

## Posters

Session organiser: BPS Secretariat

In alphabetical order of first author:

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**18:30 – 20:00 Monday 11 September**

**The spatial-temporal effect of air pollution on individuals' reported health and its variation by ethnic groups in the United Kingdom: A multilevel longitudinal analysis**

**Mary Abed Al Ahad; Urška Demšar; Frank Sullivan; Hill Kulu; University of St. Andrews**

Background: Air pollution affects the individuals' health negatively; though it is unclear whether this effect is stronger for ethnic minorities compared to the rest of population. This study uses longitudinal data to investigate the spatial-temporal effect of air pollution on individuals' reported health and its variation by ethnicity in the United-Kingdom (UK).

Methods: Longitudinal individual-level data from Understanding Society: the UK Household Longitudinal Study including 67,982 adult individuals with 404,264 repeated responses over 11 years (2009-2019) were utilized and were linked to yearly concentrations of NO<sub>2</sub>, SO<sub>2</sub>, and particulate-matter (PM<sub>10</sub>, PM<sub>2.5</sub>) pollution once at the local authority and once at the census Lower Super Output Area (LSOA) of residence for each individual. This allows for analysis at two geographical scales over time. The association between air pollution and individuals' health (Likert scale: 1-5, Excellent to poor) and its variation by ethnicity was assessed using three-levels mixed-effect linear models. The analysis distinguished between spatial (between areas) and temporal (across time within each area) effects of air pollution on health.

Results: Higher concentrations of NO<sub>2</sub>, SO<sub>2</sub>, PM<sub>10</sub>, and PM<sub>2.5</sub> pollution were associated with poorer health. Decomposing air pollution into between (spatial: across local authorities or LSOAs) and within (temporal: across years within each local authority or LSOA) effects, showed a significant between effect for NO<sub>2</sub> and SO<sub>2</sub> pollutants at both geographical scales, while a significant between effect for PM<sub>10</sub> and PM<sub>2.5</sub> was shown only at the LSOAs level. No significant within effects were detected at either geographical level. Indian, Pakistani/Bangladeshi, Black/African/Caribbean and other ethnic groups and non-UK-born individuals reported poorer health with increasing concentrations of NO<sub>2</sub>, SO<sub>2</sub>, PM<sub>10</sub>, and PM<sub>2.5</sub> pollutants in comparison to the British-white and UK-born individuals.

Conclusions: Using longitudinal data on individuals' health linked with air pollution data at two geographical scales (coarse local authorities and detailed LSOAs), this study supports the presence of a spatial-temporal association between air pollution and poor self-reported health, which is stronger for ethnic minorities and foreign-born individuals in the UK, partly explained by location-specific differences. Air pollution mitigation is necessary to improve the individuals' health, especially for ethnic minorities who are affected the most.

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**Do night owls and morning larks flock together? Exploring homophily and convergence on morningness/eveningness amongst 43,000 UK couples**

**Evelina T. Akimova, Leverhulme Center for Demographic Science & Nuffield College, University of Oxford**

**Melinda C. Mills, Leverhulme Center for Demographic Science & Nuffield College, University of Oxford  
Taiji, Nuffield College, University of Oxford**

This study provides the first large-scale analysis of homophily on morningness/eveningness (i.e., chronotype). Using a sample of 43,134 cohabiting partnerships included in the UK Biobank (2006-2018), we ask: (1) whether romantic partners are more similar on chronotype than two people selected at random; and if so, (2) whether this similarity is due to positive initial assortment or convergence over time. We assess this using self-reported, actigraphy-derived, and genetic measures of chronotype. Results show patterns of homophily on chronotype,

which appear to derive from convergence rather than positive initial assortment. This is evidenced by weak within-partnership genetic correlations on chronotype coupled with significant, positive actigraphy correlations that increase with partnership duration. However dissimilar initially, partners evidently synchronize circadian rhythms over time as they engage in the shared activities common in partnerships (e.g., co-sleeping, joint leisure, meals). Importantly, results from structural equation models suggest this convergence may be asymmetrical; women, more so than men, appear to be the ones accommodating the sleep preferences of their partner. Interestingly, negative within-partnership correlations (i.e., heterophily) are observed when using self-reported measures of chronotype. However, this appears to result from individuals using their partners as the reference point when assessing their own chronotype, which creates an artificial negative within-partnership correlation. We reflect on our findings in the context of previous research on partnership formation and stability.

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### **Exploring multimorbidity clusters, healthcare use and its impact on self-rated health among the older population in India**

**Salmaan Ansari, University of Kent, Lindsey Forbes, University of Kent, Babul Hossain, International Institute for Population Studies, India**

**Abstract Objective:** To investigate the multimorbidity clusters, healthcare utilisation and its impact on self-rated health status among older people in India. **Methods:** This study used cross-sectional data from the first wave of the Longitudinal Ageing Study in India (LASI), conducted in 2017-18. Study participants were 31,373 people aged  $\geq 60$  years. A latent class analysis (LCA) was utilized to identify multimorbidity clusters using a total of nineteen chronic diseases. Poisson regression was used to examine the association between multimorbidity patterns and healthcare utilization and models were adjusted for potential covariates. The study also assessed whether utilizing health care services affects the self-rated health (SRH) status using Propensity Score Matching (PSM). **Results:** The most common chronic conditions were hypertension (32.8%), gastrointestinal disorders (19.1%), and diabetes (14.3%). Among identified five clusters, Hypertension-Gastrointestinal-musculoskeletal [PR: 1.24, 95% CI: 1.21-1.27] and complex multimorbidity [PR: 1.31, 95% CI: 1.25-1.39] clusters showed the relatively higher healthcare use (adjusted for covariates) than “relatively healthy” cluster. PSM analysis with the nearest neighbours matching algorithm showed that healthcare utilization was significantly associated with increased in reported Good SRH of older people for all the multimorbidity clusters except for complex multimorbidity. **Conclusion:** Utilizing healthcare services improved the reported SRH of older people, however, it depends on the complexity of multimorbidity clusters. Our findings support the creation of integrated care policy that incentivizes basic healthcare clinics to manage people with different combinations of chronic health conditions. **Keywords:** chronic diseases; healthcare utilization; self-rated health; India

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### **Integrating residence permit data to estimate bilateral migration flows for South America, 2000-2015**

**Andrea Aparicio-Castro, University of Manchester Arkadiusz Wiśniowski, University of Manchester**

Under a scenario of rapid changes in South American migration, residence permit data is one of the most common sources to analyse migration flows due to their availability, access and production frequency. However, using residence permit data implies dealing with country-specific legislation that defines differently who constitutes a migrant and, therefore, who is being counted in national administrative procedures. Additionally, employing residence permit data signify handling the dissimilarities of national data collection systems. We aim to overcome these two main drawbacks in residence permit data by developing a two-level Bayesian hierarchical model to harmonise South American residence permit data. We account for (1) the minimum timing requirements to acquire a residence permit in South American countries; (2) residence permit data quality; (3) the undercount of migrants who do not need a residence permit to stay in a South American destination country due to the implementation of bilateral or multilateral free movement agreements; and, (4) the undercount of unauthorised migrants who are incorporated to statistics when regularisation processes occur. We use residence permit data on international migration collected and reported by the Continuous Reporting System on International Migration in the Americas, covering the period from 2000 to 2015. The output is a set of synthetic estimates of bilateral migration flows for South America with measures of uncertainty.

