

Special Session on ‘The Role of the Census in Regional Science’ at the 46th Regional Science Association International: British and Irish Section, in collaboration with the UK Data Service-Census Support on Wednesday 23 August at the Crown Hotel, Harrogate, Yorkshire, United Kingdom

The census is a major undertaking. No other single data collection exercise sets out to collect information from all individuals and households in the United Kingdom at a point in time. Obtaining details of over 59 million individuals in 2011 was a remarkable achievement in itself. However, in the words of the National Statistician, “The success of the census is not defined by the by how many people completed the form..... A successful census is defined by how it is used”. This session aims to demonstrate the value of population census data to Social Science in general and to Regional Science in particular. The session is organised to celebrate the publication of *The Routledge Handbook of Census Resources, Methods and Applications: Unlocking the UK 2011 Census*. Many of the presentations are based on chapters contributed to this volume.

9.30 -11.00 (1) Geodemographics and mobility

Chair: John Stillwell

9.30 Creating a New Open Geodemographic Classification of the UK Using households and 2011 Census Data *Paul Longley*, Chris Gale and Alex Singleton

9.50 Using census data in microsimulation *Mark Birkin*, Michelle Morris, Tom Birkin and Robin Lovelace

10.10 Mapping Travel-To-Work Flows *Oliver O’Brien* and James Cheshire

10.30 Moving Through the Life Course: Inter-regional Migration in England and Wales from 1971 to 2011 *Rachel Stuchbury*

11.00 Coffee

11.30-13.00 (2) Ethnicity

Chair: Paul Norman

11.30 Ethnic Identity and Inequalities: Local Authority Summaries *Ludi Simpson*

11.50 Local Ethnic Inequalities and Ethnic Minority Concentration in Districts of England and Wales, 2001-11 *Kitty Lymperopoulou*, Nissa Finney and Gemma Catney

12.10 Using Census Microdata to Explore the Inter-relationship Between Ethnicity, Health, Socioeconomic Factors and Internal Migration *Fran Darlington-Pollock*, Paul Norman and Dimitris Ballas

12.30 Why censuses are essential for estimating ethnic populations and components of change *Philip Rees*, Stephen Clark, Pia Wohland, Nik Lomax and Paul Norman

13.00 Lunch

14.00-15.30 **(3) Change over time**

Chair: Mark Birkin

14.00 Uneven Family Geographies in England and Wales: (Non)Traditionality and Change between 2001 and 2011 *Darren Smith* and *Andrea Culora*

14.20 Using Census Data for Trend Comparisons in British City Regions *Mike Coombes* and *Tony Champion*

14.40 The Changing Geography of Deprivation in Great Britain: Exploiting Small Area Census Data, 1971 to 2011 *Paul Norman* and *Fran Darlington-Pollock*

15.00 The Spatial-temporal Exploration Health and Housing Tenure Transitions Using the Northern Ireland Longitudinal Study *Myles Gould* and *Ian Shuttleworth*

15.30 Tea

16.00-17.30 **(4) Other applications and the CTP**

Chair: Phil Rees

16.00 The Prevalence of Informal Care and its Association with Health: Longitudinal Research Using Census Data for England and Wales *James Robards*, *Maria Evandrou*, *Jane Falkingham*, and *Athina Vlachantoni*

16.30 Contrasting Approaches to Engaging Census Data Users *Jim Ridgway*, *James Nicholson*, *Sinclair Sutherland* and *Spencer Hedger*

17.00 The Census Transformation Programme: Progress and Prospects *Meghan Elkin*

17.45-18.30 Reflections *John Stillwell*

18.30 Reception

Conference attendance

There is some basic information about the conference at: <http://www.rsai-bis.org/call-for-abstracts.html>

If you would like to attend the session or the conference as a whole, please contact the conference secretary, Justin Doran, by email (Justin.Doran@ucc.ie).

Abstracts

(1) Geodemographics and mobility

Using the 2011 Output Area Classification as a baseline for consumer data analytics

Paul Longley (UCL), Chris Gale and Alex Singleton

This presentation will reflect upon the creation of the 2011 Output Area Classification and the related 2011 London Output Area Classification. It will then discuss the ways in which ancillary data sources can be used in geodemographic classifications alongside census data, taking the London Classification of Workplace Zones as an example. Finally, novel uses of census and other data will be discussed in the context of updating geodemographic classifications. Some implications for the open data movement will also briefly be discussed.

