in the UK context do not differ from those of adults with siblings. Placing the findings in conversation with the wider literature on only children's circumstances and outcomes, the paper discusses possible explanations for the null finding in the UK in light of the group's greater risk of adverse health outcomes in other contexts.

Email: j.chanfreau@ucl.ac.uk

Childhood social disadvantage and premature mortality among the second-generation in Sweden, 1990-2018

Matthew Wallace, Eleonora Mussino; Stockholm University

Background: the second-generation represent one of the fastest growing and diverse sectors of young populations in a number of high and middle-income countries. Alarming, an emerging body of research reveals elevated mortality risks among the second-generation. Nearly all previous research has attempted to account for this excess by focusing on their adult socioeconomic position – notably inequalities in education and the labour market compared to ancestral natives – with mixed results. Motivation: no research has focused upon the role of childhood socioeconomic conditions – a crucial formative period in life that has been strongly linked to excess young adult mortality. Aim: to understand how multiple measures of childhood SEP affect the size and presence of the second-generation disadvantage. Data & Methods: we fit Cox PH models on Swedish population register data and study mortality among individuals from age 16 between 1990 and 2018. Preliminary results: the second-generation and second-generation mixed have a 33% and 25% higher risk of mortality than ancestral natives. Adjusting for mother's and father's education level explains one third of the excess among the second-generation but has no effect on the second-generation mixed. Next steps: to perform analyses separately by sex, specific parental origins and to examine additional measures of childhood SEP (including measures of household income, residential segregation and housing quality).

Email: matthew.wallace@sociology.su.se

(Un-) healthy ageing: Geographic inequalities in disability-free life expectancy in England and Wales

Paul Norman¹, Dan Exeter², Nicola Shelton³, Jenny Head³, Emily Murray³; ¹School of Geography, University of Leeds, ²School of Population Health, University of Auckland, ³Research Department of Epidemiology and Public Health, University College London

Health expectancies are an indicator of healthy ageing that reflect quantity and quality of life. Using limiting long term illness and mortality prevalence, we calculate disability-free life expectancy for small areas in England and Wales between 1991 and 2011 for males and females aged 50-74, the life stage when people may be changing their occupation from main career to retirement or alternative work activities. We find that inequalities in disability-free life expectancy are deeply entrenched, including former coalfield and ex-industrial areas and that areas of persistent (dis-) advantage, worsening or improving deprivation have health change in line with deprivation change. Aggregate socio-demographic attributes associated with health disadvantage are multifaceted such that it is difficult for interventions to target single variables. A mixed health picture for rural and coastal areas requires specific research.

Email: p.d.norman@leeds.ac.uk

1.15pm Tuesday 6 September: Intergenerational processes in health and mortality

When do parents bury a child? Quantifying uncertainty in the parental age at offspring loss

Diego Alburez-Gutierrez, Ugofilippo Basellini, Emilio Zagheni; Max Planck Institute for Demographic Research

Mortality decline in the context of the demographic transition is often portrayed as the harbinger of a progressively 'ordered' world in which deaths become more predictable. In this narrative, parents adjust their fertility because they are increasingly certain that their offspring will survive childhood. Here, we use formal demographic methods to evaluate whether the parental age at offspring loss does, indeed, become more predictable as a result of longer lifespans and lower fertility. Our study of selected countries for the 1850-2000 birth cohorts finds that, while offspring loss will become increasingly uncommon and be experienced at older parental ages, there is no evidence of reduced variability in the age at offspring loss. These results advance fundamental population theory and have policy implications in terms of supporting bereaved parents over different stages of the life course.

