Health & mortality strand

Strand organiser: Dr. Tiziana Leone (London School of Economics & Political Science)

Health & the life course. Tuesday 15 September 11.00am

Accumulative reproductive life histories and grip strength in Indonesia: 1993-2014 – *Tiziana Leone[1], Heini Vaisanen[2], Firman Witoelar[3], [1]London School of Economics, [2]University of Southampton, [3]Australian National University*

Reproductive histories put a burden on women's health. Pregnancies regardless of the outcome, as well as pregnancy and post-partum complications are known to create stress on bodies at least in the short term. So far the evidence on the impact of fertility on general health later on in life is mixed with low parity having a positive protective effect and no real significant effect on higher parities. There is a lack of studies taking into account pregnancies not ending in live births. Furthermore, this evidence is usually related to countries with low fertility and high standards of maternal health. We need to understand how decades of high fertility and high maternal morbidity and mortality in a low-income setting might have affected women's health. Using latent class models to analyse the first five waves of the Indonesian Family life Survey (IFLS) the aim of this study is to study the impact of cumulative reproductive histories on ageing, as indicated by grip strength later on in life. Preliminary results show a negative impact of the reproductive burden with terminations (spontaneous or induced) being the most significant factor. This study is set within the greater need to understand how high fertility might affect the ageing process of women in a low-income set

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The impact of exposure to air pollution on cognition among elderly people in China – *Kai Hu, University of St Andrews*

Background: Although most studies have established the association of air pollution with cognition, the effect of air pollution on elderly cognition is uncertain and this paper applied the Chinese context to untangle the relationship between air pollution and cognition. Methods: Data from the China Health and Retirement Longitudinal Study (CHARLS) were linked with satellite data at the city level from NASA according to the exact interview time and locations. In this study I chose 2 waves at year of 2013 and 2015. The association between air pollution and cognition was evaluated longitudinally with individual fixed effect regression models. Results: In fixed effect models, to explore the effect of transitory and cumulative exposure to air pollution, I run 4 models separately and each one applied the PM2.5 average of different short-term exposure. Specifically, in terms of recall memory, the coefficient of 3-month exposure is -0.664 but for mental status, the figure is -0.241 (95% CI: -0.019 - -0.002). The results show the strong association between long-term exposure to air pollution and cognition but depend on different measure for cognition. Conclusions: We provide evidences that the effect of air pollution on cognition was pronounced as elderly people age, especially for those with low socioeconomic status and from rural areas. Short-term effect of air pollution on cognition has no evidence in this study but long-term exposure to air pollution is more harmful. When an aging society is coming to China, it is crucial to improving the health of aging people, particularly for cognition that related to their daily life quality.

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Is having children bad for your health? The causal and unequal effect of reproductive history on hypertension in India – *Laura Sochas (London School of Economics)*

The burden of cardiovascular disease in Low-and-Middle-Income Countries (LMICs) is increasing. 80% of deaths by cardiovascular disease occur in LMICs, for which hypertension is the number one risk factor. Most of

the research on the determinants of hypertension, particularly in LMICs, has focused on behavioural "modifiable" risk factors, such as eating unhealthy food, smoking, drinking, and insufficient exercise. Much less attention has been paid to the impact of social stressors over the life course, such as reproductive history. This study uses the largest available DHS with hypertension biomarkers, India 2015-16 (>800,000 respondents), to causally investigate the effect of parity on hypertension. It applies an instrumental variable strategy developed by Angrist and Evans (1998), having a first and a second-born child of the same sex, as an instrument for having an additional third child, and conducts heterogeneity analysis by gender and by socio-economic status (wealth, caste). This type of heterogeneity analysis is particularly important in order to unravel social from biological pathways in the relationship between reproductive history and hypertension. This study's results are particularly important given that the repercussions of child-bearing for parents' own health and ageing beyond direct maternal mortality and morbidities, as well as inequalities therein, are so vastly under-studied.