Using census data in microsimulation modelling

Mark Birkin (LIDA, University of Leeds), Michelle Morris, Tom Birkin and *Robin Lovelace* (LIDA, University of Leeds)

This presentation will explore the value of census data for academic research and public policy analysis using spatial microsimulation. It will begin with a broad overview of methods and an explanation of the rationale for the creation of synthetic microdata from neighbourhood statistics. Applications will be considered in relation to three problem domains: urban mobility; diet and nutrition; and consumer choices. Case studies will be used from real world examples in both local government and commercial environments. The use of complementary data sources will also be highlighted, placing emphasis on the combined value of census data with emerging sources of data for lifestyles and behaviour. This will lead on to a broader discussion of issues in relation to the cross-validation of different data sources and, in particular, the robustness of census data. There is also a commentary on trends in the utility and value of alternative data sets in a world which is ostensibly overflowing with ‘big data’.

Mapping travel-to-work flows

Oliver O'Brien (UCL) and James Cheshire

A fine-grained origin-destination dataset, showing counts of travel-to-work flows split by mode of transport, was incorporated into an online scrollable/zoomable map, which allowed for intuitive navigation of the data and easy identification of distinct flow patterns. The technique demonstrates that even with a relatively simple cartographical treatment of the data, insights can be quickly gained.

Moving through the life course: inter-regional migration in England and Wales from 1971 to 2011

Rachel Stuchbury (University College London)

Using the ONS Longitudinal Study it is possible to follow individual people in England and Wales from the 1971 census until (currently) 2015, incorporating four more census returns on the way. Variables derived from postcodes are available for researchers, showing distance (in bands) between address at last census and at this census. This presentation includes analysis of distance and direction of moves by individuals from 1971 to 2011, stratified by individual and household characteristics.

(2) Ethnicity

Ethnic identity and inequalities: Local authority summaries

Ludi Simpson (University of Manchester)

Flexible access to census results for a wide range of policy and research work was made simple through drop-down lists, lookup functions and text conditional on data values. This example emphasised clear visualisation of tried and tested analyses to provide answers to common questions.

Local ethnic inequalities and minority concentration in England and Wales, 2001-11

Kitty Lymperopoulou (University of Manchester), Nissa Finney and Gemma Catney

There has been a longstanding debate in the UK about the residential patterns of ethnic minority groups and the consequences of these patterns for social cohesion. However, there has been less focus on the role of residential segregation in perpetuating the socio-economic disadvantage of ethnic minority groups and, as yet, there is little evidence on how residential segregation patterns relate to spatial patterns of ethnic inequality. This presentation draws on data from the 2001 and 2011 Censuses in the UK to explore how ethnic group concentrations within local authorities in England and Wales are related to patterns of ethnic inequality in employment, education, housing, and health. The Index of Dissimilarity is used to measure residential segregation for nine ethnic minority groups in 2011 and how it has changed since 2001, for neighbourhoods (output areas) within districts. Ethnic inequality is measured as the absolute difference in the proportion of White British people and people from ethnic minority groups within districts for employment, education, housing and health. Considerable variation by ethnic group and district is found in the association between segregation and socio-economic inequality, suggesting both positive and negative ‘effects’ of segregation. Key findings are that: high residential segregation is associated with high ethnic inequalities in education within districts; high residential segregation is associated with low ethnic inequalities in employment, health and housing and this relationship strengthened over the 2000s; higher levels of ethnic inequality are found in districts which have had least reduction in segregation, or experienced an increase in segregation.

