Developments in official population statistics

Strand organiser: Phil Humby (ONS)

Ensuring official statistics on population and society serve the public good
Claire Mokrysz - ONS

Official statistics should serve the public good. The Office for Statistics Regulation (OSR), as the independent regulatory arm of the UK Statistics Authority, works to uphold the trustworthiness, quality and value of statistics and data used as evidence; protect the role of statistics in public debate; and develop a better understanding of the public good of statistics. Our regulatory work is guided by the statutory Code of Practice for Statistics, which we set and assess compliance against. A key aspect of the Code is ensuring that statistics address user needs. Population statistics have a uniquely significant role, forming the denominator for many other statistics produced both within and external to government. The Population and Society (PopSoc) domain within OSR has a remit across the four nations covering statistics on the size and geographic spread of the population (including census and admin-based population statistics), on the factors driving population change (including births, deaths and migration), and on people's lifestyles and culture, including sport, language and identity. In this presentation, we will cover the role of OSR, with a focus on recent regulatory work from the PopSoc domain, as well as how we support and encourage producers to engage with those who use their statistics to help to ensure their needs are met.

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Towards a better understanding of Unattributable Population Change 2011-2021 for the Lower Tier Local Authorities of England and Wales
Tony Champion - Newcastle University

After each decennial Population Census, the Office for National Statistics (ONS) revises the mid-year estimates rolled forward from the previous Census so as to match the results of the latest one. As part of this process, ONS adjusts its annual series for each of the separate components of population change using its latest records and methodology, which it has now done for 2011-2021. The results of this 'reconciliation' exercise reported in articles released in November 2023 and April 2024 reveal that, even after adjusting the original mid-year estimates series by reference to the latest data and methods including backdating the Higher Education Leavers Method (HELM) to 2011, for every local authority there is a residual between the sum of these revised components and the overall 2011-2021 population change indicated by the 2021 Census, which ONS lists as a separate 'component' labelled Unattributable Population Change' (UPC). For the majority of places, this is fairly small relative to their total population size, but for a significant minority it is substantial, raising questions as to its nature and degree of permanence and to whether some allowance should be made for it in ONS's post-2021 population estimates and projections. This paper strives for a better understanding of UPC by examining its geography across the 331 local authorities of England and Wales, then correlating their UPC 'rates' with a selection of their characteristics, ending up with a typology summarising the principal dimensions of UPC variation.

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Rebasing and reconciliation of mid-year population estimates following Scotland's Census 2022
Michael Edie, Martin Miller, Jennifer Pennock - National Records of Scotland,

Accurate population estimates are the cornerstone of effective policy planning and resource allocation. In Scotland, National Records of Scotland (NRS) continuously strives to refine methodologies to ensure the most precise population figures. In this paper, we present the rebasing of the last ten years of population estimates, focusing on the integration of 2022 Census Data and an updated International Migration Methodology.

Between censuses, National Records of Scotland produces annual mid-year population estimates, using the preceding census as a benchmark and rolling forward each year, accounting for births, deaths and intra and international migration. Over the ten-year inter-censal period, these rolled forward estimates "drift" from true population and that found at the subsequent census. Drift refers to the gradual divergence between estimated population figures and the actual counts observed. It is mainly due to the migration figures, as migration is the most difficult part of population change to estimate. Here, we scrutinize the scale and causes of such 'drift effects' and subsequently rebase our population estimates for the last decade.

The rebasing process begins with census data gathered in 2022, providing the foundation for population stocks. To address the dynamic nature of international migration, we investigate census data and administrative records to identify levels of migration churn and in particular

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Making the UK the best place to be a veteran.
Trudy Hill, Esme Hookway, Hannah Willmett, Chloe Stone, Emily Knipe, Office for National Statistics

For the first time, Census 2021 in England and Wales asked a question about previous service in the UK armed forces. 1.85 million UK armed forces veterans responded to indicate that they had served as either a regular, reserve or both. Building on that response and to be able to capture more detailed data about life after service in the UK armed forces, the ONS conducted the first UK wide Veterans' Survey on behalf of the Office for Veterans' Affairs.