Email: alburezgutierrez@demogr.mpg.de

Intergenerational adaptation of adult mortality among refugees and their descendants

Matthew Wallace and Ben Wilson; Stockholm University

It is well known that immigrants generally have a lower risk of dying than native-born populations, whereas a similar mortality advantage is not experienced by the children of immigrants. However, little is known about the mortality of refugees and their children. This is an important omission, not least because many destinations have experienced an increase in the arrival of refugees over recent years, but also because forced migration has been theorised to have a significant impact on health and social welfare. Here, we carry out a case study of Sweden, using longitudinal register data for the whole population. These data allow a comprehensive analysis of mortality for refugees who arrived as adults (G1), or as children (G1.5), as well as the native-born children of refugees (G2). We study all deaths from 1997-2016 for the population aged 15-44 in 1997. The results show that there is evidence of a sizeable mortality advantage for G1 refugees, and that this advantage is similar to that experienced by other immigrants, but that it disappears for members of the G1.5 and G2 population. The higher mortality risks that are faced by children of refugees in early adulthood are not driven by cancers, accidents or suicides, but instead by circulatory diseases, other diseases and other external causes. The children of refugees from Sub-Saharan Africa and the Middle East face the greatest disadvantage, although it is somewhat smaller than the disadvantage faced by immigrants from the same regions who were not forced to migrate.

Email: ben.wilson@sociology.su.se

Does heritability of health risk behaviour among adolescents increase in fragile family contexts?

Philipp Dierker, Mine Kühn; Max Planck Institute for Demographic Research

Adolescent health risk behaviour is receiving particular attention in population health research because of the far-reaching consequences for later life. It is considered a cause of mortality as well as a cause of social problems such as crime, school dropout and poverty. While previous demographic research has focused on social predictors of health risk behaviour, it is important to note that significant genetic influences have also been demonstrated for each of these behaviours. We additionally assume that there are Gene-by-Environment interactions in the sense that heritability of health risk behaviour is lower in families with both biological parents than in single mother families. Causes may include trigger (single mother families provide favourable behaviour for genetic risk development), social control (stricter parental rules prevent realization of genetic risk), and compensation (parental warmth prevents genetic risk development). We investigate this on the basis of twin data from the German TwinLife study and use ACE variance decomposition models to

estimate the genetic variance components for smoking, alcohol consumption and drug use and further find out whether these are moderated by parental partnership status. Our results show clear patterns of increased heritability in single mother families. Our analyses reveal that for both smoking and drug use, genetic variance is significantly moderated by family type. For alcohol use, increased heritability is also present in single mother families, but the interaction is not significant. These results are robust even when socioeconomic status is held constant.

Email: dierker@demogr.mpg.de

Adult children's education and their older parents' health in Denmark. Is there a causal relation?

Cosmo Strozza¹, Margherita Moretti², Virginia Zarulli¹; ¹Interdisciplinary Centre on Population Dynamics, University of Southern Denmark, ²Department of Statistical Sciences & Department of Public Health and Infectious Diseases, Sapienza University of Rome

In the literature on health inequalities and intergenerational transmission of human capital, most studies focus on the influence of older to younger generations. Only a few studies examined how the socioeconomic status of the younger generations influence older generations in terms of health. If higher adult children's education is found to better older parents' health, investment in education can also serve, particularly in ageing societies, at improving the sustainability of welfare systems. In this study, we aim at understanding whether: (i) the education of adult children affects the physical and cognitive health of their old parents; (ii) there is a gender-specific pattern in this human capital transmission. We draw on SHARE data for Denmark and the linkage to the Danish National Registry, allowing to have exact information on parents' survival and both on parents' and children's education. To identify different subpopulations of longitudinal changes among the old parents, we will construct latent classes of physical and cognitive functioning trajectories over the follow-up period by using Growth-Mixture-Model (GMM). We will verify the presence of a causal relationship between the education of adult children and the health of their old parents through causal inference methods, such as the Instrumental Variables approach or Regression Discontinuity Design, using the Danish schooling reform.