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## **GCE modelling of migration**

**Gilbert Boateng Institute of Economics Friedrich Alexander University Erlangen-Nurnberg Germany**

ABSTRACT CGE Modelling of Migration Gilbert Boateng, Institute of Economics, Friedrich Alexander University, Erlangen Nurnberg, Germany Migration has been on the agendas of national and international organisations due to its role in the development of global economies. Empirical studies on migration are local, country, or region-based; Mundaca (2009) LAC; Coulibaly (2015) SSA; Chowdhury (2016) Developing Countries; Kadyshva (2019) Europe. However, with the increased global integration since the Uruguay Round negotiations, which occurred under the guidance of the General Agreement on Tariffs and Trade (GATT) in 1985, NAFTA in 1989, EU Integration in 1993, the Kyoto Protocol in 1997, the WTO-Doha Round in 2001, and China's WTO accession in 2001, there have been calls for the quantitative analysis of policies on a global basis. We provide for this gap by going beyond community, national, or regional empiric studies and providing a global-based and more comprehensive insight into the study of migration. This paper investigates the impact of a 3% migration shock of skilled and unskilled labour on sending and receiving regions using a Global Migration (GMig2) model that is based on the GTAP 10 database. Next, we examine the effect of the migration shock ( $c\_MIGNOSP$ ) on trade, price, wages, welfare, and the macroeconomic and economy-wide effect on the regions. We make a unique methodological advancement to the literature on migration by using a comprehensive global database and a computable general equilibrium (CGE) modelling method that enables the tracking of the shock impact on sending and receiving regions. Our preliminary results indicate a positive worldwide equivalent variation (WEV). Email.gilbert.boateng@fau.de

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## **Technology-driven structural labour market change and women's return to work after childbirth**

**Honorata Bogusz, University of Warsaw**

Becoming a mother can be considered a critical event for women's careers and a central driver of gender inequality, which also exacerbates economic inequalities among women. At the same time, technological change has been transforming the structure of labour demand in favour of workers with cognitive skills and putting lower-skilled workers at risk of precarity and unemployment. Studies showed that European women are overrepresented in occupations which are at the highest risk of automation. In this paper, I combine the gender and class inequality perspective to provide new, intersectional evidence on the employment consequences of maternity and technological change. To do this, I construct measures of task content of occupations using data from the Employment Survey of the German Federal Institute for Vocational Education and Training (BiBB). These indicators reflect how technology is altering demand for types of activities done at work. The measures are linked to high-quality individual register data from the German Pension Fund (FDZ-RV) spanning years 2011-2020. Through competing risk models, I find that women with analytic occupations in highest demand are the most likely to transition to full-time employment after the first childbirth, while women with jobs requiring interpersonal skills usually go to part-time employment. In contrast, women with manual occupations at risk of automation are most likely to go to unemployment. Mothers with cognitive jobs are the ones who most frequently transition to the second birth, a finding which is consistent with previous literature on the topic of technology-driven labour market change and fertility.

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## **The Impact of Parenthood on Labour Market Outcomes of Women and Men in Poland**

**Radost Waszkiewicz, Honorata Bogusz, University of Warsaw**

Poland records one of the lowest gender wage gaps in Europe. At the same time, it is a socially conservative country where women's rights have been on the decline. We argue that, in the Polish context, the gender gap in income is a more appropriate measure of gendered labour market outcomes than the gap in the hourly wage. We analyse the gender gap in income in Poland in relation to the parenthood status, using the placebo event history method, adjusted to low resolution data, and the two waves of the Polish Generations and Gender Survey (2010, 2014). Contrary to similar studies conducted in Western Europe, our analysis uncovers a large degree of anticipatory behaviour in both women and men who expect to become parents. We show that mothers' income decreases by about 20% after birth but converges to the income trajectory of non-mothers after 15 years. In contrast, the income of eventual fathers is higher than that of non-fathers both before and

after birth, suggesting that the fatherhood child premium might be driven primarily by selection. We also demonstrate a permanent increase in hours worked for fathers, as opposed to non-fathers and a decrease in hours worked for mothers who converge to the trajectory of non-mothers after 15 years from the birth. Finally, we compare the gender gaps in income and wages of women and men in the sample with those of individuals in a counterfactual scenario where the entire population is childless. We find no statistically significant gender gaps in the counterfactual scenario, thereby concluding that the gender gaps in income and wages in Poland are driven by parenthood and most likely, by differences in labour market participation and hours worked.

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### **Local social networks and fertility in the United Kingdom**

#### **Effects of temperature shocks on family planning use in low-and-middle-income countries**

**Katherine Del Salto Calderon, Max Planck Institute of Demographic Research; Joshua Wilde, Portland State University and Max Planck Institute of Demographic Research**

**Aim:** Environmental stressors are likely to influence a variety of fertility determinants. Drawing from the literature on the relationship between climate change and fertility, this paper aims to expand the evidence on the behavioral pathways by exploring the effect of temperature shocks on family planning use. Current evidence is restricted to very specific geographical settings, this paper aims to fill this gap by analyzing these effects on 49 low-and-middle income countries. **Data:** We link contraceptive calendar data from the Demographic and Health Surveys with gridded data from the National Oceanic and Atmospheric Administration's (NOAA) temperature datasets from 1995 to 2021. **Methods:** We use fixed-effects (FE) models where our dependent variable is month-woman contraception use and our independent variable of interest is temperature shocks. The latter is captured by a vector corresponding to a set of region-month temperature bins representing the number of days within each month where daily temperature is within that given bin. We also include region-month FE. This methodology allows non-linear relationship between temperature and contraception use. Most importantly, it allows for causal inference because we only use the random temperature fluctuations across years for the same region-month to identify the effect of temperature on contraceptive practices. **Expected Results:** Overall contraception use remains stable independent of temperature shocks. However, we expect to find heterogeneous effects among populations living in rural and urban areas, with the former being more likely to adjust family planning use, following high temperatures.

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### **Sexual abuse and unwanted pregnancies amongst women and girls in Malawi during the Covid-19 pandemic**

**Lana Chikhungu, University of Portsmouth**

The Covid19 pandemic movement restrictions shed more light on how vulnerable women and girls are to violence and sexual abuse within the confines of their own homes (WHO, 2021). For example, in Malawi, increased levels of teenage pregnancies were reported during the first wave of the Covid19 pandemic. Nonetheless, the extent of the impact of the Covid19 pandemic on sexual abuse and unwanted pregnancies on women and girls in Malawi has not been investigated. This study uses data on reported cases of rape and defilement from the Malawi Police and the number of women accessing post abortion care services from Dhis2 to investigate the impact of the Covid19 pandemic on sexual violence and unwanted pregnancies for women and girls in Malawi. The quantitative data is complemented by qualitative data obtained through key informant interviews with professionals from the Malawi Police and District hospitals to follow an explanatory mixed methods design (Creswell and Clarke, 2011). Findings reveal huge regional variations in the percentage change of the reported cases of rape and defilement and the number of women and girls accessing post abortion care services during the Covid19 pandemic compared to the period before. The general perspective of key informants was that there was a rise in cases of rape and defilement and the number of women with unwanted pregnancies during the Covid19 pandemic period. This study confirms that sexual abuse towards women and girls increases during periods of restricted movements but levels are likely to be underreported.

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**Transnational kin networks: An analysis based on crowdsourced online genealogy**  
**Andrea Colasurdo, Diego Alburez-Gutierrez; Max Planck Institute for Demographic Research**

Kinship networks are central in the migration process and the impact of kin networks on migration behavior should be analyzed to better understand the decisions of migrants and their trajectories. Existing studies which evaluate the impact of family ties on geographical mobility usually focus on residential movements within a country or some specific transnational migrations. However, there is still a substantial lack of knowledge about how these family networks have changed over time and have involved extended families and different countries. Thanks to online genealogies and historical datasets demographic and kinship information are available across multiple centuries and generations. Using the online crowdsourced genealogy FamiliX, a database extracted from Geni.com, this research will shed light on the dispersion of transnational kin networks across countries and their development over time. This quite new and unused data source contains information on transnational movements and transnational kin ties over time, which is usually missing in the traditional national surveys, where movements and networks are restricted by country borders. The results will provide a comprehensive overview of the spread of family networks for focal individuals based on seven European countries and the United States and the change in these networks from 1700 to 1900. Indeed, the information that this study will produce is mostly historical and its results will help scholars of migration to understand contemporary and future trends and give relevant suggestions to shed light on the actual dispersion of kin networks and predict potential migration behaviors.

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**Quality assessment of online genealogical data for demographic research: The case of FamiliX**  
**Andrea Colasurdo, Riccardo Omenti; Max Planck Institute for Demographic Research University of Bologna**

FamiliX is an online crowdsourced genealogical data set containing micro-level information about over 86 million profiles across multiple countries and centuries as well as their transnational kinship ties. Even though this data source has not been primarily designed for demographic research, it provides researchers with key demographic information about individuals in historical periods without ground-truth population data. Nonetheless, FamiliX has many limitations, including high heterogeneity in the completeness of relevant demographic and family-related information as well as several biases arising from the reconstruction of genealogical trees. This research aims to develop individual-level indicators to assess the quality of the data records and to spread awareness among researchers about the potential of online genealogical data for demographic research. Thus, two distinct indexes have been constructed to measure the level of completeness of the family-network and demographic information of each profile. Furthermore, it is explored how the distributions of these quality indicators in the countries with the largest number of profiles, i.e., European and North American Countries, change across different centuries and within family networks. The preliminary results show that the information quality is better during the 18th and 19th centuries, especially for males that were born and died in the same country. Overall, this research work provides guidelines to scholars interested in employing this data source about how to use the record-specific indexes to carefully select their sample.