This presentation will show how Census 2021 data has been analysed to provide the first official insight into the UK armed forces veteran population, their families, and how veterans compare with a non-veteran population, filling a data gap and helping public bodies fulfill their duties under the Armed Forces Covenant.

The presentation will then describe how the Veterans' Survey was developed, processed and analysed to give a powerful insight into the demographic, social, and economic situation of veterans across the UK. The survey data has been used to understand veteran's experiences of transition to civilian life, gaps in services and experiences of life after service for niche veteran groups. Our ongoing research of the survey data will be used to understand outcomes, help develop evidence based policy and inform service providers about the specific needs of veterans and their families.

The development of these official statistics have helped to deliver commitments under the UK Government strategy and moving forward provide a foundation of statistics about the UK armed forces veteran community.

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Past, present, and future national population projections
James Robards, Michelle Clift-Matthews, Tom McGrail White - Office for National Statistics

National population projections (NPPs) provide vital insights for policymakers into what the future population of the UK might look like if observed demographic trends continue. Responding to user needs, and in order to include the latest available census and international migration data, ONS, with colleagues at NRS, NISRA and the Welsh Government, has provided a number of annual interim NPPs releases over the last three years. This presentation will describe the latest insights into the potential future population of the UK and development of assumptions for interim 2021-based NPPs. In the latest NPP release the UK population, estimated to be 67.0 million in mid-2021, is projected to rise by 6.6 million to 73.7 million over the next 15 years to mid-2036 (a 9.9% increase). In comparison, between mid-2006 and mid-2021 the population is estimated to have grown by 6.2 million (a 10.2% increase). For the latest release, expert views, and the latest migration estimates (for mid-2022 and mid-2023) along with use of updated migration statistics for the period 2012 to 2021, led to expectations of higher net international migration than the assumptions used in previous 2020-based interim NPP releases. This presentation will explain the development of migration assumptions for the latest NPPs and explore key findings before going on to show preliminary insights from our comparison of past rounds of NPPs to rebased mid-year estimates, registered births and registered deaths and conclude by outlining planned timescales for release of future projections more broadly aligned to the regular biennial release timetable.

Comparison of Scotland's Census and Combined Administrative Dataset
David Rowley - National Records of Scotland

As happens after every census, National Records of Scotland are now considering the shape and scope of future delivery for population statistics in Scotland. SIDDs (Scotland's Integrated Demographic Datasets) are statistical population datasets constructed by linking several administrative datasets together: electoral register, education and health datasets, and vital events. Business rules use information from the source datasets, along with which datasets individuals appear on, to filter this to individuals estimated to be usual residents of Scotland. SIDDs have been produced for each year from 2016 to 2022 (including census day), and the counts of individuals on these are Administrative Data Based Population Estimates (ABPEs).

This talk presents analysis on individual-level and aggregate comparisons between the SIDDs and official benchmarks (census and Mid-Year Estimates (MYEs)). Individual-level comparisons explore the overlap between the SIDD and the census. Aggregate comparisons look at differences down to data zone level, giving insights into what parts of the population the ABPEs might struggle to accurately estimate. Trends over time are compared between the ABPEs, MYEs and the changes between the 2011 and 2022 censuses.

Comparisons of household numbers and structure breakdowns are also presented. Where there are differences, individual-level comparisons can show whether this is due to the SIDD having missed individuals, including individuals in error, or placing individuals at the wrong location. Comparing the locations of individuals on the SIDD and census also shows which administrative data sources most accurately place individuals, with implications for geographic breakdowns of population estimates from administrative data.

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Population estimation for Scotland's Census 2022
Benjamin Little & Ralph McDevitt - National Records of Scotland

National Records of Scotland published first outputs from Census 2022 on 14 September 2023. As in previous census cycles, we planned to use stratified Dual-System Estimation utilising a Census Coverage Survey (CCS). Due to lower-than-expected response rates to both the census and the CCS, we adapted our methods to enhance the CCS with administrative data and changed our Dual-System estimation approach to utilise a logistic regression model.