Email: margherita.moretti@uniroma1.it

2.45pm Tuesday 6 September: The impact of Covid-19 on excess mortality and life expectancy

Bounce backs amid continued losses: Life expectancy changes since COVID-19

Jonas Schöley¹, José Manuel Aburto^{2,3,4}, Ilya Kashnitsky³, Maxi Kniffka¹, Luyin Zhang², Hannaliis Jaadla⁵, Jennifer B. Dowd², Ridhi Kashyap²; ¹Max Planck Institute for Demographic Research, ²University of Oxford, ³CPoP, University of Southern Denmark, ⁴London School of Hygiene and Tropical Medicine, ⁵University of Cambridge

The COVID-19 pandemic triggered an unprecedented rise in mortality that translated into life expectancy losses around the world, with only a few exceptions. We estimate life expectancy changes in 29 countries since 2020, including most of Europe, the US and Chile, attribute them to mortality changes by age group, and compare them to historic life expectancy shocks. Our results show divergence in mortality impacts of the pandemic in 2021. While countries in Western Europe experienced bounce-backs from life expectancy losses of 2020, Eastern Europe and the US witnessed sustained and substantial life expectancy deficits. Life expectancy losses were moderately correlated with measures of vaccination uptake. In contrast to 2020, the age profile of excess mortality in 2021 was younger with those in under-80 age groups contributing more to life expectancy losses. However, even in 2021, registered COVID-19 deaths continued to account for most life expectancy losses.

Email: jose-manuel.aburto@sociology.ox.ac.uk

The World Mortality Dataset: Tracking excess mortality across countries during the COVID-19 pandemic
Ariel Karlinsky¹ and Dmitry Kobak²; ¹Hebrew University of Jerusalem, ²University of Tübingen

Comparing the impact of the COVID-19 pandemic between countries or across time is difficult because the reported numbers of cases and deaths can be strongly affected by testing capacity and reporting policy. Excess mortality, defined as the increase in all-cause mortality relative to the expected mortality, is widely considered as a more objective indicator of the COVID-19 death toll. However, there has been no global, frequently updated repository of the all-cause mortality data across countries. To fill this gap, we have collected weekly, monthly, or quarterly all-cause mortality data from 121 countries and territories between 2015 to 2022, openly available as the regularly updated World Mortality Dataset, which is currently the main source of mortality data for the World Health Organization, Our World in Data and more. We used this dataset to compute the excess mortality in each country during the COVID-19 pandemic. We found significant excess mortality in 2020 and 2021 in many countries, with some also showing significant undercounting of COVID-19 death tolls. Our results highlight the importance of open and rapid all-cause mortality reporting for pandemic monitoring.

Email: karlinsky@gmail.com

A radically simple way to monitor life expectancy

Ilya Kashnitsky¹, Alexey Raksha², Jonas Schöley³, José Manuel Aburto^{1,4,5}; ¹Interdisciplinary Centre on Population Dynamics, University of Southern Denmark, ²Independent demographer, ³Max Planck Institute for Demographic Research, ⁴University of Oxford, ⁵London School of Hygiene and Tropical Medicine

Period Life Expectancy is the key summary measure of current mortality. Elimination of the direct influence of population age structure allows to meaningfully compare mortality levels and changes across the populations and over time. Calculation of life expectancy demands high quality detailed data on death and population counts disaggregated by sex and age. Such data is only available for the more developed countries. Moreover, even in the most developed countries, it becomes available with a considerable time lag. And for most countries across the world timely and high-quality deaths statistics is not available. In situations of mortality shocks such as the COVID-19 pandemic near real time mortality level comparisons are crucial. Building on the studied regularities of human mortality, we offer a method of reliable life expectancy short-casting based only on the time series of its previous values and the time series of total deaths counts observed in the population, not disaggregated by sex and age. The radical simplicity of the method allows to monitor changes in life expectancy in near real time, if time disaggregated (daily, weekly, or monthly) total death counts are available. This is work in progress, see <https://doi.org/10.31219/osf.io/g9mxt>