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The impact of life course exposures to neighbourhood deprivation on health and well- being: a review of the long-term neighbourhood effects literature – ***Paul Norman[1], Stephen Jivraj[2], EmilyMurray[2], [1]University of Leeds, [2]University College London***

This review paper details a small but growing literature in the field of health geography that uses longitudinal data to determine a life course component to the neighbourhood effect thesis. For too long there has been reliance on cross-sectional data to test the hypothesis that where you live has an effect on your health and wellbeing over and above your individual circumstances. We identified 53 articles that demonstrate how neighbourhood deprivation measured at least 15 years prior affects health and wellbeing later in life using the databases Scopus and Web of Science. We find a bias towards US studies, the most common being the Panel Study of Income Dynamics. Definition of neighbourhood and operationalisation of neighbourhood deprivation across most of the included articles relied on data availability rather than a priori hypothesis. To further progress neighbourhood effects research, we suggest that more data linkage to longitudinal datasets is required beyond the narrow list identified in this review. The limited literature published to date suggests an accumulation of exposure to neighbourhood deprivation over the life course is damaging to later life health, which indicates improving neighbourhoods as early in life as possible would have the greatest public health improvement.

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Cumulative neighbourhood deprivation exposure and mid-life health trajectories – ***Stephen Jivraj[1], Emily Murray[1], Paul Norman[2], [1]University College London, [2]University of Leeds***

The neighbourhood in which we live is considered to be an important factor in our lives. We ask whether the neighbourhood in childhood is important for individuals' mid-life health trajectory and whether cumulative exposures to neighbourhood deprivation are more important than the current neighbourhood deprivation. We follow the 1958 NCDS and 1970 BCS birth cohorts for whom information was available about individual and contextual factors from at least age 16. We find that exposure to greater neighbourhood deprivation in childhood does predict worse health trajectories.

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Neighbourhood deprivation effects on body-mass index across the life course: structural equation modelling of data from two prospective British longitudinal birth cohorts – ***Emily Murray[1], Stephen Jivraj[1], Paul Norman[2], [1]University College London, [2]University of Leeds***

Living in a more deprived area is associated with worse health, at any stage of life. We use structural equation modelling to evaluate: (1) the neighbourhood effect, in which area deprivation directly affects individuals' health; and (2) health selection, in which people sort themselves into neighbourhoods over time by health. We

used data from the 1958 and 1970 British Birth. For both cohorts, BMI and area deprivation strongly tracked through life, and area deprivation predicted BMI at the next.

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Health & mortality: Determinants of health. Tuesday 15 September 4.00pm

The impact of housing conditions on mortality in Belgium (1991-2016) – *Joan Damiens, Université Catholique de Louvain*

In Western countries, including Belgium, life expectancy has increased over the last decades, as well as social inequalities in health and mortality. Existing research tends to approximate socioeconomic status with the educational level, occupational status or income. Housing is yet another socioeconomic factor that is much less considered when studying inequalities in mortality. Indeed, housing is a complex and multidimensional element impacting several aspects of a person's health and well-being (physical, mental and social). The data used in this research are the result of the coupling of the population censuses of 1991, 2001 and 2011 and the National Register. They cover the entire population of Belgium over 25 years. Through life tables analysis and multivariate logistic regression models, this research contributes to existing research by setting trends in housing conditions between 1991 and 2016 in relation to social inequalities in health and mortality over this period in Belgium. It shows that housing conditions have a specific effect on the risk of death, in addition to other socio-economic characteristics. On the 2011-2015 period, once controlling for demographic and socioeconomic characteristics (education, professional status and income), a 25% higher mortality rate separate tenants from owners on the one hand, and population living in low quality housing from those living in better quality housing on the other hand. Ensuring good housing conditions seems a necessary step to reduce inequalities that should be considered in social policies.

