

# Developments in Official Population Statistics strand abstracts

## Office for National Statistics

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### 1.30pm Monday 13 September: Session 1: Census 2021 in England and Wales

#### Overview of Census 2021

**Jon Wroth-Smith; Head of Census Statistical Design, Office for National Statistics**

In 2021 ONS carried out the decennial Census and is now in the process of producing the essential statistics which result. The first part of this overview will set some of the key elements of the overall design and a number of adaptations that were made as a result of the pandemic. This includes changes that were made ahead of the operation and during the operation itself.

The second section will provide summary of the steps that are being taken to produce the final statistics including the implementation of our coverage and validation strategy. This is critical as there is inevitably some under (and over count) with the census so we are using a range of methods to ensure that the final statistics are representative of the whole population rather than just who completed a census form.

As in previous years, ONS is undertaking a comprehensive validation of the census estimates before they are published. This work builds on the range of work ONS has undertaken using administrative sources since the last census, including the development of Administrative Based Population Estimates (ABPEs) as part of its ambition to transform the way that population and migration statistics are produced.

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#### Addressing in Census 2021

**Rob Doherty; Census Statistical Design Address Lead, Office for National Statistics**

Census 2021 has an address-based design. It is through an address that we make initial contact, that we monitor return rates and through which we remind householders of the need to complete a return. This session will set out how the address frame was developed ahead of Census 2021. A range of data sources were used during this process, including AddressBase and a range of supplementary administrative sources for communal establishments such as halls of residence or care homes. During the development phase we also carried out a clerical review process to give us greater confidence in the addresses we made initial contact with.

During the live operation we maintained the address frame by adding new cases and changing the classification type where required. The second part of this session will set out some of the key learnings, including the clerical resolution process we carried out. We will also set the census experience in the context of the future development work that ONS will be carrying out to transform social and economic statistics making greater use of administrative data.

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#### Developing Covid-19 relevant Census 2021 outputs

**Samantha Trace; Research Officer (Census), Office for National Statistics**

The census has historically met two main types of user need:

- Describing the population and its characteristics on census day
- Informing plans and decisions in the 10 years following census day

At the start of the global Coronavirus pandemic, the ONS undertook frequent assessment of the viability of undertaking Census 2021 as planned. This included working with stakeholders to assess the impact on identified user needs if Census 2021 in England and Wales went ahead under Covid restrictions. A key finding was the need to describe the population on census day, which would then allow us to use the Census as a baseline for monitoring recovery from the pandemic.

We therefore updated and added to the guidance provided alongside the questionnaire to emphasise that respondents should provide answers reflective of their situation on 21 March 2021. This is important for topics where circumstances may have changed as a result of the pandemic.

To maximise the utility of the data in the current social and economic context we have also reassessed our plans for producing outputs, and are working on some new proposals. These include, for example, indicator variables allowing statistics on:

- key workers
- those not in employment, education or training (NEETs), and
- care home residents

We also identified a risk of reduced utility of some existing outputs, such as travel-to-work data, where circumstances may be subject to rapid change.

This presentation will explore how we developed the guidance before moving on to discuss our specific proposals for innovative new outputs and how we have assessed if the data produced would be of high enough quality and non-disclosive.

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## **3.00pm Monday 13 September: Developments in official population statistics: Session 2: Census Outputs and Analysis**

### **Overview of the Northern Ireland Census 2021**

**Daniel McConville; Northern Ireland Statistics and Research Agency**

NISRA carried out the decennial Census in Northern Ireland in 2021 working closely with ONS throughout its planning and delivery. Whilst many of the systems and services used to deliver the Northern Ireland census were shared with ONS, there were also local differences in the questionnaire and in a number of key delivery areas. NISRA will outline some of these key differences and cover what steps were taken as a result of the pandemic. The presentation will also touch on plans for the upcoming NISRA outputs consultation and how users can participate in and contribute to that.

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### **Outputs and analysis release schedule**

**Edward Morgan; Head of Census Analysis Coordination, Office for National Statistics**

ONS has committed to the ambitious target of publishing first findings from Census 2021 within one year of Census day and the full range of outputs within two years of Census Day.

To meet these targets, we have developed a four-phase release schedule to meet the needs of our stakeholders. To ensure we maximise the utility of the Census 2021 data and achieve significant public and policy impact, we have developed a comprehensive analytical programme that will run from Spring 2022 to Summer 2025. The programme aims to shine a light on all areas of society, produce statistics on every sub-population, provide statistics which are relevant to the population it serves and produce a coherent story of our population. A core area of focus will be on the three new questions on sexual orientation, gender identity, and armed forces veterans.

This presentation will lay out the shape of the release schedule and the accompanying analytical plans. Looking beyond March 2023, ONS will discuss developing plans around what is possible in terms of UK data releases, especially given the move of Scotland's Census to 2022 and further Census 2021 analysis linked to other data sources such as income data.