Email: ilya.kashnitsky@gmail.com

Changes in Danish life expectancy by living arrangement in 2020

Serena Vigezzi, Cosmo Strozza, Julia Callaway, Ilya Kashnitsky; Interdisciplinary Centre on Population Dynamics, University of Southern Denmark

On 13th of March 2020, in response to the first death officially due to COVID-19, the Danish government imposed a lockdown that would remain in full force for the following month and only gradually end. As schools, non-essential shops and places of work and leisure closed down, individuals suddenly spent a much larger share of their time at home and in the company of other household members. Living arrangements are known to be strongly tied with mortality, as partnered, and especially married, individuals tend to live longer than other groups. Here, we ask whether these inequalities remained unchanged in Denmark during the first lockdown. Using recently released, detailed register data on the whole Danish population, we will calculate the excess deaths during this period by sex and living arrangement. In this way, we plan to capture all deaths tied, directly or indirectly, to the pandemic. While some preliminary analyses suggest Denmark did not suffer significant excess deaths during those months, this overall result may be hiding remarkable differences between groups. Understanding whether specific groups experienced higher-than-normal mortality would not only highlight potential shortcomings in the handling of the pandemic in Denmark, but it may also help illuminate the mechanisms underlying mortality differentials by living arrangement in standard times.

Email: sevi@sam.sdu.dk

5.30pm Tuesday 6 September: Gender and sex gaps in mortality

Narrowing sex gap in mortality in seven European countries: Regional differences and cause-specific contributions

Markus Sauerberg, Sebastian, Klüsener, Pavel Grigoriev; Federal Institute for Population Research

Sex mortality differentials have been narrowing in recent decades in most European countries. This evolution can be ascribed to two different mechanisms. First, the cardiovascular revolution has started later among men. In recent years, mortality from heart diseases has been decreasing strongly for men, resulting in the narrowing of the sex gap in mortality. Second, women picked up smoking later as compared to men and the negative effects on mortality have caused increases in deaths from cancer for women. While previous studies have focused mostly on national analyses, our aim is to study the narrowing of the sex gap in mortality at the regional level. We use REDIM-data on cause-specific mortality by age, sex, and region for seven European countries from the early 1990s to 2019. The evolution of sex mortality differentials is examined on the basis of age-standardized death rates. Our first results indicate that men have experienced stronger mortality reductions than women, which mostly stem from improvements in heart diseases. Further, the narrowing of the sex gap can also partly attributed to increases in lung cancer death rates among women. Still, there is substantial regional variation, highlighting the importance of going beyond national level analyses.

Email: markus.sauerberg@bib.bund.de

Understanding the sex gap in lifespan uncertainty

Hampton Gaddy¹, José Manuel Aburto^{1,2}, Ridhi Kashyap¹; ¹University of Oxford, ²London School of Hygiene and Tropical Medicine

At the population level, lifespan uncertainty has a strong negative correlation with life expectancy; longer lives tend to be more certain ones. However, little research has disaggregated this correlation by sex. Using series of national period life tables, we report that men tend to have notably higher levels of (adult) lifespan uncertainty than women, conditional on levels of (adult) life expectancy. This tends to be due to men in recent decades exhibiting both old-age mortality improvements and persistently high young-adult mortality. We demonstrate this generality and some exceptions to it, and we plan on supplementing our work by analysing contributing causes of death. Our findings suggest an important, new dimension along which lifespan uncertainty should be studied.

Email: hampton.gaddy@nuffield.ox.ac.uk

How has the gender gap in life expectancy changed? The impact of age- and cause specific mortality in the Western Balkans 1975-2017