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Do longer lives mean better health in Spain? Recent trends in disease-free life expectancy at age 65 years – *Pilar Zueras, Elisenda Rentería, Centre d'Estudis Demogràfics, Universitat Autònoma de Barcelona*

Life expectancy in Spain is among the highest in the world. Nevertheless, we don´t know if improvements in health conditions in older ages have followed death postponements. Studies in Spain show a stable trend in years lived in ill health in the past. To assess if there has been a compression of morbidity, this study examined changes between 2006, 2012 and 2017 in life expectancy with and without diseases for men and women aged 65+ in Spain and regions, as these have competences on health planning. We focused on the prevalence of 10 specific health conditions: cancer, stroke, myocardial infarction, heart disease, diabetes, hypertension, cholesterol, chronic back pain, asthma and chronic obstructive pulmonary disease. We used the Sullivan method to estimate life expectancies with and without disease to a sample of 20,455 individuals aged 65 or older who participated in one of the National Health Surveys of 2006 (n=7,717), 2012 (n=5,815) or 2017 (n=6,923). Results showed expansion of almost all diseases, although it has been different by region and sex. The regional analysis unveiled that over time women outperformed men in some areas, which points to expanding this type of analysis. Sex differences could result of changes in the population composition, led by diverging trends in health-related behaviors for men and women, or to greater benefits of women than men from changes in the health provision of services. Moreover, regional differences in HLE decreased between 2006 and 2012 and widened by 2017, suggesting differences in getting through the financial crisis.

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The trend in mean height of Guatemalan women born between 1945 and 1995: a century behind - ***Astrid Arriaza, Hambidge, Krebs, Garcés, Amos Channon, University of Southampton***

Background: Access to health care preserves population wellbeing and promotes health equity. Health care services arranged across levels of care are required to treat health conditions across the life course. Progress towards health care equity policies would benefit from better understanding about realised access to health across the life course, especially among the Global South countries. Objective: To explore the coverage and variations for health care seeking behaviour and utilisation levels over the life course for primary and secondary public health care services in rural Guatemala. Methods: Individual level data from administrative records, including demographic characteristics and visits to the public health care facilities located within a limited catchment area at four geographies in rural Guatemala. Multilevel binary logistic regression and negative binomial models adjusting for individual characteristics are used to model health seeking behaviour and utilisation levels, independently for the two levels of the health care. Findings: Realised access to public health care services in rural areas is limited with further reduction for secondary services provided by a physician. The population groups using public health services suggest that the provision of services is mostly for children and women at reproductive age, for both levels of care. A high proportion of the population is being underserved, thus indicating that the public health care services lacks horizontal health care equity. Furthermore, lower utilisation amongst older population groups, indicates that the provision of public health care services also lacks vertical health equity. Those with greater need do not have greater access to services.

Sex and socioeconomic disparities in the development of multimorbidity in Scotland: the benefits of applying a sequence based, longitudinal approach – ***Genevieve Cezard, Frank Sullivan, Juliana Bowles, Kathleen Keenan, University of St Andrews***

To understand health inequalities, we need to go beyond the single disease framework. Multimorbidity, defined as the cooccurrence of two or more chronic diseases, has been shown to be more prevalent in older population, in women and those with lower socio-economic status (SES). Most multimorbidity research remains cross-sectional, typically aiming to identify disease clusters at a single point in time. We aim to investigate the social patterning of multimorbidity trajectories in Scotland both cross-sectionally and longitudinally. We used the Scottish Longitudinal Study (SLS), which links censuses (2001 and 2011) to hospitalisation, diabetes and cancer register data to identify multimorbidity and disease trajectories over 10 years (2001-2011). Our cohort focuses on 120K individuals aged >=40 years in 2001. Educational level in 2001 and the Scottish Index of Multiple Deprivation (SIMD 2004) were used as SES proxies. We explored sex and SES inequalities in multimorbidity using Poisson regression. Men and those with lower individual and neighbourhood SES were more likely to be multimorbid. Using sequence analysis to characterise multimorbidity trajectories as well as sex and SES inequalities in diverse disease trajectories, we expect these same groups to experience faster levels of multimorbidity accumulation and specific disease trajectories. This study highlights the influence of the timing of and sequencing of disease onset in shaping social health inequalities in later life and the need to go beyond a cross-sectional approach in researching multimorbidity differences. It also provides a characterisation of multimorbidity progression through the application of sequence analysis used in life course studies.