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**Transformation: Providing the best picture of our population**  
**Vicky Collison, Justine McNally**

The census provides a detailed snapshot every 10 years of who we are and how we live and provides the best picture of population at a moment in time. However, the coronavirus pandemic has underlined the need for more timely information to capture the constant change in our population. Our vision is to transform population and social statistics to have a system that produces more frequent, timely, flexible and inclusive population statistics. This system maximises administrative data, or data collected for the purpose of running services such as GP registrations, at the core. This system also uses surveys to complement the administrative data. We aim to provide a more up-to-date picture of the population to help us detect changes in demographic trends as they happen. This has the potential to help us better understand seasonal patterns and what these mean at the local level, for example how the movement of student populations and seasonal workers impact the use of services. In this poster we present what this system looks like, bringing together all the component parts to produce

coherent, consistent population statistics including: - Improved population statistics down to small area level - Estimates of how and where we live and of the make-up of our communities - Estimates that allow the comparison of different attributes in the population - Broader analysis of outcomes over time; for example, understanding the differences in Covid-19 mortality for people with different characteristics or occupations.

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### **Fertility decline in Derbyshire: building a longitudinal dataset using the census and index of marriages, 1881-1911**

**Emma Diduch, University of Cambridge**

In this research I construct a longitudinal dataset on women's life courses in late nineteenth-century Derbyshire using a combination of census records, archival material, and marriage indexes. Most studies of census record linking confine themselves to male individuals because of the difficulty of identifying women in future records after marriage – maximizing the chances of matching individuals but creating unrepresentative samples of the historical population. This problem can be addressed by limiting geographic focus and therefore the universe of potential matches to make linking more efficient, and by introducing additional identifying information from other primary sources. My research will focus on the textile manufacturing districts of Derbyshire and a collection of archival materials from factories owned by WG and J Strutt Ltd. These not only allow fact-checking of the census' categorization of women's employment, but will also allow a more detailed look at the conditions of work – wage levels, occupational segregation, withdrawal from work due to marriage or pregnancy, and education of child workers in factory schools. Linking women across censuses via records of their date of marriage and married name enables analysis of how early experiences of work and family histories influenced later decisions about age at marriage and marital fertility. Together these data will have the potential to address long-standing debates about fertility decline in England – including social and occupational gradients of decline, stopping versus spacing behavior, and interactions with trends in infant mortality.

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### **Sex differences in COVID-19 mortality: A longitudinal, cross-country perspective**

**Katarzyna Doniec (1,2), Mine Kühn (3), Jennifer Beam Dowd (1,2)** 1.Leverhulme Centre for Demographic Science, University of Oxford, United Kingdom. 2. Nuffield College, University of Oxford, United Kingdom. 3. Tilburg University, Tilburg, Netherlands.

We examine sex gaps in COVID-19 mortality across countries and time using COVID-19 mortality data from 20 countries from 2020-2022, provided by the COVerAge database. We analyse country-month trends in sex-specific age-standardized mortality rates and cumulative death rates. We calculate absolute (rate difference) and relative (rate ratio or RR) mortality sex gaps over time. Overall, males suffered higher COVID mortality than females across all countries and time periods. As expected, the male excess in absolute death rates was highest during periods of high overall COVID-19 mortality. Absolute differences were largest in Brazil, the United States and Colombia, and smallest in Austria, Germany, and Spain. The largest absolute differences in death rates were generally observed in the 60-79 age group, although not in all countries. Male-female differences in relative risk, in contrast, were similar across age groups and remained relatively stable over time for the majority of countries. Using a multilevel generalised least squares model, we also find that male Covid-19 mortality rates, compared to females, exhibit greater variation (i.e. the higher interquartile range) over time and between countries. Finally, we replicate our findings using sex- and age-specific all-cause excess mortality rates over the same period, taken from the Short-term Mortality Fluctuations data series. In sum, we show that the comparisons of the magnitude of sex differences in Covid-19 mortality between countries and over time depend upon whether the relative or absolute measure of disparity is used.

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### **Son preference and prenatal care in India: The impact of gender on prenatal health care and child mortality**

**Sylvi Dubuc, Paul Emile Charlier; University of Strasbourg**

Son preference resulting in excess girls' mortality and prenatal sex-selection against female is well documented in large parts of South Asia, and notably in India. Perhaps surprisingly, inequalities in prenatal health care motivated by gender preferences are less studied, especially for the most recent period. In this research we are

taking advantage of the new National Family and Health Survey (NFHS-5) and the previous NFHS-4 to analyse some of the individual and household level factors associated to inequalities in prenatal care of women and pregnancy using logistic regressions. We use the birth recode dataset to compile a composite variable of 'recommended antenatal care', based on Jejeebhoy et al (2014), allowing us to compare access to prenatal care over time. Higher education and household wealth improve prenatal care for women expecting a child, either male or female. Care also varies by region and religion. We find a reduction in inequalities due to the gender of the (expected) child. Nonetheless when decomposing the model by child gender, preliminary results suggest a persistent gender effect on prenatal care access, at higher birth order. (we are currently refining and expanding the analyses). Using Kaplan-Meier and logistic regression modelling, we further analyse the link between prenatal care and child mortality, questioning the role of the child gender (This later analysis is in process). Preliminary results suggest that beyond prenatal care, other (unmeasured) postnatal factors should also be investigated to explain persistent excess girls' mortality.

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#### **Press coverage of the economy: construction of coverage and sentiment indices**

**Paolomaria Fabrizio (Dipartimento di Statistica, Informatica, Applicazioni 'Giuseppe Parenti'); Patrizio Lodetti (Dipartimento di Statistica, Informatica, Applicazioni 'Giuseppe Parenti'); Raffaele Guetto (Dipartimento di Statistica, Informatica, Applicazioni 'Giuseppe Parenti'); Daniele Vignoli (Dipartimento di Statistica, Informatica, Applicazioni 'Giuseppe Parenti')**

Media, intended as aggregators of news and opinions, represent the main source of information regarding economic issues for most individuals. This article builds quantitative and qualitative indices of media economic narratives based on data on the coverage of the economy in Italian newspapers from 2009 to 2020. The data stem from a the LexisNexis database, which includes newspaper articles from a 54 European countries over the past 20 years. The study analyses both the amount of economic coverage and the sentiment conveyed by the news, with the purpose of creating comprehensive indices reflecting the media narrative on the overall state of the economy. These indices will be constructed exploiting a machine learning approach, through the implementation of two Natural Language Processing models with the language model BERT: the first model will discriminate between "in-topic" (talking about economy) and "off-topic" news, whereas the second model will assign a sentiment (positive, neutral, or negative) to the "in-topic" news. In addition, the article examines the reliability and validity of the constructed indices through a comparison with objective indicators of the Italian economic situation. The results show that the economic trends described in the media are not always aligned with actual economic trends. The article also discusses possible applications of these indices in population studies, such as fertility research, and demonstrates the potential of media-based indices as a complementary tools for economic analysis.

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#### **2020-based interim national population projections: Year ending June 2022 estimated international migration variant and future plans**

**Matt Fedyniak, Tom McGrail White, Michelle Clift-Matthews, James Robards; Office for National Statistics**

After the publication of the 2020-based interim national population projections (NPPs) in January 2022, the next NPPs were planned to include Census 2021 data and a revised back series of earlier years of data. However, at the end of 2022 HM Treasury and the Office for Budget Responsibility asked ONS to review the latest evidence and expert views on potential future international migration to assist with the Spring Budget 2023. Expert views and the latest data pointed towards expectations of higher net international migration than the assumptions used in our 2020-based interim NPP national principal projections. In January 2023 ONS published a variant of the 2020-based interim NPPs. The variant projection reflects the latest provisional estimates of international migration and gives an indication of the possible future size and composition of the population. Results from this variant projection show that the UK population is projected to increase by 4.2% over the 10 years to mid-2030 and by 8.0% by mid-2045. Compared with the previous NPPs, the UK population is projected to grow faster, being 0.7 million bigger in mid-2030 than was previously projected, and 1.5 million bigger by mid-2045. This presentation will outline the production of the 2020-based NPPs variant, explain how the demographic assumptions were developed and give an overview of the results. It will also outline future plans for population and household projections, including the use of Census 2021 data in future population and household

projections.