Dijana Spasenoska; London School of Economics and Political Science

Objective: To understand the age- and cause specific contributions to the gender gap in 8 Western Balkan countries in 1975-2017. Methods: Life-tables are calculated based on nationally available data. Data on underlying causes of death was obtained from the National Statistical Agencies and Arriaga's method was used to decompose the difference. Results: The findings show that the gap in life expectancy increased for all the countries during the study period, especially during the 1980s. However, unlike in other well studied Eastern European countries, where the increase in the gap could be attributed to the decrease in male life expectancy, in the countries studied the increase can be attributed to improvements in female life expectancy. Yet, the countries that have the highest life expectancy for both males and females, and lowest gender inequality, Slovenia and Croatia, have the highest gap in life expectancy in 2017, 5.8 years female advantage and 6.04 years respectively. This is predominantly attributable to the declining mortality rate due to cancers and cardiovascular diseases for females. In comparison, the gender gap in Macedonia, has remained low, 2.48 years in 1975 and 3.80 in 2017, reflecting the lower female life expectancy and the highest mortality rate due

to cardiovascular diseases for females in the region. Conclusion: This study's results are particularly important, not only because they characterize the age- and cause-specific contributions to the gap in life expectancy in the countries of Western Balkan, but also because they are set within the greater discussion of gender equality and health outcomes.

Email: d.spasenoska@lse.ac.uk

Temporary employment and well-being: the role of the family structure and gender in European countries
Olga Leshchenko; University of Konstanz

The relationship between employers and employees is changing due to the irrevocable globalization process, the decline in the labour unions power, technological developments, and social and demographic shifts in the societies. The change results in the rise of precarious work, which are jobs with high instability, temporary contracts, limited opportunities for professional growth, and insecure income. Due to these reasons, precarious employment, similarly to unemployment, can lead to worse physical and mental health outcomes. On the one hand, the family can play a buffering role, and having a partner might reduce the negative effect of temporary employment on well-being. On the other hand, the result might be gendered, and men with a spouse could experience even worse well-being outcomes due to inability to fulfil the breadwinning role. What is the association between temporary employment and subjective well-being? How do family structure and gender moderate this relationship in European countries? To analyze these relationships, I use European Social Survey Data from 2002 to 2018 and apply multilevel modelling. Preliminary results show that men in insecure employment and a spouse have a lower level of well-being than single men. Moreover, the effect is more pronounced among countries with more traditional norms regarding the role of men and women in society. Email: olga.leshchenko@uni-konstanz.de

9.00am Wednesday 7 September: Health and mortality in low-and middle-income countries

The good, the bad and the ugly: Biomarkers and anthropometric predictors of diagnosed diabetes among adults in Lesotho

Sally Sonia Simmons; Department of Social Policy, London School of Economics and Political Science

In Lesotho, where diabetes accounts for most non-infectious disease hospitalisations and the Basotho are the second most obese population in Africa, research on the prediction and diagnosis of adult diabetes using biomarkers and anthropometric indices is limited. The study, therefore, identified biomarkers and anthropometric indices that could accurately predict and detect diabetes in Lesotho. Using data from the Lesotho WHO STEPwise approach to non-communicable disease risk factor surveillance conducted in 2012, three lasso regression models were fitted to identify from the 23 indices, the best predictor and detector of diagnosed diabetes. Models one, two and three included all biomarkers, anthropometric indices, and biomarkers and anthropometric indices. The study revealed that relative fat mass (0.55) was the most accurate anthropometric predictor, and fasting plasma glucose (0.72) was the most accurate biomarker for predicting diabetes. Between these three models, fasting plasma glucose (0.92) was the most accurate predictor of diabetes. Also, model three (anthropometric indices only) produced the largest (0.16) proportion of false-negative self-reported diabetes. Diabetes and its association with biomarkers and anthropometric indices are complex public health challenges in Lesotho. Providing the most relevant biomarkers and anthropometric indices for diabetes prediction and detection is a significant public health and adult health promotion step in Lesotho.