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Health & mortality: Population health. Wednesday 16 September 11.00am

Identifying geographical heterogeneity of under-five child nutritional status in districts of India - ***Monirujjaman Biswas, Jawaharlal Nehru University, India***

The nutritional status of under-five children often cited as a sensitive indicator of household's living standard as well as economic condition and also an important determinant of child survival. Despite India has already

achieved a remarkable progress in reducing child malnutrition, progress toward reducing the number of malnourished children has been sluggish. improvements in nutrition still represent a massive unfinished agenda. OBJECTIVE: The objective of this study identified the place-specific spatial dependencies and heterogeneities in the associations between socio-economic and demographic factors and nutritional status among under-five children in India. The study used a geocoded database from the fourth wave of National Family Health Survey (NFHS-4 2015–16) data for 640 districts. The dependent variables were stunting, wasting and underweight. Moran's I and univariate LISA were used to confirm the spatial autocorrelation and clustering of nutritional status. Multivariate Ordinary least square (OLS), Geographically weighted regression (GWR), spatial (lag/error) models were employed to decrypt the determinants of under-five nutritional status. Overall, the prevalence and spatial clustering (Moran's I statistics) of stunting, wasting and underweight were 38% (0.634), 21% (0.488) and 36% (0.721), respectively. GWR results disclosed that the relationships between the outcomes and its covariates were significantly place-specific and spatially clustering in terms of their respective magnitude, direction and strength. Regarding model performance and prediction accuracy, GWR better fit compared to traditional OLS models. The findings of the present study identified district-level nutritional conditions (hotspots) in India, where children are under severe risk of malnutrition can help health professionals, planners and policymakers in designing and implementing effective place-specific health policies to improve district-level under-five nutrition status in India.

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Is it better to intermarry? Ethnic composition of marriages and suicide risk among native-born and migrant persons in Sweden - ***Anna Oksuzyan[1], Siddartha Aradhya[2], Jennifer Caputo[1,3], Sven Drefahl[2] , [1]Max Planck Institute for Demographic Research, [2]Stockholm University, [3]Center on the Demography and Economics of Aging, the University of Chicago***

Marriage is protective against suicide across populations, including for persons of different ethnicities and immigrant backgrounds. However, the well-being benefits of marriage are contingent upon marital characteristics—such as conflict and quality—that may vary among persons of different migration backgrounds in interaction with the migration background of their spouse. Leveraging Swedish register data, we compare suicide mortality hazard among married persons on the basis of their and their spouse's migration background. We find that relative to those in a native Swede-Swede union, Swedish men married to female immigrants and immigrant women married to native men are at higher risk of death by suicide, while immigrants of both genders who are married to someone from their birth country have lower suicide mortality. The findings support hypotheses about the strains that may be encountered by those who intermarry, as well as the potential selection of individuals into inter- and intra-marriages**.**

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Differentials in self-assessed health by generation: cross-country comparisons – ***Marion Burkimsher, Independent researcher affiliated with the University of Lausanne***