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### **Understanding the Persistence of Socioeconomic Disparities in Smoking during Pregnancy: Starting, Quitting and Continuing Smoking in Finland and Sweden**

**Rachel Ganly, University of Oxford**

Socioeconomic disparities in smoking in pregnancy are a critical mechanism for the intergenerational transmission of health inequality in high-income countries. Maternal smoking in pregnancy is the largest behavioural risk factor which deleteriously impacts birth outcomes, infant mortality and morbidity, and chronic childhood conditions. Although policies to reduce adult smoking and promote smoking cessation for expectant mothers have contributed to lower overall rates of smoking in pregnancy, disparities in smoking in pregnancy over time have been inconsistently documented and their drivers remain poorly understood. Using national register data over forty-five years (1973 to 2017) in Sweden, and over thirty years (1987 to 2016) in Finland, we use multiple measures of educational attainment and socioeconomic status at the couple level to understand the strongest predictors for smoking at various stages of pregnancy. Second, we examine the underlying contribution of non-smoking at onset and quitting during the first trimester to educational disparities in continued smoking.

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### **An overview of version 4 of the Statistical Population Dataset (SPDv4)**

**Michael Hamill, Josh Best, ONS**

ONS is developing a Dynamic Population Model (DPM) to produce more frequent and timely population statistics for England and Wales. The DPM draws from multiple data sources, which are then subject to statistical modelling techniques and demographic insights to capture the resident population. The primary stock input into the DPM is the Statistical Population Dataset (SPD). Like the DPM, the SPD aims to capture the resident population as accurately as possible. Unlike the DPM, the SPD is created using only administrative data sources, such as those provided by the NHS and HMRC, without any kind of adjustment being applied. The SPD therefore serves as a 'base' measure of the population, which is then adjusted in the DPM to address gaps in coverage i.e., where we are including too many or not enough records. This poster gives an overview of our latest version of the SPD. We describe the rules we apply to the raw datasets that determine which records are included and excluded, and highlight key findings from our comparisons to Census 2021. These findings include aggregate comparisons at output areas, our lowest level of geography, and record-level linkage to the census to identify specific instances of incorrect inclusion and exclusion. These comparisons give us our best measure of the coverage of the SPD and where to make improvements. In addition, we include findings from our latest time series that indicate stability of the SPD's performance over time. Finally, we describe our plans to continue developing the SPD moving forwards .

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### **Overcoming challenges in admin-based population size estimation: A 2021 case study**

**Ceejay Hammond, Mark Linton and Eleanor Law affiliations: Methodology and Quality Directorate, Office for National Statistics**

Every 10 years since 1801, the population size of England & Wales (E&W) has been primarily estimated using a census. The aim of a census is to capture everyone who is a usual resident, in their usual location. Standardised methods have been developed to adjust for missingness (undercoverage error) and incorrect inclusion (overcoverage error) in the census data. The Office for National Statistics (ONS) is pioneering a hybrid data model incorporating administrative data through our transformation of population and migration statistics. This has never been done before by the ONS. Unlike in some other countries, E&W does not have a central population register and typically, admin data is not collected in E&W with the intention of estimating the population size. For the past several years, ONS has iteratively developed a large, linked administrative dataset to function as an administrative based population count, but a count is not an estimate. The Methodology and



Quality Directorate at ONS are building on and developing innovative methods of producing population size estimates from a large, linked admin dataset as a population count or stock. To estimate undercoverage and overcoverage error, methods such as dual system estimation and estimated overcount propensities are implemented. Using the 2021 Census Coverage Survey, we had to overcome the challenge posed by its exclusion of large communal establishments. Trimming has also been developed to remove erroneous records from the admin data stock. Results of the published population size estimates will be presented alongside the estimated 95% confidence intervals. Key Words: Census; admin data; Overcoverage; Undercoverage; dual system estimation; census coverage survey; Statistical Population Datasets; propensities; trimming; confidence intervals

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**Cancer incidence and Survival in Pakistanis, Bangladeshis, and their descendants in England and Wales**  
**Joseph Harrison, Frank Sullivan, Katherine Keenan, Hill Kulu; University of St. Andrews**

The migrant mortality advantage is a widely observed phenomenon, thought to occur due to positive selection of migrants and better health behaviours. This paper seeks to further understand health differentials between Pakistani and Bangladeshi immigrants, their descendants, and the native population in England and Wales. We apply survival analysis to the Office for National Statistics Longitudinal Study of England and Wales, to compare hazard ratios of cancer incidence between these groups. Moreover, we observe the ten-year period after diagnosis to identify differences between these groups in mortality following onset of cancer. We apply stepwise models to control for socioeconomic characteristics that have previously been found to influence health and mortality. Results highlight that the risk of cancer onset is substantially lower for individuals born in Pakistan and Bangladesh. This advantage is also seen in their British born descendants. However, following incidence of cancer there is no significant difference in mortality between these groups, and for descendants the risk may be elevated. We conclude that lower incidence of cancer and not better survival once diagnosed is the driver of the low cancer mortality observed in Pakistanis and Bangladeshis in England and Wales. We should investigate further how protective behaviours prevent the onset of cancer but fail to improve survivability. Using this detailed administrative data to investigate both incidence and onset of cancer across immigrant generations is a novel contribution and sheds new light on the migrant mortality advantage and immigrant health, particularly in relation to cancer.

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**Constraints on migration in pre-industrial China**  
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This project will produce the first detailed, individual-level dataset of migration in China proper across the 1600-1949 period. It will use lineage genealogies to examine the determinants of migration and its effects on the welfare of migrants and their descendants. These findings will in turn provide a new empirical understanding of the factors behind the slow pace of urbanisation and industrialisation in pre-industrial China. Genealogies do not consistently record migration, but they do record a mix of five pieces of geographical information: (1) the geographical centre of the lineage; (2) places of work or study; (3) destinations of direct migration; (4) grave sites, and (5) origin of wives. These five variables will then be used to reconstruct simplified life course models for each lineage member. Aided by an AI-based OCR approach, I have now completed the transcription of 45,103 records (19,253 women and 25,850 men). The data will be used to estimate two empirical models. First, a logit model isolating what demographic characteristics influenced the probability of migration, especially migrant ancestors, and educational attainment. Second, I will fit a Bayesian linear regression model to predict the distance of migration based on the same suite of demographic variables. The key argument of this paper is that China's equal partible inheritance system tied most of the population to their ancestral land and reduced overall mobility. Uneducated people were disproportionately affected by these institutional arrangements, which effectively halted urbanisation in China for almost a millennium.

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**Kinship Forecasts for the UK**  
**Jason Hilton, University of Southampton Joanne Ellison, University of Southampton Eregul Dodd, University**

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Kinship ties are amongst the most important social relationships we make during our lives. Kin members are important sources of support, both substantial and emotional, and understanding kinship networks provides information a series of difficult policy problems, from social care to loneliness to housing. Young people provide informal care to elderly relatives. Older people provide housing and financial support to younger family members. Kin members of the same generation (siblings, cousins) can provide important emotional support to one another. To understand potential changes in these areas in the future, we need to understand how such kinship networks may change. Kinship forecasts are this presented for England and Wales. These forecasts are produced by employing the matrix population methods of Caswell (2019). Kinship networks are outcomes of demographic processes; fertility, mortality and migration affect the number of kin available to individuals. Therefore, kinship forecasts require demographic rates forecasts as inputs, and the paper will discuss the demographic forecasting methods used to produce such rate forecasts. This paper may also describe a Monte Carlo approach to incorporate uncertainty from probabilistic forecasts of demographic rates into final kinship forecasts.

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**Spatial variations in epidemiological change in Great Britain, 1861–1901**

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This paper will use newly generated cause-specific subnational mortality data to explore spatial and temporal variations in mortality in Great Britain from 1861 to 1901. It is well established that there is considerable subnational variation in mortality patterns, however, up to now, much of the research in the historical context has focused on local and regional patterns within Scotland and England and Wales separately. Our aim is to take a more holistic approach and to consider epidemiological developments across the whole of Great Britain. We will use individual-level data from the Digitising Scotland project to produce age, sex and cause-specific mortality rates for consistent Registration Districts in Scotland. Newly created nosologies for Scotland will, for the first time, allow direct comparison with the English and Welsh mortality rates from the published Decennial Reports of the Registrar General for England and Wales (Woods and Shelton 1997).