We explain the rationale for these changes in methodology. We based this decision on reducing error, bias, and overcount, particularly that arising from administrative data.

We then describe how our model selection process worked. To evaluate a range of models, we created datasets with different variable groupings. The main effects were chosen a-priori, while interactions were selected by stepwise selection. Models were evaluated using k-fold validation, with the goal of maximising model fit and minimising error. Bootstrapping was then used to estimate model variance. The best model was then combined with over-coverage weights from a separate probabilistic Bayesian overcount model.

We then discuss the QA process for the estimates, which included various internal and external stakeholders. During this process we identified some bias in the estimates which were corrected by calibrating to a trusted data source for some regions or demographics.

We present the final rounded estimates along with key comparators. We discuss why we are confident in the quality of our outputs, including the feedback we received from both users and our International Steering Group and in comparison to our KPIs.

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Regulating population statistics: OSR's assessment of ONS's admin based population estimates in England and Wales
Vicky Stone & Catherine Davies - Office for Statistics Regulation

The Office for Statistics Regulation (OSR) are currently assessing ONS's Admin Based Population Estimates (ABPE) in England and Wales. Measuring the population accurately is an essential part of understanding different aspects of our lives and our communities. Population estimates are used for making important government policy decisions at a national level, but also at more detailed regional and local levels.

The Office for National Statistics (ONS) has traditionally produced its population estimates using information from a survey it carries out every 10 years – the Census. To improve statistics on population to reflect changes in society and technology and better meet user needs, ONS has developed Admin Based Population Estimates (ABPE) for England and Wales using the Dynamic Population Model.

Our assessment is considering whether the statistics meet the professional standards set out in the Code of Practice for Official Statistics, with the first phase focused on the following areas:

1) The suitability and quality assurance of the data and methods used in the Dynamic Population Model to produce population estimates in England and Wales.

2) The extent to which ONS is benchmarking the state of readiness of population estimates to replace the cohort component method previously used.

3) An initial investigation into user understanding of, and confidence in, the proposed new method, and ONS communications on this.

We expect to publish the findings from the first phase of our assessment in June 2024 and will be able to share these as part of the session at the conference.

Improving Travel and Tourism Statistics: Understanding the UK's Temporary Population
Claudia Jenkins - Office for National Statistics

Following a review of our statistics in 2019, the Office for National Statistics are transforming the way we collect travel and tourism (T&T) data in order to deliver more efficient, accurate and coherent T&T statistics. This involves moving away from the sole use of the International Passenger Survey (IPS) and instead using a new mixed methodology approach. The new approach from July 2024 includes the introduction of household survey data (e.g. The Great Britain Tourism Survey), with the ONS's longer-term ambition being to move to an administrative data model with machine learning methodologies. Primarily, ONS have been exploring the possibilities that short-term accommodation, mobility and financial transaction data (e.g. Airbnb, Advanced Passenger Information and VISA card data to name a few) can bring to better understand international mobility and the temporary population in the UK. This presentation will talk through the approach, research and complexities involved in introducing novel methodologies to measuring T&T, as well as outline some initial results for comparing survey and administrative data methodologies.

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Admin-based living arrangements: New research and innovative methods
Sally Mylles – Office for National Statistics

Accurate and timely data on the living arrangements of residents of England and Wales is a priority for national and local governments as well as other users. While the decennial Census collects these data, the more time that passes between censuses, the less timely and reliable that information becomes. Between censuses, outputs on households are produced using the Labour Force Survey but the geographic breakdowns that can be produced are limited by sample sizes.

ONS has the ambition to use administrative data to produce estimates of the number, size and composition of households in England and Wales. To our knowledge, this is a novel approach not yet undertaken by any other national statistics agencies. We aim to produce estimates which are more timely and at a lower level of geography than is presently possible and that are coherent with the admin-based population estimates (ABPEs). This presentation will provide an overview of work to date to produce an admin-based living arrangements dataset. It will also cover plans for the next few years to move towards producing robust estimates for households that are of sufficient quality to be labelled as official statistics in development.