Using census microdata to explore the inter-relationships between ethnicity, health, socioeconomic factors and internal migration

Fran Darlington-Pollock (Queen Mary University of London), Paul Norman and Dimitris Ballas

Ethnic inequalities in health, although widely observed, are not fully understood. Theories of selective sorting between area types and social classes may help explain changing ethnic health gradients in England as opportunities and propensities for either internal migration or social mobility vary between ethnic groups. Furthermore, processes of selective sorting can help us interpret the complex inter-relationships between ethnicity, health, socioeconomic factors and internal migration. In this presentation, we explore these relationships using census microdata to establish whether selective sorting may vary between ethnic groups and if selective sorting is contributing to changing ethnic health gradients. Through analysis of the Census Samples of Anonymised Records, we find that despite marked variations in the propensity to migrate by ethnic groups, the relationship between migration and health is consistent between ethnic groups. However, we show that the extent of the influence of socioeconomic status on the health-migration relationship does vary. To assess the contribution of selective sorting to changing ethnic health gradients, we use the Office for National Statistics Longitudinal Study to compare the health of different groups transitioning between deprivation quintiles and social classes. Our results show that these transitions can contribute to changing ethnic health gradients. Further, it is likely that for minority groups, movement within the middle deprivation quintiles may be particularly important in terms of the contribution to changing health gradients.

Why censuses are essential for estimating ethnic populations and components of change

Philip Rees (University of Leeds), Stephen Clark, Pia Wohland, Nik Lomax and Paul Norman

This presentation describes the creation of new estimates of ethnic populations and components of change in local authority districts (LADs) in England for years between the 2001 and 2011 Censuses. Information on ethnic populations by age and gender is provided in censuses. In between censuses, information on ethnic population change is scarce. To fill the gap, we used data from the two censuses with reconciled total population and component estimates published by the Office of National Statistics. The sequence of steps used to produce a ten-year time series is described. These reconciled population and component estimates provide a firmer foundation for ethnic-specific projections than hitherto available. The role of the census in this work is vital.

(3) Change over time

Uneven family geographies in England and Wales: (Non)Traditionality and change between 2001 and 2011

Darren Smith (University of Loughborough) and Andreas Culora

This presentation uses 2001 and 2011 Census data for England and Wales to explore how family formations at local authority district level have been reproduced and/or transformed during the 2000s. Using six variables drawn from Duncan and Smith's (2002) earlier study of geographies of family formations, the chapter shows that regional patterns have become more entrenched, and divisions within England and Wales would appear to have become more intense. It is argued that some local authorities have seemingly joined 'regional clubs' of traditionality and non-traditionality, with the effects of urban-rural, coastal and university towns being a key factor in

the differentials of family formations. These spatial differences will have major bearings on diverse demands for social welfare and public policy in England and Wales

Using census data for trend comparisons in British city regions

Mike Coombes (CURDS, University of Newcastle) and Tony Champion

City decline has attracted growing interest in several countries, but recent high levels of net immigration mean that few if any British cities are seeing absolute population decline. Even so it is clear that some patterns of uneven growth such as the north-south 'divide' show a continuing importance in analysing relative decline. Census stock and flow datasets on 74 cities covering the UK's larger cities allow some multi-dimensional analyses that can draw out key longer-term trends. Particular emphasis is put upon forms of decline likely to increase the risk of poverty. This leads to a focus on the labour market which in turn called for analysis by city labour market area, so changes in local job availability can be linked to change in local employment rates. A synthesis index of relative decline is developed, and a set of other variables then used to model the resulting city index scores. These analyses suggest that for robust research and monitoring of cities on issues such as relative decline, Census stock and flow datasets are certainly necessary but not sufficient.

The changing geography of deprivation in Great Britain: Exploiting small area census data, 1971 to 2011

Paul Norman (University of Leeds) and Fran Darlington-Pollock

A major use of census data has been the development of measures of small area deprivation. Deprivation indices have had widespread use in public health, local government and academic research. In a variety of settings, we might be interested in knowing whether area deprivation has changed over time including whether a regeneration scheme has had the desired effect or whether health inequalities are increasing or decreasing. However, deprivation schemes are invariably cross-sectional and various census aspects mean that determining change over time is challenging. Nevertheless, methods to address these issues exist along with a recent literature on measuring change in area characteristics over time. This chapter will first give examples of census based deprivation schemes and their usage. The methods used to measure change in area deprivation over time are then outlined. This is followed by a description of the geographies of change during the five censuses 1971 to 2011 in several case study locations. The presentation concludes with a consideration of the future of deprivation measures with respect to the 2021 Census and the use of administrative data as inputs to deprivation indices.