In the first wave of the Generations and Gender Surveys, which were mostly carried out around 2004-2006, respondents were asked to give a self-assessment of their general health status, from 1 (very good) to 5 (very poor). We have data from twelve countries, four in Western Europe and eight in East Europe, plus East and West Germany. We calculated the moving average health 'score' for each cohort from those born in 1935 to the 1980 cohort (so aged about 25-70 at the time of the survey). For the oldest respondents, those residing in the Eastern European countries were clearly less healthy than their contemporaries in Western Europe, with men and women from Georgia having the worst scores. However, when we compare the health status of the younger generations we see marked changes in the ranking of the countries. Russia has replaced Georgia as the least healthy country for young people in their 20s, whilst the Netherlands, which has very healthy older people, barely scrapes average marks for their young people. For women there is a cluster of countries all vying for healthiest young people: Hungary, Germany (where there is now little difference

between the old East and West Länder), Romania and Bulgaria. Norway ranks surprisingly poorly: the youngest generation is third from the bottom for females and second from bottom for males. Young people in Switzerland are also in the bottom half of the country rankings, although their older people are second in health only to the Netherlands.

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Establishing the contributions of international immigrants to total population health in the Nordic countries – *Matthew Wallace[1] (presenting), Sven Drefahl[1], Michael J Thomas[2], Astri Syse[2], Laust Hvas Mortensen[3], Jose Manuel Aburto[4],[1]Stockholm University, [2]Statistics Norway, [3]Statistics Denmark, [4]University of Southern Denmark*

Background: international immigration to rich countries is responsible for around two thirds of migration globally and accounts for most of the growth of the world's population of international immigrants since the turn of the millennium. A recent review, conducted as part of the UCL-Lancet Commission on Migration and Health, showed that immigrants in rich countries often have lower average mortality than native-born populations do. Despite being pervasively observed, few studies have ever progressed beyond trying to determine whether or not this mortality advantage exists. However, with sizeable and increasing shares of immigrants in rich countries, there is a growing need to explicitly consider the role of international immigrants in national mortality patterns, international mortality rankings, and health and pension systems. Aim: to quantify the role of international immigration in overall population health in the five Nordic countries. Data and methods: we use register data from the five countries over three decades, from 1990 to 2018. We calculate annual life expectancies at birth by sex for the total population and for native-born only and class the difference between these two figures as the contribution of immigrants to overall population health. Findings: we reveal a dynamic and growing role of immigrants in population health that should resonate strongly in other rich countries that have large immigrant shares and raise questions about the future role of immigration in key host country systems.

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Health & mortality: Access to health care. Wednesday 16 September 1.00pm

Exploring geographical variance of complete immunization coverage in India: A district-level spatial modelling approach - *Monirujjaman Biswas, Jawaharlal Nehru University, India*

This study aims to explore place-specific spatial dependencies and heterogeneities in the relationships of various factors on the district-level full immunization coverage in India. The study used a geocoded database for 640 districts of India, drawn from the 4th wave of the National Family Health Survey (NFHS) in 2015–16. Univariate Moran's I and LISA maps were used to confirm the spatial autocorrelation and geographical hotspots of the district-level full immunization coverage. Multivariate Ordinary Least Squares (OLS) and Geographically Weighted Regression (GWR) models were employed to examine spatial relationships and decrypt location-based district-level analysis. The prevalence of full immunization care was 62 percent as per the national figure. The GWR results revealed that the relationships between the outcome and set of cofactors were significantly place-specific and spatially clustering in terms of their respective magnitude, direction, and differences in due to local characteristics across India. In terms of model performance and prediction accuracy, the GWR model was performing better over OLS estimates through comparisons of R2 and Akaike Information Criterion (AICC) in both models. Furthermore, the GWR model also improves the reliabilities of the relationships by reducing spatial autocorrelations. The findings suggest that the local GWR model has the potential to explain complexities in place-specific variations that could be ignored by OLS on the local causes of immunization coverage. Highlighting the socio-economic importance's on the spatial dependence and

heterogeneity, appropriate intervention should be devised to safeguard the child from vaccine-preventable diseases reduce the geographical heterogeneity of full immunization coverage across India.