Email: s.simmons1@lse.ac.uk

Women's community-level education and under-five survival in sub-Saharan Africa: a cross-country analysis
Chiara Puglisi; European University Institute

The importance of women's education for under-five survival has been widely demonstrated in the demographic literature. Research on the matter has largely focused on the mother-child dyad, but a strand of literature has focused on how the education of other women in the community can affect the survival of children during the first five years of life. The country-specificity of previous studies and the contradictory nature of their findings raise the need to further investigate the relationship. In light of this, in this study I employ multilevel logistic regression analysis and meta-analytical tools to explore Demographic and Health Survey (DHS) data on 30 Sub-Saharan African (SSA) countries. I do this to assess the robustness of previous findings and explore country-level differences in the role that community education among women plays on under-five survival, by investigating the extent to which a country's human development moderates such relationship. Moreover, I analyse whether women's community education is a more powerful determinant of survival during later stages of childhood, rather than infancy. Findings reveal substantial cross-national variation in the effect of women's community education on infant and child survival, and a small moderating role played by countries' human development in the relationship. Women's community-level education is found to constitute a more powerful protective factor for the survival of children aged 12-59 months, compared to children in their first year of life.

Email: chiara.puglisi@eui.eu

HIV Prevention Cascades highlight differences in interventions needed to support married and unmarried 15 to 24 year-old women (AGYW) at risk of HIV infection in Manicaland, East Zimbabwe

Simon Gregson^{1,2}, Louisa Moorhouse¹, Tawanda Dadirai², Rufurwokuda Maswera², Tafadzwa Museka², Phyllis Mandizvidza², Freedom Dzamatira², Blessing Tsenesa², Robin Schaefer¹, Constance Nyamukapa^{1,2};
¹Imperial College London, ²Biomedical Research and Training Institute

Background: 15-24 year-old women (AGYW) remain a key population for HIV prevention in sub-Saharan Africa but little attention is paid to the contrasting barriers faced by married and unmarried AGYW. Differences in intervention needs between the two groups were assessed by comparing their HIV prevention cascades (HPCs) in high prevalence populations in Manicaland, Zimbabwe. Methods: Data from a long-running general-population cohort (1998-2013) were used to compare HIV incidence rates in AGYW by marital status and sexual risk-behaviour. Data from a pilot sero-survey of HPCs (2018/19; N=9803) were used to construct condom cascades for each group and to compare gaps in the cascades and explanatory factors for these gaps. Results: HIV incidence was 2.51% (95%CI, 1.32%-3.71%) and 3.77% (2.63%-4.91%) in married and unmarried AGYW at higher risk, respectively, and 1.11% (0.85%-1.36%) in AGYW at lower risk. In 2018/19, 20.7% (440/2122) of uninfected AGYW were at higher risk of HIV; 53.4% (235/440) being married. 5.5% (13/235) and 61.5% (99/161) of married and unmarried AGYW at higher risk used condoms. The HPCs show much larger gaps in motivation and capacity to use condoms effectively for married AGYW (Figure 1); but the gap in condom access was larger for unmarried AGYW (Figure 2). Lack of risk perception, partner support and negotiating skills were major barriers for married women; lack of acceptable condom provision was the main access barrier for unmarried women. Conclusion: Married women constitute a large proportion of AGYW at risk of HIV infection in Manicaland and require different interventions to unmarried AGYW.

Email: sajgregson@aol.com

Understanding mobility limiting lower limb conditions in Nepal: Distribution and impact

Andrew Amos Channon¹, Mahesh Puri², Lucy Gates¹; ¹University of Southampton, ²CREHPA, Nepal

Introduction: Lower limb conditions (LLCs) encompass a wide range of issues like injuries, congenital abnormalities, and musculoskeletal issues that may result in pain, mobility limitation and psychological impact. These are likely to have consequences on individuals, households and society with impact to both health and economy. In Nepal, and around the world, the burden and pattern of LLCs is not well known. Data: A survey was conducted in three districts of Nepal in 2021 to assess the distribution of the burden of LLCs alongside their implications. 2525 households were surveyed, with 500 LLC sufferers aged 18+ asked detailed questions.