The spatial-temporal exploration health and housing tenure transitions using the Northern Ireland Longitudinal Study

Myles Gould (University of Leeds) and *Ian Shuttleworth* (Queens University Belfast)

The nature and value of the Northern Ireland Longitudinal Study (NILS) is demonstrated through a statistical analysis of changes in individuals' health status, housing tenure and

residential movement between the 2001 and 2011 Censuses. Multilevel analysis of individuals located within Super Output Areas, and also aggregate mapping of Local Indicators of Spatial Association (LISA) using 2011 Census Area Statistics are undertaken. Over the ten year period in which some people report worsening of their health whilst others experience an improvement, we show how probabilities in health transition are related to starting tenure as well changes in tenure and address between 2001 and 2011. We also provide evidence of distinctive 2011 geographies of self-reported illness and housing tenure, and suggest that spatial context does matter to a degree for individual health transitions. The presentation concludes with a reflection on the analyses presented, consideration of potential future research applications using the NLS, and also some general observations on the changing data landscape.

(4) Other applications and the CTP

The prevalence of informal care and its association with health: Longitudinal research using census data for England and Wales

James Robards (University of Southampton), Maria Evandrou, Jane Falkingham, and Athina Vlachantoni

Informal or unpaid caregiving is increasingly significant in the context of an ageing population and pressures related to the funding of care in later life. The relationship between health and informal caring remains contested. Cross-sectional analysis of recent census data points to a positive association between caring and health, with carers being less likely to report a limiting long-term illness than non-carers. However, there may be a healthy carer selection effect, with those in better health being in a position to provide care. This chapter investigates the relationship between caring and health using the ONS Longitudinal Study, a 1% sample of the population of England and Wales, using 2011 Census records linked to the 2001 Census responses from the same individuals. Two separate dimensions of the ‘caring-health’ relationship are investigated using a longitudinal approach. First, the impact of caring on health is examined using a typology of care provision - non-carers, light carers and heavy carers - in 2001 and 2011. Second, the chapter investigates the relationship between health and care, examining the characteristics associated with providing care in 2011, taking into account prior selection into the caring role at 2001. Multivariate analysis predicting informal caring at 2011 among those who were providing care in 2001 indicates that being in fair health in 2011 is significant, as is the intensity of care provision in 2001. The implications of these findings for future research and for the design of policy supporting carers are discussed.

Contrasting approaches to engaging census data users

Jim Ridgway, *James Nicholson* (University of Durham), Sinclair Sutherland and Spencer Hedger

The strategy of the Office for National Statistics has been to increase user engagement with census data, often via interesting data visualisations. Here, we describe a logical development of this approach, namely to engage politicians and their aides with visualisations of rich data (including census data). We describe the development of the *Constituency Kit*, a resource developed collaboratively by the House of Commons Library and Durham University which

synthesizes census data from UK Census Offices and other sources. It was designed to support planning and analysis around the 2015 UK General Election. We describe our user-oriented design process, and some criteria for creating interactive data visualisations. We argue the case for collaborative links between national statistics offices, academics and secondary data providers which can be mutually beneficial.

The Census Transformation Programme: progress and prospects

Meghan Elkin (ONS)

In 2010, the UK Statistics Authority asked the National Statistician and the Office for National Statistics (ONS) to review the future provision of population statistics in England and Wales in order to inform the Government and Parliament about the options for the next census. Over the next three years, ONS undertook extensive research into new ways of counting the population, reviewed practices in other countries, engaged with a wide range of users, completed a three month consultation and commissioned an independent review of methodology. In March 2014, the National Statistician recommended a predominantly online census in 2021 supplemented by the further use of administrative and survey data. The Board of the Authority and the Government subsequently accepted and endorsed the National Statistician's recommendation. This presentation outlines early thinking and plans by ONS to deliver an online census in 2021. It considers the impact on the design of a move to an online first approach as a means for the public to complete census questionnaires, and the greater use of administrative data to improve the efficiency, effectiveness and quality of the census. It also describes the strand of work on continued research into the potential to switch to an administrative data based Census after 2021.