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Understanding variations in health care seeking behaviour for primary and secondary public health care services in rural Guatemala - *Astrid Arriaza, University of Southampton*

Background: Access to health care preserves population wellbeing and promotes health equity. Health care services arranged across levels of care are required to treat health conditions across the life course. Progress towards health care equity policies would benefit from better understanding about realised access to health across the life course, especially among the Global South countries. Objective: To explore the coverage and variations for health care seeking behaviour and utilisation levels over the life course for primary and secondary public health care services in rural Guatemala. Methods: Individual level data from administrative records, including demographic characteristics and visits to the public health care facilities located within a limited catchment area at four geographies in rural Guatemala. Multilevel binary logistic regression and negative binomial models adjusting for individual characteristics are used to model health seeking behaviour and utilisation levels, independently for the two levels of the health care. Findings: Realised access to public health care services in rural areas is limited with further reduction for secondary services provided by a physician. The population groups using public health services suggest that the provision of services is mostly for children and women at reproductive age, for both levels of care. A high proportion of the population is being underserved, thus indicating that the public health care services lacks horizontal health care equity. Furthermore, lower utilisation amongst older population groups, indicates that the provision of public health care services also lacks vertical health equity. Those with greater need do not have greater access to services.

Applying social capital framework in examining the role of transport system and health facility services in shaping child survival in a resource-poor setting - *Rornald Kananura Muhumuza, Tiziana Leone, Arjan Gjonca*, *London School of Economics*

Transport systems (enabling infrastructures and availability of transport services) and health facilities are community resources that contribute to the wellbeing of the population. Using multimethods' qualitative data, we apply Social Capital (SC) framework to examine the contribution of transport systems and health facility services in shaping children's survival in a resource-poor setting. Data were collected between June-November 2019 in Iganga and Mayuge district in Eastern Uganda through in-depth interviews(20) with women who experienced child loss in the last 4 months prior to the month of interview, focus group discussions(10) community women and men, and key informant interviews(42) with local transporters, traditional birth attendants, formal health workers, ambulance drivers and community leaders. Our interaction with the community, health facility and district level study participants revealed transport systems and responsive health facilities as substantial mediators of access to required health facility services. Because of unreliable transport systems and unresponsive health facilities, deaths and unassisted deliveries en-route to and at the facility were cited. Other identified SC resources were civil society (provided services that included voucher for maternal and new-born services, programs for motivating women to access services and drug subsidies at the community level), community transporters, politicians (purchased community ambulances), government, and other community and family networks such as community health workers and husbands. These results emphasise the need for addressing the transport systems and recurrent inadequate health facilities' amenities. Leveraging on existing community networks including community transporters and community health workers are crucial in promoting access to child's health services.

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An investigation into factors associated with delivery and repair of prostheses in a Cambodian clinic –
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Background: The need for prostheses in Cambodia is mainly served through NGO providers. There is a high need due to mines, road traffic accidents and increasing diabetes. Little is known in LMICs about the supply of prostheses, including the profile of those who access services, how often they are repaired and the socio-demographic factors related to access to prosthetic services. Methods: A unique dataset from Exceed Worldwide is used, a charity supplying prostheses across South and South-east Asia. Client data from one clinic is used, indicating dates of prothesis delivery and repair between 1993 and 2019. Other factors include age, gender, work role, date of amputation and prosthesis type. Distance between home and the clinic has been measured to assess if this is related to repair frequency and to understand access issues. Survival analysis is used to analyse replacement devices, while recurrent-event survival analysis is applied to study the frequency of repairs. Results: The mean number of different prostheses that each client has is 3.3, with each device lasting on average about 3 years. Younger, female clients have their devices replaced more often than older, male clients. There is about a year gap between repairs to devices, with younger female wearers who have newer prostheses with more frequent repairs. The identification of distance to travel is ongoing. Discussion: There are differences between groups in the supply of prosthetics. The results from this study allow an exploration of lifetime cost of different types of prosthetic as well as highlighting underserved groups.

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