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**Demographic determinants of transition in sexual life among adolescents in India: Do gender gaps exist**

**Suresh Jungari International Institute for Population Sciences, Mumbai, India**

Social science researchers, particularly demographers, are keen to understand adolescents' transition to adulthood through varied approaches and methods. The long-lasting interest of demographers in exploring and relating the demographic factors that drive the transition in sexual life in transition is evident in both developed and developing countries. Limited attention has been given to how gender gaps exist in the transition in the sexual life of adolescents. The study objective is to examine demographic determinants of transition in the sexual life of the young population and to examine the gender gaps in the transition in sexual life. The study used the National Family Health Survey's (NFHS) recent three rounds of data conducted during 2005-6, 2015-6 and 2019-21 to examine the transition of sexual life. NFHS data allows exploring the changes in demographic determinants and sexual life. Sexual life operationalized for this study as age at first sex and considered mean age at first sex. Results show that the transition in sexual life among adults is slow. Meagre increase in mean age at first sex observed from NFHS-3 to NFHS-5 among men in India. It was 22 in 2005-6, 23 in 2015-16 and 23.79 in 2019-21. Which shows the very slow increase in age at first sex. The same trend is followed in women as well. However, gender differences in the mean age at first sex larger and consistent over period of time. Great interstate differentials in sexual life are evident. Several demographic factors are playing role in transition of sex life.

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**Changes in fertility intentions during the Covid-19 pandemic: An analysis based on the UK household longitudinal study**

## **Ellie Jane Kearton - University of St Andrews Francesca Fiori - University of St Andrews**

With the outbreak of the coronavirus pandemic, concerns emerged over how the economic and social uncertainty surrounding the pandemic would influence fertility intentions and consequent fertility behaviour. In the UK, there has been an overall decline in total fertility rates since the 1980s reaching 1.56 births per woman in 2020. Further reductions could result in historically low fertility rates, with implications for its demographic future. Therefore, it is important to understand how fertility intentions have changed in the context of the pandemic and the characteristics associated with those who were least likely to realise or abandoned their intentions to have a(nother) child. This study uses longitudinal data from the UKHLS (baseline: January 2018-February 2020 and follow-up: September 2021), to assess whether intentions to have a(nother) child changed in the context of COVID-19, and identify the factors associated with maintaining, realising and revising positive childbearing intentions. Multinomial logistic regression analysis is employed, on a sample of 881 women, aged 16-45, who expressed positive intentions to have a(nother) child at baseline. Results show 23.61% of women realised their intentions of having a child and 19.18% of women abandoned them. Among those most likely to revise their intentions were women over 30 years old, who already have children, not married or co-habiting, whose financial situation deteriorated, and who were worried more often. Overall, this study suggests changes in fertility intentions are likely to be influenced by the context of the pandemic and specifically, the economic uncertainty and general worry it caused for many.

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## **Inequities in access to healthcare for people with disability in Indonesia**

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Background: Disability prevalence statistics in Indonesia have increased markedly due to demographic and epidemiological changes, alongside improved disability measurement. People with disabilities (PWD) face barriers to accessing health care. This study investigates factors related to healthcare access, focusing on people with disability in Indonesia. The characteristics of individuals who have been formally diagnosed with disabilities will be compared to those who have functional limitations. Methods: This study used individual-level data from the Indonesian Family Life Survey (IFLS) 5 alongside province-level data from the Indonesian Statistics yearly report. A multilevel binary logistic regression model estimated the factors associated with healthcare utilisation, focusing on disability. Results: Two types of disability were identified: medically diagnosed and functional limitations, as defined by activities of daily living. Over 35% of those with functional limitations have never obtained a medical diagnosis. Diagnosed disability is more prevalent among those of higher socio-economic status. People with diagnosed or functional disabilities are more likely to utilise healthcare services. Multilevel models indicate that healthcare utilisation is associated with age, gender, socio-economic status, health insurance, health status and chronic conditions, as well as disability status. Conclusions: People of higher socioeconomic status can afford access to health and gain a medical diagnosis for their conditions. PWD have higher health service use, although the quality of care is unknown. Access to healthcare by PWD remains low in several provinces, especially provinces with a high prevalence of disability. There are persistent inequities in healthcare utilisation between disability status accounting for other background factors.

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## **The war, refugees, and the future of Ukraine's population**

**Hill Kulu, Sarah Christison Chia Liu Júlia Mikolai University of St Andrews**

This study analyses the effect of Russia's invasion of Ukraine in 2022 on the future of Ukraine's population. We conduct a series of population projections with different assumptions on the proportion of refugees that may return to Ukraine. Our projections show that if past demographic trends continue, Ukraine's population is projected to decline by one-sixth over the next two decades and become older. These trends are largely driven by past and current demographic developments: continued very low fertility and large-scale emigration at the turn of the century. With war casualties and a large portion of the Ukrainian population seeking safety abroad from the conflict, the country's population is projected to decline by one-third. The decline would be even larger among the working-age population and children. Russia's invasion has not only led to immense human and economic costs in Ukraine in the present but also carries long-term demographic repercussions.

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### **Gender, spousal migration, and the left-behind spouse's housework time in China: Exploring the role of co-resident parents**

**Weiwen Lai (Stockholm University), Yuying Tong (The Chinese University of Hong Kong)**

This study examines how spousal migration and co-resident parents jointly shape the left-behind spouse's housework time for Chinese men and women. Using longitudinal data from the China Health and Nutrition Survey (1997-2015) and individual fixed effect models, this study finds that spousal migration has a gendered impact on the left-behind spouse's housework time. Having a migrant wife increases the left-behind husband's housework time, but facing a migrant husband, left-behind wives' housework time does not change, and it even decreases for some. This study also suggests that the relationship between spousal migration and the left-behind spouse's housework time differs by the presence of co-resident parents, and the moderating role of co-resident parents differs for left-behind husbands and left-behind wives. When a wife migrates, co-resident parents take on most of the housework left to the left-behind husband by the migrant wife. However, this moderating role of co-resident parents is not observed for left-behind wives, for whom living with parents adds to their burden and leads to more unfavorable housework outcomes. This study highlights both gender and intergenerational dynamics as essential factors to better understand the consequence of spousal migration on the left-behind spouse's household activities, especially in contexts where migration is a family project involving adult children and their parents. Left-behind spouses' housework is not only shaped by their and their migrant spouse's different gender roles in the family but also the intergenerational cooperation, in which support from parents is often shaped by the gender of their children or children-in-law.

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### **Producing provisional internal migration estimates using administrative data**

**Magdolna Lorinc, Beth Allen, Anjali Solanki, Izzy Pearce, Esther Irving, Emilie Woodhall ; Office for National Statistics**

The Dynamic Population Model (DPM) is developed by the ONS to better respond to user needs for more timely, frequent and accurate population and migration statistics, maximising the use of administrative data. Internal migration is a key input into the DPM, as it represents the largest component of population change at local authority level. This poster presents a visual summary of our research into producing provisional admin-based internal moves between local authorities in England and Wales, and between the constituent countries of the United Kingdom from mid-2022 to mid-2023. These provisional estimates are produced about a year before the official figures. Currently, our estimates which feed into the DPM consist of moves using health data only. We are exploring a variety of alternative methods and various administrative datasets to improve our outputs, including education and tax data. We are investigating student and higher education leavers' mobility, inclusion of prison populations and armed forces, lagging in admin data, and the overall quality of administrative sources to accurately reflect residential moves. In addition, Census 2021 provides a unique opportunity to compare administrative data with the most reliable population data we have access to and is therefore another core area of focus for our team. We also plan to include limitations of different administrative sources and plans for future development in the poster.

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### **Narrative storytelling of older Chinese's loneliness, social isolation and social support in Scotland: an intersectional life course analysis**

**Mengxing Ma, Prof Nissa Finney, Dr Jo Mhairi Hale. Population and Health Research Group, School of Geography and Sustainable Development, University of St Andrews**

Loneliness and social isolation are considerable concerns because of their high prevalence and negative effects on health and wellbeing. Older Chinese may be at higher risk of loneliness and social isolation based on the intersection of their old age and marginal status as ethnic minorities and immigrants. This study originates from qualitative research that explores loneliness and social isolation of 20 ethnic minority/immigrant older adults in Scotland through in-depth interviews. This presentation will tell four older Chinese' life stories: one Chinese couple migrated from Hong Kong in middle age and worked in restaurants, one Chinese woman migrated from

Mainland China in old age for marriage, and one Chinese man migrated from Malaysia at a young age for higher education. By telling their past, present and imagined future and applying an intersectional lifecourse analytical lens, we explore how immigration, ethnicity and other factors (e.g. age, gender, socio-economic status, and language capacity) intersect and impact older Chinese experiences of loneliness, social isolation and support systems. Older Chinese in Scotland are not homogeneous and so do their loneliness and isolation experiences. Their intersectional social positions impose higher vulnerabilities of loneliness and isolation on them, but they mobilise their individual and collective resources to encounter such vulnerabilities. The degree of their vulnerabilities and resources varies dramatically given the significant differences in their age, gender, place of origin, SES, and migration pathways. This study warns of the dangers of homogenising and problematising older Chinese and overlooking the inequalities within the older Chinese groups.