Results: Over the whole country, 26.6% of households reported that there was at least one person with an LLC residing there, with variation between districts. There was a strong age gradient, with older adults suffering more from musculoskeletal conditions, while younger adults suffering from the effects of injuries or trauma. Almost 60% of sufferers had stopped work due to their LLC, with 92% reporting that their work had been affected. Over a fifth of respondents had severe or extreme issues with cleaning or dressing, while a quarter felt that there were problems with getting involved in society. Conclusions: The scale of LLCs in Nepal is much higher than expected. LLCs affect all aspects of life, especially in a country where access to facilities of all types can be limited due to accessibility. LLCs are an issue that need to be understood while focusing on the drive towards Universal Health Coverage

Email: a.r.channon@soton.ac.uk

11.30am Wednesday 7 September: Covid-19 and population health

Impact of socioeconomic deprivation on SARS-CoV-2 spread in Italian provinces in different restriction levels: A longitudinal multilevel approach

Luca Dei Bardi^{1,2}, Anna Acampora¹, Mirko Di Martino¹, Marina Davoli¹, Nera Agabiti¹, Giulia Cesaroni¹;
¹Department of Epidemiology of the Lazio Region, ²Sapienza University of Rome

Background: Italy implemented a three-tier restriction system based on different levels of risk (yellow=medium; orange=medium-high, red=high) to face the second COVID-19 wave at the beginning of November 2020. Little is known whether the effect of the tiers was equal among provinces (NUTS-3) with different socioeconomic deprivation. We analyzed the SARS-CoV-2 daily reproduction number to estimate the effect of the province's deprivation at each restriction level. Methods: The daily reproduction number (R_t) was estimated as the instantaneous R_t using incidence data from the Civil Protection Department and considered as the dependent variable. Socioeconomic Deprivation (SED) was measured using the percentage of individuals whose yearly income was less than 10,000€ (2019 data from the Ministry of Economy and Finance) and used as the independent variable. To estimate the effect of SED on R_t and its Standard Deviation (SD), we used multilevel linear regression models with random intercepts stratified by restriction level. We adjusted for the number of days into the tier first and then for other covariates. Results: We found different trends of R_t by SED. More deprived provinces had lower increases in yellow (SED=0.0013 SD=0.0011; days=0.0073 SD=0.0010; days*SED=-0.0001 SD=0.0000) and orange (SED=0.0054 SD=0.0009; days=0.0106 SD=0.0009; days*SED=-0.0005 SD=0.0000), but slower reductions in red (SED=0.0018 SD=0.0013; days=-0.0294 SD=0.0012; days*SED=0.0003 SD=0.0000). Conclusions: Differences in reducing the spread of SARS-CoV-2 were found at the province level during the second outbreak, with the highest restriction tier having a stronger effect in less deprived provinces. However, lower tiers were more effective in more deprived provinces.

Email: l.deibardi@deplazio.it

Economic and social impacts of a raging pandemic. Years of life expectancy lost and productivity losses in Colombia

Rafael Navarro; Netherlands Interdisciplinary Demographic Institute/Groningen University

The novel coronavirus has been raging across the world since January 2020. After being declared as a pandemic in March 2020 by the world health organization, in this year the disease has left more than 55 million infections and 1.31 million deaths. Besides the huge cost in life and human loss, this current pandemic has had profound economic effects. Lockdowns have crippled industries, affected jobs, impoverished countries, and plunged the biggest economies into an economic shock. But the lasting effects of the pandemic will be profound and need to be studied. The life loss will have an impact in years of life lost given that the coronavirus is now, for some countries, one of the main causes of death. Mortality has an economic impact: death people are removed from the workforce and is possible to quantify the economic losses of this excess mortality produced by the novel coronavirus. Using the Arriaga method of Life years potentially lost, we can quantify the economic impact of excess mortality, in terms of productivity, current and future income losses.

The scope of the study will be focused on Colombia and Latin America. As the world grapples with the raging pandemic, it's crucial to anticipate the long-lasting effects of the pandemic and assess the true scope of the medium and long-term effects that are above the losses of life. There's a fertile research path to be walked in order to understand a new and shocking virus who were able to stop the world in its tracks.