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**Accessing Scottish Census data**  
**Liam Cavin; National Records of Scotland**

Abstract: At National Records of Scotland we are committed to making information from the Scottish Census available for use. In addition to publicly accessible datasets, we produce a range of microdata products available to researchers. We create bespoke extracts of record level data for use in research by accredited researchers, which can be accessed only in secure environments. In this talk, we will outline the range of data products that are available, the scope of demographic and socioeconomic variables covered, the processes involved in seeking access, and summarise some uses of the data by researchers. Our aim here is to help you understand how you might be able to access census data for use in your own research projects.

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**Data visualisation for Census 2021 outputs**  
**Rob Fry; Head of Data Visualisation, Office for National Statistics**

This presentation will cover a range of new editorial and data visualisation formats that we're exploring and building towards ahead of our Census 2021 release schedule. Our aim is to help support a wide range of user needs and maximise the benefits of Census 2021 data and analysis. We will present our early prototypes and thinking behind them. Some formats are more exploratory in nature, for example small area mapping atlas, whilst others will be more explanatory e.g. semi-automated techniques to present localised narratives.

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**9.00am Wednesday 15 September: Session 3: Developments in Official Population Statistics**

**The impact of the Coronavirus (COVID-19) pandemic on population estimates for England and Wales**  
**Neil Park; Head of Population Estimates Unit, Office for National Statistics**

While the Coronavirus (COVID-19) pandemic has clearly changed the levels and drivers of population change across England and Wales, it has also had a significant impact on the data sources used in the construction of the annual population estimates. Specifically, the pandemic has caused delays in the registration of births, the suspension of the International Passenger Survey, and a range of challenges to the assumptions that we make when producing the mid-year estimates for England and Wales. For example, the GP patient register is used in three of the components of the mid-year estimates (internal migration, international immigration, and emigration) but the pandemic may have changed the way individuals interact with it, and there may be geographic patterns to these changes.

In addition, the definitions that we use for the population estimates (e.g., usual residence, term-time) have become more difficult to define since the start of the pandemic. For example, typically, the majority of students spend most of the year at their study location. However, this is less clear in the year to mid-2020 with the curtailment of the academic year occurring in March/April 2020, 6 months into the year.

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**2023 recommendation: transforming our population and social statistics**  
**Larry Bartleet and Vicky Staples; Census and Transformation Policy and Engagement Team, Office for National Statistics**

Where next after Census 2021? In 2023, the National Statistician will issue recommendations to Government on the future of the population and social statistics system, including the future of the census, as part of ONS's Census & Data Collection Transformation Programme. As laid out in the 2021 Census White Paper and several publications since, ONS is developing its use of administrative data so that statistics on the population and housing can be provided by integrating the best available sources of information (such as administrative data, surveys) to be more responsive to user needs.

Eight 'lenses' are guiding ONS's approach to these recommendations, so that they reflect core user needs, are methodologically assured, and deliverable. A key 'lens' of interest is 'ambition': ambition to improve the accessibility, timeliness, and flexibility of our statistical system, and to deliver a better service to our users. We will introduce our approach and the story so far in the first presentation.

Another of our lenses is 'consultation & engagement': ensuring that we have consulted widely on what users want and need from a transformed system, and that we are transparent in how this is reflected in the work building towards the recommendations. We will introduce our plans over the next year and highlight all the opportunities for you and your colleagues to get involved in our pathway towards the 2023 recommendation.

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**Bringing together and making best use of admin data: the potential for population characteristic estimates**  
**Sam Pendleton, Alison Reynolds, Joe Herson; Social Statistics Transformation and Research, Office for National Statistics**

As part of our plans to deliver the 2023 recommendation, we are conducting extensive research into the potential to use administrative and survey data to produce statistics that describe the characteristics of the population and housing. This research uses and links various administrative datasets shared with ONS for statistical purposes by other government departments and organisations. This presentation will shine a spotlight on ethnicity, focusing on initial research into the potential for producing statistics on the population by ethnic group using Hospital Episode Statistics, English School Census and Improving Access to Psychological Therapies data. It will explore the challenges of using administrative data, the methods used to bring data sources together, the quality and coverage of data sources and our plans for further research.

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**Regulating official population statistics to serve the public good**  
**Siobhan Tuohy-Smith and Mari McGhee, Office for Statistics Regulation**

Population statistics are crucial in informing public and political debates, and sit at the centre of discussions of health, education, the economy, migration and many other topics at both the national and regional levels. As regulators at the Official for Statistics Regulation, it is our role to support confidence in official population statistics by addressing harms and making sure that these statistics serve the public good. In this session we will explain the role of the Office of Statistics Regulation and how our work ensures that official population data and statistics are of sufficient quality and value to reliably support public debate and inform decision making for a wide range of stakeholders. We will draw on case studies from our recent work, including how we have been responding to the changing environment of the pandemic and its impact on society and the economy.

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## **10.30am Wednesday 15 September: Developments in official population statistics: Session 4: Working towards integrated population and migration estimates**

### **Creation of Administrative Based Population Estimates for Scotland**

**Lindsay Bennison, David Rowley; Scotland's Census 2022: Admin Data Team, National Records of Scotland**

In November 2020, National Records of Scotland (NRS) published statistical research on Administrative Data Based Population Estimates (ABPE) for Scotland's population in 2016. This presentation will discuss the methodology used in this process and present some findings.