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### **Address linking to assign Unique Property Reference Numbers (UPRNs)**

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Households in Scotland complete a census return for all usual residents. Invites are sent to households using a Census Address Register, an address frame with UPRNs, but sometimes people are missed. To avoid underestimating the population, a sample of areas are surveyed again in a Census Coverage Survey (CCS). The CCS is designed to have independence from the census, with enumerators manually producing an address frame (without UPRNs). Records from the CCS and census are linked to count the number of people appearing on both, and the number appearing on only one of census or CCS. Census estimation methods use these counts to estimate the total population. A challenge for National Records of Scotland (NRS) centred on linking those address records. Building on experiences with linking 'messy' addresses in generating Administrative Data-Based Population Estimates (NRS, 2021), the team sought to assign UPRNs to CCS addresses, to facilitate links to Census returns. Splitting up an address, or tokenisation, can be complicated because people use different formatting and structures for their address. NRS' decision to use a bespoke approach to address linking, was also influenced by local needs, including handling addresses of rural dwellings (some Gaelic spellings) and tenement properties where flats are numbered in quite varied formats. UPRN was appended to just under 51,500 CCS records that were successfully linked to Census records (93.7% success rate). This poster will outline the challenge for NRS and the approach taken. Delegates can discuss the potential benefits of such an approach for data linkage research where address data does not include a UPRN.

Reference: NRS (2021) Administrative Data Based Population Estimates, Scotland 2016 - 2018 - Statistical Research. Available at [Administrative Data Based Population Estimates, Scotland 2016 - 2018 - Statistical Research | National Records of Scotland \(nrscotland.gov.uk\)](https://www.nrscotland.gov.uk/statistical-research/administrative-data-based-population-estimates-scotland-2016-2018) (Accessed: 29 August 2023)

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### **Beyond the missing link: A network-based procedure to evaluate migration theories**

**Micol Matilde Morellini; University of Oxford**

Over the last two decades, the demographic study of migration has reached an impasse. While empirical research has made significant strides in producing more accurate estimates of human movement worldwide, the theoretical landscape is highly fragmented, with a plethora of competing theories seeking to explain migration and its drivers. This paper proposes a novel solution to evaluate and adjudicate between migration theories by introducing simulations and network analysis as valuable methodologies and analytical lenses. Specifically, the network-based procedure reconciles the agency and structural elements of migration by simulating random networks stemming from migration theories, and then comparing them to the features of observed migration networks. This novel approach provides a unified framework for assessing migration theories that is highly flexible, as it can be applied to several migration phenomena, both internal and international, and to a wide range of inferential models. Applying the proposed procedure to the case of student migration in 31 European countries between 2009 and 2019 (N = 5.7+ million mobile students) reveals that even migration theories that account for most of the variance in the data (adjusted R-squared > 0.81) fail to explain the particular structure of the network and the presence of migration clusters and bilateral corridors. These findings shed new light on the drivers of international student migration in Europe and highlight the contrast between the agency of migrants and the structural elements of the migration process, thereby further supporting the proposed procedure.

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### **Alternative formulations of migration-adjusted population replacement levels of fertility for European countries**

**Nick Parr**

In 2019 the total fertility rate (TFR) was below 2.1 in every country in Europe. With zero migration, continuation of such fertility levels would eventually cause depopulation. However, in 2019 net migration was positive in 73% of Europe's countries. This paper considers indicators of whether the population will eventually decrease below its current size if fertility, mortality and migration remain constant. The data are for 22 European countries for 2019. It proposes a new formulation of fertility replacement level which adjusts the familiar 'just below 2.1' level for effects of prevailing immigration counts and emigration rates by age and sex. The values of this measure are compared to those for a parallel measure which inputs net migration volume and to the TFR which would have produced zero growth in 2019, assuming other components of population change are unchanged. The migration-adjusted replacement TFR ranges from 0.86 for Spain to 2.44 for Croatia. It is below 2.1 in 15 of the 19 countries for which it can be calculated and below the current TFR in six countries. The paper contributes by proposing a new method proposed which generates critical values for fertility which can aid the understanding of population growth dynamics in populations with non-zero migration. It can be calculated for populations with negative net migration, unlike the measure of migration-adjusted TFR proposed by Parr (2021).

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### **Community stakeholders' perspectives of changing family planning practices among the Rohingyas living in the camps of Bangladesh**

**Batiya Rahman<sup>1</sup>, Pragna Paramita Mondal<sup>1</sup>, Tasnima Haque<sup>1</sup>, Joe Strong<sup>2</sup>, Ann M. Moore<sup>3</sup>, Kaosar Afsana<sup>1</sup>; <sup>1</sup>BRAC James P Grant School of Public Health, BRAC University, Dhaka, Bangladesh, <sup>2</sup>London School of Economics and Political Science, <sup>3</sup>Guttmacher Institute, New York.**

USAackground: Family planning (FP) has a troubled past among the Rohingyas. However, a number of recent studies indicate that there has been increased usage of contraceptives among Rohingya women. The purpose of this study was to explore the current utilisation patterns of FP services among the Rohingyas in Cox's Bazar. Methods: Sixty in-depth interviews were conducted with the Rohingya community influentials, including Majhis (block leaders), imams (religious leaders), teachers, married men, and community mobilisers. Thematic analysis was performed. Results: Participants highlighted the cultural norm of men's participation in women's sexual and reproductive health use of and access to FP services within the camps. According to the participants, the majority of Rohingya couples are perceived to be using 'Card dawai' (pill) and 'dipo' (injection), widely accepted and well-known methods. Despite the contradictions of using FP contrary to the religion, the use and practice of contraception have changed due to factors related to husbands' involvement, supportive sermons regarding FP from the mosques, the availability of facilities and providers, and the support of NGO volunteers. Overcrowded settlements in camps, a lack of resources, financial constraints, and children's uncertain prospects prompted Rohingyas to limit their family size. Participants suggested that interventions targeting the men, strong support mechanisms from community leaders, and easily accessible FP could help improve the use of FP methods. Conclusion: Changing practices of FP in the Rohingya community were observed by the community members. Despite differing views on the social acceptability of contraception, participants felt it was important to improve FP acceptance among the Rohingyas.

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### **Male Sterilization in India: A gender perspective**

**Pradeep S Salve<sup>1</sup> and Chander Shekhar<sup>2</sup>; <sup>1</sup>Department of Population & Development, International Institute for Population Science, Mumbai, <sup>2</sup>Department of Fertility Studies, International Institute for Population Science, Mumbai**

Disproportionate share of contraceptive use by women makes family planning services women-centric in India. The meagre and declining share of male-based contraceptive use, along with the overwhelming prevalence of female sterilization, has its underpinning in the lack of emphasis on fertility regulation with the use of temporary methods. Recent trends in the share of contraceptive choices not only contest the most touted cafeteria approach but also serves counter to the National Health Policy 2017 target of increasing vasectomy prevalence.

Hence an inspection of trends in vasectomy may help in course correction needed to realised NHP targets. Study used the govtmnet service statistics data available from 1956 to 2019 and five rounds of National Family Health Survey (NFHS) from 1991-92 to 2019-2021 at the national and sub-national levels. Results show that the prevalence of vasectomy significantly decreased from 86% in the year 1966 to 46% in 1976 throughout India, and subsequently to 1.4% by the year 2019. State-level analysis highlighted that western states, including Bihar, Odisha and West Bengal, have de-escalated vasectomy prevalence from 1970 compared to the other regions in India. Similarly, the prevalence of male sterilization has continuously decreased from 3.4% in NFHS-1 (1992) to 0.3% in NFHS-5 (2021). Study depicted that the family planning services were systematically forced on women by limiting the choices to males in the cafeteria approach. The absence of a genuine promotion of vasectomy, the set goal under the NHP of increasing vasectomy prevalence in a time-bound manner may well remain beyond reach.