Email: navarro@nidi.nl

Personal risk or societal benefit? Investigating adults' support for COVID-19 childhood vaccination

Chiara Chiavenna¹, Laura P. Leone¹, Alessia Melegaro^{1,2}, Tiziano Rotesi³, Scott E. Bokemper^{4,5}, Elliott E. Paintsil⁶, Aryn A. Malik^{6,7}, Gregory A. Huber^{4,5,8}, Saad B. Omer^{6,7,9,10}, Maria Cucciniello^{11,1}, Paolo Pin^{12,13};

¹Bocconi University, Dondena Centre for Research on Social Dynamics and Public Policies, ²Bocconi University, Social and Political Science Department, ³University of Lausanne, Department of Economics, ⁴Yale University, Institution for Social and Policy Studies, ⁵Yale University, Center for the Study of American Politics, ⁶Yale Institute for Global Health, ⁷Yale School of Medicine, ⁸Yale University, Department of Political Science, ⁹Yale School of Public Health, ¹⁰Yale School of Nursing, ¹¹University of Edinburgh, Business School, ¹²Università di Siena, Department of Economics and Statistics, ¹³Bocconi University, Bocconi Institute for Data Science and Analytics (BIDSA)

Parental hesitancy has undermined the success of childhood vaccination programs in recent years, and COVID-19 vaccines represent no exception. We analyse parents' and non-parents' self-reported probability of supporting COVID-19 childhood vaccination, and test whether their opinion can be influenced via two survey experiments in Italy (n=3,524 participants) and the UK (n=3,066 participants). Respondents were randomly assigned to: a "risk treatment" that highlighted the potential risks of COVID-19 to a child, a "herd immunity treatment" that emphasised the community benefits of paediatric vaccination, or a control message. Similar appeals have proven effective in increasing intentions to vaccinate among adults, but little is known for paediatric vaccination. Participants' probability of supporting vaccination (assessed on a 0-100 scale) had a mass-polarized distribution on the extremes, both among parents and non-parents, and across treatment groups. Specifically, in the UK, 18.7% of responses were concentrated on 0, and 19.0% on 100. Using the relative distribution method, we find the "risk treatment" to reduce the proportion of Italian parents strongly against vaccinating (0) by up to 29.6%, while increasing the proportion of neutral parents (50) by up to 45.0%. A non-significant similar tendency is observed among UK parents. The "herd immunity treatment", instead, was only effective among non-parents. Specifically, in the UK, up to 22.2% fewer non-parents were against vaccinating minors, while up to 16.1% more were in favour (100). These results demonstrate the potential of information treatments in addressing parental vaccine hesitancy, but also document the need to tailor their formulation to the targeted group.

Email: laura.leone@unibocconi.it

Significant impacts of the COVID-19 pandemic on race/ethnic differences in USA mortality

José Manuel Aburto, Andrea M. Tilstra (presenting), Ginevra Floridi, Jennifer B. Dowd; University of Oxford

We examine trends in lifespan inequality, average years of life lost, and the contribution of specific causes of death and ages to race/ethnic life expectancy disparities in the United States from 2010 to 2020. We find that life expectancy in 2020 fell more for Hispanic and Black males (4.5 years and 3.6 years, respectively) compared to White males (1.5 years). These drops nearly eliminated the previous life expectancy advantage for the Hispanic compared to White population, while dramatically increasing the already large gap in life expectancy between Black and White people. In 2020, lifespan inequality increased slightly for Hispanic and White populations, but decreased for Black people, reflecting the younger age pattern of COVID-19 deaths for Hispanic people. Overall, the mortality burden of the COVID-19 pandemic hit race/ethnic minorities particularly hard in the USA, underscoring the importance of the social determinants of health during a public health crisis.

Email: andrea.tilstra@sociology.ox.ac.uk
