

## Regional and local demography

Session organiser: Dr. Mark Fransham (University of Oxford)

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### 2.45pm Tuesday 6 September

#### **Challenges of updating demographic projection models to incorporate the results of the 2021 Census** **Ben Corr, Wil Tonkiss; The Greater London Authority**

The Greater London Authority produces a range of annually updated demographic projections to inform strategic and local planning across London. Census data form crucial inputs to the GLA's models, underpinning assumptions about the size and characteristics of the population and dwelling stock, as well as patterns of migration, and trends in household formation. With outputs from the 2021 Census being released from summer 2022 onwards, the GLA is now preparing to update its models to incorporate this new information. The process of updating the models is likely to be complicated by a number of issues, including:  
A long timeframe for the release of all necessary Census tables, requiring that individual model components be updated piecemeal over the course of a year or more.

The need to generate back series of key input data consistent with both the results of the 2021 and 2011 Censuses. This will be made more challenging by the high level of uncertainty about changes that have occurred since the start of the pandemic

The Census capturing a snapshot of an atypical period, where patterns of migration were greatly disrupted by the pandemic, and which may not provide a good basis for projections of future behaviour.

In this presentation we will outline these challenges in more detail and demonstrate some of the methodological approaches we have developed to address them.

Email: [ben.corr@london.gov.uk](mailto:ben.corr@london.gov.uk)

#### **Uncertainty of population projections and its impact on policy making in shrinking regions** **Frank Swiaczny; Federal Institute for Population Research (BIB) Germany**

Population projections at the subnational, regional and local level are widely applied for spatial planning and policymaking. Volatility of population trends and uncertainty of projections are common issues to consider when taking planning and policy decisions. Volatility and uncertainty are particularly prominent at lower levels of scale, where internal migration patterns determine a large degree of variation in regional population trends. To address the uncertainty of projection outcomes, especially at the regional and local level, scenarios with alternative assumptions and probabilistic prediction intervals can be utilized. The presentation draws on recent regional population projections for Germany and the Netherlands at the county and municipality level to discuss how population projections shape planning and policy discourses and the perception of places, especially under conditions of population decline. Volatility and uncertainty of growing populations are part of generalized growth scenarios and an established practice of "planning for growth". Variation in population growth can be addressed by gradually adjusting existing plans. However, predicting population decline, which is a reality in a rising number of regions across Europe, imposes a paradigm change. Population decline is often perceived as a stigma that frames a negative future of places and contributes to a vicious circle of regional decline, in which a shrinking population plays a pivotal role. Whether a population is predicted to continue growing, to remain stable or to start to decline asks for fundamentally different approaches of policymaking and accepting a culture of "planning for decline".

Email: [frank.swiaczny@bib.bund.de](mailto:frank.swiaczny@bib.bund.de)

#### **Uncertainty of population projections and its impact on policy making in shrinking regions** **Niall Newsham, Francisco Rowe; University of Liverpool**

Human populations are in a constant state of change and are dependent on fertility, mortality and migration outcomes. Spatial differences in the extent of these demographic drivers lead to unequal demographic

developments across territories. Within Europe, interactions between these drivers are increasingly producing population declines, with the continental population of Europe projected reverse its longstanding trajectory of growth into that of decline by 2025 (UN 2019). Such decline is expected to bring about unprecedented social and economic challenges to all levels of governance. This study aims to analyse the causes of sub-national population declines across the entirety of Europe, in a total of 735 areas in 34 countries. Specifically, we apply Das Gupta's decomposition (Das Gupta 1991) to empirically determine the contributions of fertility, mortality and migration to population decline from 2000 to 2018, creating trajectories of these contributions. We will then compare the similarity of these trajectories using a k-means algorithm to cluster areas with homogeneous causes of population decline. Considering the results of a preliminary analysis, we anticipate a range of distinct clusters detailing the temporal evolution of causes of population decline. From this we will analyse the spatial distribution of the clusters across Europe and highlight area specific policy strategies for the mitigation and prevention of population decline for all areas.

Email: [niallnewsham22@gmail.com](mailto:niallnewsham22@gmail.com)

**Measuring small-area level deprivation in Belgium: The Belgian Index of Multiple Deprivation 2001 and 2011**  
**Martina Otavova<sup>1,2,3</sup>, Christel Faes<sup>2</sup>, Catherine Bouland<sup>4</sup>, Eva DE Clercq<sup>5</sup>, Bram Vandendinden<sup>2,4,5</sup>, Thierry Eggerix<sup>1</sup>, Bruno Masquellier<sup>1</sup>, Brecht eveleeschauwers<sup>3,6</sup>; <sup>1</sup>Center for Demographic Research, UCLouvain, <sup>2</sup>Data Science Institute, I-BioStat, Hasselt University, <sup>3</sup>Department of Epidemiology and Public Health, Sciensano, Brussels, <sup>4</sup>Research Centre on Environmental and Occupational Health, School of Public Health, Université Libre de Bruxelles, <sup>5</sup>Department of Risk and Health Impact Assessment, Sciensano, Brussels, <sup>6</sup>Department of Translational Physiology, Infectiology and Public Health, Ghent University**

Simple measures of income, education or employment are the most common proxies of socioeconomic deprivation used in Belgium. Our goal was to develop a time- and space-specific, composite measure of deprivation, the Belgian Index of Multiple Deprivation (BIMD), represented by a single summary measure whose interpretation is straightforward. We combined individual data from the 2001 and 2011 Belgian Censuses, the National Register on all-cause mortality and population structure, and aggregate data from the Intermutualistic Agency and Federal Police Belgium. Construction of the BIMDs required multiple steps. Firstly, in sync with literature review of currently existing indices and in collaboration with Belgian stakeholders and experts, we identified six domains (income, employment, education, health, housing, and crime) and their indicators for statistical sectors, the smallest administrative unit in Belgium. To combine indicators into domains, we standardized them by ranking, scaled them and added the scaled scores together using equal weights, or, if possible, weights generated by the maximum likelihood factor analysis. To generate overall BIMDs scores, we used exponential transformation of domain scores and combined these scores with explicit weights into overall BIMD scores. Domain and overall BIMD scores were then ranked from 1 to 18 295 from the most to the least deprived statistical sectors and assigned to deciles. Our final products, the BIMD2001 and the BIMD2011, are suitable not only for use by local policy makers and communities for effective targeting of resources, but also in academia or public health for further investigation of health or environmental inequalities.

Email: [martina.otavova@uclouvain.be](mailto:martina.otavova@uclouvain.be)

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