After completing the governance process for this project, 11 administrative datasets were processed and de-identified at NRS, before being transferred to Scotland's National Safe Haven for linking and analysis. The methodology used several linking variables so data could be linked, even without exact agreement between records. Records from across the data sources were resolved into individuals using these links. Business rules then indicated which individuals to include in Scotland's Integrated Demographic Dataset (SIDD). The ABPE were then produced from this.

The presentation will also compare the ABPE with the official mid-year population estimates (MYE) at Scotland level and broken down by age, sex, deprivation and urban-rural classifications. The ABPE figures are similar to those of the MYE, and the distributions are roughly similar at a national level. However there remain some interesting differences. The presentation will look at these findings in more detail.

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### **Update on population and migration statistics transformation**

**Justine McNally; (Social Statistics Transformation, Analysis and Research) and Fiona Aitchison; (Centre for International Migration), Office for National Statistics**

ONS are working to transform population and migration statistics to make best use of new and existing data sources and meet the needs of our users for better evidence to support decision-making at both national and local levels. We will provide an update on the latest progress with our research to develop new admin-based migration estimates (ABME) and admin-based population estimates (ABPE).

We have focused our development of ABME on using DWP RAPID and Home Office border data to measure international migration into and out of the UK. RAPID data provide a view of interactions across the breadth of government benefits and earnings datasets. Using this data, we are developing methods to estimate long term migration based on interactions with benefits and earnings systems. Border data from the Home Office provide further insight into the cross-border movement of people.

We will also share analysis of our current ABPE methods, the insight we have into how this has been impacted through data sources changing over time, how we are developing our understanding of the quality of the ABPE and how we plan to develop the ABME and ABPE to bring them together into a coherent system.

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### **Estimating international migration during the COVID-19 pandemic**

**Nicky Rogers<sup>1</sup>, Louisa Blackwell<sup>2</sup>, Duncan Elliott<sup>3</sup>, Amy Large<sup>4</sup>, Sonya Ridden<sup>5</sup> and Mingqing Wu<sup>6</sup>, Principal Methodologists (<sup>1-4</sup>) and Methodologists (<sup>5-6</sup>), Office for National Statistics**

The coronavirus (COVID-19) pandemic presents a significant challenge to the UK and the statistics that we rely on. Vital information is needed more than ever to respond to its impact. The pandemic has disrupted our assumptions, methods and data sources around migration, necessitating innovative use of other data and modelling methods to produce timely measures.

The International Passenger Survey (IPS) stopped in March 2020, due to the pandemic. This accelerated the need to use administrative data sources to fill the evidence gap. New and innovative methods were needed to

estimate international migration. These methods had to also acknowledge potential disruption due to Brexit and the introduction of a new immigration system at the end of 2020.

In this presentation we describe our use of Multivariate State Space Models to estimate international migration. We are developing these with timeseries experts in ONS Methodology and with modelling and migration experts at the Universities of Southampton and Warwick. We are indebted to colleagues at the Home Office for making data available to us and for their expertise and input. We engaged with experts from academia, government, and other agencies to follow their judgement on model assumptions to produce a range of provisional estimates for the COVID-19 period.

Repurposing and using administrative data as a proxy for international migration estimation, we are also working closely with data visualisation experts in ONS to try to communicate such complexity to a wide range of stakeholders and audiences.

We welcome feedback on this work in progress.

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### **Fractional Counting for administrative based population statistics**

**Matthew Plummer, Michael Hawkes, Daniel Ward, Jonathan Rees, Iva Spakulova, Almas Mumtaz, Greg Payne, Alison Whitworth; Statistical Methodologist, Office for National Statistics**

The fractional counting project aims to provide multivariate, small area population statistics using a weighted administrative dataset. Initially, an integrated admin-based population dataset is derived by linking together anonymised record-level data between several administrative data sources. This linked dataset contains attribute information such as age, sex and location of residence, from which multivariate outputs can be derived. However, there may be instances where individuals have conflicting information, such as multiple conflicting address records. Ultimately, the fractional counting project aims to develop a method that resolves uncertainties in the underlying sources, such as conflicting information, to provide accurate population counts. Whilst other approaches have developed integer-based methods, counting on a fractional basis is more data driven and requires less assumptions to be made, which may lead to less bias in the estimates. In addressing the conflicting location of residence issue, linked admin records from 2011 are initially linked to records from the 2011 census (we assume represents a 'truth' state of information for individuals) to establish a residency weight for each record in the hypercube (ranging from 0-1). Weights are then adjusted to account for other uncertainties, such as the reliability associated with each admin source, to provide more accurate population estimates. A challenge for the project is to continuously adjust the weights as the hypercube 'rolls forward' each year following 2011. This project will consider using a population attributes survey to adjust the weights as the hypercube moves forward year on year, to provide continuously updated population characteristic estimates.

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