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### **Social cartography and satellite-derived building coverage for post-census population estimates in difficult-to-access regions of Colombia**

**Lina Maria Sanchez-Cespedes, Colombia National Administrative Department of Statistics; Doug Leasure, Leverhulme Centre for Demographic Science, University of Oxford; Natalia Tejedor-Garavito, WorldPop, University of Southampton; Glenn Harry Amaya Cruz, Colombia National Administrative Department of Statistics; Gustavo Adolfo Garcia Velez, Colombia National Administrative Department of Statistics; Andryu Enrique Mendoza, Colombia National Administrative Department of Statistics; Yenny Andrea Marín Salazar, Colombia National Administrative Department of Statistics; Thomas Esch, German Aerospace Center; Andrew Tatem, WorldPop, University of Southampton; Mariana Ospina Bohórquez, Colombia National Administrative Department of Statistics;**

Effective government services rely on accurate population numbers to allocate resources. In Colombia and globally, census enumeration is challenging in remote regions and where armed conflict is occurring. During census preparations, the Colombian National Administrative Department of Statistics conducted social cartography workshops, where community representatives estimated numbers of dwellings and people throughout their regions. We repurposed this information, combining it with remotely sensed buildings data and other geospatial data. To estimate building counts and population sizes, we developed hierarchical Bayesian models, trained using nearby full-coverage census enumerations and assessed using 10-fold cross-validation. We compared models to assess the relative contributions of community knowledge, remotely sensed buildings, and their combination to model fit. The Community model was unbiased but imprecise; the Satellite model was more precise but biased; and the Combination model was best for overall accuracy. Results reaffirmed the power of remotely sensed buildings data for population estimation and highlighted the value of incorporating local knowledge.

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### **Forced migration and fertility behaviour: A case study of Syrian refugees in Turkey**

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Population studies literature has shown growing interest in the relationship between forced migration and demographic behaviour in the last few decades, despite the challenges of data availability. As events of mass forced displacement continue to unfold in various parts of the world, more research on understanding refugee behaviour becomes ever more critical to develop better policy response. In this study we investigate how forced migration shapes fertility behaviour, focusing on the case of Syrian refugees in Turkey. The Demographic and Health Survey (DHS) conducted in Turkey recently released data on a refugee-only sample, namely the DHS Turkey 2018 – Syrian Migrant Sample. The DHS data shows that the total fertility rate (TFR) in Turkey is 2.3, while the TFR of Syrian refugee women in Turkey is 5.3, higher than the TFR in Syria. We use the detailed information on fertility and migration history in DHS to explore the fertility patterns of Syrian refugee women in Turkey. Using event history methodology, we test whether elevated fertility may be the case for Syrian refugee women after arrival in the host country. We take into account time spent in Turkey, number of relocations inside Turkey (if any), the fertility rate of childhood and current provinces as well as socio-demographic indicators to observe the change in the total number of children. Our study aims to contribute to the field of the demography of forced migration by providing evidence on how war-induced migration shapes fertility

behaviour, using a rich dataset on Syrian refugees in Turkey.

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### **Who is aging out of place? Determinants of international retirement migration**

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While international retirement migration gained popularity with the rise of globalization and individualization, little is known about whom the retirement migrants are compared to those who do not migrate. To gain further insight into the selectivity retirement migration, we examine a broad set of determinants. We employed the survey of Dutch Retirement Migrants Abroad, a new dataset based on a probability sample of Dutch nationals with an oversample of retirement migrants (ages 66-90). The survey includes 5,225 migrants who migrated from the Netherlands and permanently reside in forty different destination countries and 1,339 Dutch retirees who reside in the Netherlands. Using discrete-time event-history models, we tested the effect of socioeconomic status, social ties, personality traits, and cultural values on the likelihood of migration. Having a partner and a higher occupational status raised the likelihood of migration. Additionally, retirement migrants were more likely to be adventurous, postmaterialist, and identify with the counterculture of the sixties than non-migrants. Having more social ties in the Netherlands decreased the likelihood of migration. This study highlights the complex interplay of determinants influencing who migrates and who stays. Our findings bring us closer to understanding this group of people who decided to age out of place.

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### **Estimation of ecosystem resilience and its linkages with infant and under five mortality in india: gender differences assessment across 707 districts, 2000-2020**

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Research Question: The frequency of climatic shocks in terms of rainfall deficit and heat stress has increased in the recent past and is expected to rise in the near future. The present study estimates the ecosystem resilience for the entire landmass of the country and explores the linkages with various episodes of neonatal mortality, infant and under-five mortality in India. Data and Methods: The study used satellite data to assess ecosystem resilience and mortality from the National Family Health Survey (NFHS-5). Univariate and bivariate spatial autocorrelation maps were used to identify the spatial autocorrelation and clustering of ecosystem resilience with neonatal mortality rate (NMR), infant mortality rate (IMR), under-five mortality rate (U5MR). We applied multivariate ordinary least square and spatial autoregressive models to check the association empirically. Additionally, we applied multivariate cox hazard model to estimate the hazard of dying at age  $t$  for an individual associated with exposure to a non-resilient ecosystem, given that they lived up to  $t$  years. Result: The ecosystem resilience map shows that the north western part of India is severely non-resilient while the central and south India is resilient. Spatial autoregressive model (SAR) results suggest that the ecosystem resilience is significantly associated with NMR, IMR, and U5MR. An increasing value of resilience showed statistical association with the decreasing ( $\beta$ : -6.730) prevalence rate of U5MR across India, followed by IMR ( $\beta$ : -5.242) and NMR ( $\beta$ : -3.452) at  $p$ -value of  $<0.001$ . Furthermore, the cox-proportional hazard model portrays that non-resilient ecosystems and temperature have raised these mortalities. Further, male children are 1.188, 1.114 & 1.17 times more prone to NMR, IMR & U5MR respectively, compare to the female children.

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### **From couch to fit: A bibliometric analysis of physical activity and reducing obesity in countries**

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This bibliometric analysis aims to explore the research trends and patterns related to physical activity and obesity. A total of 1995 articles were retrieved from the Web of Science database until 2023. The analysis includes bibliometric indicators such as the number of publications, citations, keywords, and bibliometric coupling to identify the research hotspots and collaborations. Results show a steady increase in publications, with the majority coming from high-income countries. The United States is the most productive country, followed by the United Kingdom. The most frequently used keywords are "weight," "exercise," and "health." The coupling analysis reveals that researchers from the same country tend to share similar research ideas frequently. Additionally, the analysis identifies research gaps in low- and middle-income countries and highlights the need for more studies focused on specific populations such as children, women, and older adults. Overall, this study provides a comprehensive overview of the research trends and knowledge gaps related to physical activity and obesity, which can inform future research directions and policy decisions.

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**Mapping the frontiers of health information research: A bibliometric odyssey**  
**Sally Sonia Simmons, Department of Social Policy, London School of Economics and Political Science**

The provision of health information has been recognised as a crucial strategy in mitigating the increasing health and economic costs caused by malnutrition in various countries, according to health promotion experts. In light of this, it is essential to establish a statistical inventory of research output on this subject to provide guidance to countries with limited health information research in creating health information indices. This research conducts a bibliometric review of 13,678 health information studies published between 1900 and 2023 and sourced from the Web of Science database. Using bibliometric methodologies, the study's focus was analysed, and the studies were cross-referenced with the research agenda. The analysis revealed several critical trends in health information research, including a significant rise in publications mainly from high-income countries, which indicates the growing importance of this field. The study also identified the most influential researchers and institutions in health information research, which can guide future collaborations and research initiatives. Additionally, the most cited and impactful articles in health information research were identified, which can serve as a valuable resource for researchers and practitioners. Finally, all health information themes were categorised into topics to identify emerging concepts in the field. In conclusion, this bibliometric analysis provides valuable insights into the present state of health information research, highlighting critical trends and outlining key areas for future research. The results of this study can guide researchers and policymakers to identify research gaps and address emerging issues in the field of health information.

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**The Muslim population's experience of loneliness during the COVID-19 pandemic in the UK**  
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Due to the strict and repeated lockdown measures during the COVID-19 pandemic, many people have suffered increased feelings of loneliness and isolation. However, these experiences have substantially varied for different ethnic and religious groups, some of which have been disproportionately affected due to extensive worship and community life restrictions. In this paper, we focus on the experiences of loneliness for the Muslim population in the UK. Using innovative data on ethnic and religious minorities' lives in the UK, the Evidence for Equality National Survey (EVENS), we focus on how feelings of isolation have changed during the pandemic, as well as on four specific dimensions of the experience of loneliness. Estimated logistic regression models revealed that compared to the rest of the UK population, Muslim people were more likely to experience decreases in feelings of loneliness during the pandemic. However, whereas there were no differences between the general population and Muslim people in the odds of feeling left out or isolated from others, we found that Muslim people were more likely to report feeling lonely even after controlling for gender, partnership status, household size or daily contact with family and friends. Our findings highlight that the decreases in feelings of isolation

during the pandemic might signal stronger mobilisation of support networks for Muslim people in the UK. Nonetheless, persistent feelings of loneliness warrant further investigation of the role of experienced discrimination in different life domains by the Muslim population in the UK.

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### **Delayed life transitions and the use of assisted reproduction: An analysis by educational level of women in Spain.**

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The recent increase in the use of assisted reproduction technologies (ART) in high-income societies may be explained by a substantial delay in the attempts to get pregnant. This postponement is, in turn, associated with other delays in the transition to adulthood events that occur mostly before parenthood, such as having a first job, leaving the parental household or cohabiting with a first partner. All population groups in contemporary European societies have experienced a delay in fertility, but this has not been uniform. In particular, highly educated women tend to spend more time in formal education and experience the critical life events that lead to parenthood. This research aims to analyse the different paths to ART and ART outcomes (live birth) according to women's level of education. Using longitudinal data from the 2018 Spanish Fertility Survey, we use Event History Analysis techniques to assess these differences. The results suggest that age at the first co-resident partnership has the strongest effect in predicting the likelihood of using ART, making highly educated women more likely to use assisted reproduction than their less educated counterparts. However, although highly educated women use ART later, they have higher cumulative live birth rates when considering the age at which they start using assisted reproduction. These rates are especially high at very late ages (43+), suggesting that they are more likely to use donated eggs.

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### **Gender & sexual and reproductive health in Brazil: the role of religion**

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In the past few decades, Brazil has experienced a religious transition. In 1970, 91.8% of the population self-declared Catholic, compared to 64.6% in 2010 (last available Census). At the same time, the proportion of Evangelicals of all denominations jumped from 5.2% to 22.2%. Therefore, the variable religion plays a crucial role in understanding current Brazilian population-related questions, including those related to sexual and reproductive health (SRH). This paper aims to analyze how gender roles are presented in SRH texts found in the magazine "Biblical Lessons" ("Lições Bíblicas" in Portuguese), published by the Assembly of God (AG) in Brazil. Using keywords (in Portuguese) connected to abortion, sexuality, and family planning, the search yielded two issues, one in 2002 and one in 2018. The content analysis of the two issues reflects the differences observed in the political momentum. 2002 was the last year of centrist Fernando Henrique Cardoso's second presidential term, whereas 2018 was the first out of four years of far-right Jair Bolsonaro's mandate when a new political moment was faced in the Brazilian public agenda linked to growing Evangelical participation. Consequently, the published content in 2018 is more direct and rigid in reinforcing established dogmas as a marker of difference between believers and non-practitioners if compared to 2002. There was a call for improving the Christian discipline as a form of resistance to mundane patterns, seen as the real enemy of family values.

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### **Intergenerational transmission of marriage norms: new evidence from urban India**

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In India, family-arranged marriages have historically been the most common form of partner selection. However, since the early 2000, urban areas have seen an increase in the proportion of joint-arranged marriages and, more slowly, self-arranged marriages. We exploit newly collected survey data representative of the Indian urban population to examine whether and how marriage practices are changing and marriage norms are transmitted between generations of the same family. In specific, our unique data allow us to examine the

relationship between (i) how marriages are traditionally arranged in women's families (family-arranged, jointly-arranged, self-arranged), (ii) their own marriage arrangements and (iii) their intention on how their children's marriages will be arranged. Descriptive findings suggest that an increasing proportion of women are self-arranging their marriages across both marriage and birth cohorts, though parent-alone marriages continue to be the most popular way of forming union; yet, we also observe that a change in norms is taking place, whereby women are increasingly willing to accept that their own children will marry through self-arranged, love marriage. Preliminary results from multinomial logistic models indicate that the probability of accepting self-arranged marriages for children is highest among women who self-arranged their marriages, but who were coming from families where marriages were typically arranged jointly with parents. These are followed by the "most modern" women, i.e., those who self-arranged their unions coming from families where self-arranged marriages are the norm. We find some heterogeneity across women's and their husbands' educational level, caste as well as region of residence.

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### **Estimating structural inequalities in the "cost of care"**

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Unpaid care is a 'wicked problem' across most (post-)industrialised nations. Low fertility rates coupled with advancements in longevity have simultaneously increased demand for -- and reduced the supply of -- social care. This remains one of the most contentious political issues discussed in the House of Commons to date, with the UK projected to shortly far exceed its ability to support those in need. As such, increasing 'costs of care' are realised and borne by those providing 'informal' care. This has become even more evident both during and after the Covid-19 pandemic, with the care infrastructure pushed to the extremes of its limit. We lack reliable, causal estimates of the effect that providing this care has, and what optimal policy responses should be. We also lack an understanding of how unequal these inter-sectional costs might be. Using rich longitudinal data from the UKHLS, we computationally expand the Individual Synthetic Control method as proposed by Vagni and Breen (2021). We create weighted 'counterfactual' versions of carers based on their socio-demographical characteristics, and use this person as a 'control' version to calculate opportunity costs of providing care based on an observed, 'treated' version of themselves. We answer questions such as, but not limited to: What are the differences in net household income in real terms between carers and non-carers across time? How do these effects aggregate up from the micro, to the meso and macro levels? How are these effects stratified across age, gender, ethnicity or geo-spatial location?

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### **Work-family life courses and retirement: a machine learning approach**

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This article utilizes machine learning to model career outcomes and life paths to identify at-risk groups for long-term unemployment as individuals approach mandatory retirement age. With increasing life expectancy, a shrinking working-age population, and drops in fertility, individuals are expected to work longer in later adulthood. However, policies aimed at promoting longer working years must consider the various circumstances that may prevent certain groups of people from participating in the labor market. Prior research has shown that employment opportunities in later life are closely linked to prior employment trajectories. For example, those with more years worked in physically demanding jobs are more likely to retire early due to disability or long-term unemployment resulting from obsolete skills. Early retirement is frequently linked to decreased pension benefits, and if working years are extended, more individuals may experience involuntary job loss, exacerbating social disparities among the elderly population. To project whether and when individuals may become disabled, unemployed, switch to part-time work, or leave the workforce to care for family members in the 10 years before mandatory retirement, the German Pension Insurance data and a sequence-to-sequence Transformer model are utilized. Projected life course outcomes are clustered using the sequence analysis, and multinomial logistic regression is used to explain the risk of long-term unemployment near retirement. According to the preliminary results, there are several sectors of the economy in Germany where individuals are expected to experience significant changes in the coming years, including the digital sector, renewable energy, and healthcare.

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### **Using Wikipedia data to monitor unexpected migration events**

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Migration flows are phenomena difficult to monitor and predict. The challenge increases when these migration events are related to reasons difficult to anticipate, such as the onset of wars. Digital trace data are a complementary source of information that can help to monitor, predict and assess real-time changes faster than official statistics. In this study, we propose a methodology to use Wikipedia data to determine how the number of views or edits on Wikipedia pages about countries and cities around the world change over time due to rising interest, in response to big migration events. As a case study, we focus on two recent mass migration events caused by wars in Syria (2011) and Ukraine (2022). We investigate the number of edits in Arabic and Ukrainian across Wikipedia pages dedicated to European countries. Moreover, we assess and correlate the number of views on Ukrainian Wikipedia pages dedicated to cities in Poland with the number of Ukrainian refugees in Poland. Our results contribute to the literature on the relationship between information and migration networks and reveal opportunities in the use of Wikipedia as a proxy to study and predict mass migration flows.

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### **Variation in sources: Counting hard to reach populations, the case of Orthodox Jews in London**

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How can researchers better ensure they have reliable counts for hard-to-reach populations? It is widely known that Orthodox Jews in the United Kingdom are undercounted on the national census. On the other hand, non-governmental organizations are incentivized to inflate counts on their membership registrars in return for more state resources. In this research note, we demonstrate the utility of using sources at different levels of analysis which come from different agencies and organizations, for triangulating and estimating counts of hard-to-reach populations in advanced industrialized democracies. We rely on the case of Orthodox Jews in London and demonstrate how bridging micro-level data (interviews), meso-level data (non-state associations) and state-collected macro-level data (state collected) gives radically different estimates for the number and distribution of Orthodox Jews in London. We end with a discussion which outlines a framework for better aligning data sources with research questions when the true population counts of hard-to-reach populations are unknown.

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