

Institution: City University London
Unit of Assessment: 19 Business and Management Studies
Title of case study: Estimating local populations with far greater accuracy using administrative data
<p>1. Summary of the impact</p> <p>There is growing evidence that official population statistics based on the decennial UK Census are inaccurate at the local authority level, the fundamental administrative unit of the UK. The use of locally-available administrative data sets for counting populations can result in more timely and geographically more flexible data which are more cost-effective to produce than the survey-based Census. Professor Mayhew of City University London has spent the last 13 years conducting research on administrative data and their application to counting populations at local level. This work has focused particularly on linking population estimates to specific applications in health and social care, education and crime. Professor Mayhew developed a methodology that is now used as an alternative to the decennial UK Census by a large number of local councils and health care providers. They have thereby gained access to more accurate, detailed and relevant data which have helped local government officials and communities make better policy decisions and save money. The success of this work has helped to shape thinking on statistics in England, Scotland and Northern Ireland and has contributed to the debate over whether the decennial UK Census should be discontinued.</p>
<p>2. Underpinning research</p> <p>At present, the main source of population statistics in the UK comes from the decennial Census of Population, last undertaken in 2011. This population count is projected for each of the interim years as mid-year estimates based on assumptions about future fertility, mortality and migration. The methodology and results of these population counts have been increasingly criticised and were described as 'unfit for purpose' by the House of Commons Treasury Select Committee in May 2008. The growing dissatisfaction with the Census, including its high cost, led to an announcement by the Rt Hon Francis Maude MP, Minister for the Cabinet Office, that the 2011 Census would be the last. The Office for National Statistics (ONS) will report in 2014 that the Census should be replaced with an alternative based on administrative data sources.</p> <p>The term 'administrative data' refers to information collected primarily for administrative (not research) purposes. These types of data are collected by government departments and other organisations for the purposes of registration, transaction and record-keeping, usually during the delivery of a service. Examples of administrative data include welfare, tax, health and educational record systems. These datasets have for many years been used to produce official statistics to inform policy-making. The potential for these data to be accessed for the purposes of social science research is increasingly recognised, although it has not as yet been fully exploited.</p> <p>Mayhew (Professor at City since 2002) and co-author Gill Harper (Research Officer at Birkbeck, University of London 2001 to 2007, Research Fellow at City 2008 to 2009, now Operations Director at Mayhew Harper Associates) have been developing their system for the exploitation of administrative data and measuring populations since 2000. They have completed over 60 projects in that period for local authorities, healthcare organisations and the 'third sector' (Mayhew and Harper, 2003). Their company, formed in 2003 under the brand name 'neighbourhood knowledge management' (nkm), produces demographic and other data at a fraction of the cost of the Census. Their methodology for counting populations and their research into how administrative data can be captured and organised at a local level for the benefit of local service providers and communities is described in two peer-reviewed research papers (Harper and Mayhew 2012a, 2012b). Administrative data sources produce population estimates in time periods not normally or logically achievable through survey methods, while the higher level of 'granularity' delivers much greater detail and geographical flexibility (Mayhew and Harper, 2010).</p> <p>The innovative methodological features of their approach, approved by the Information Commission, includes secure systems for data handling, legally-binding data sharing protocols, information governance certification, algorithms for cleaning and linking data at the person and</p>

address levels, algorithms for combining data to produce population estimates and innovative analytical and modelling tools for processing and reporting data.

Data available from all local authorities and health trusts are linked together at address level using the universally-available Local Property Gazetteer. Following data linkage, an algorithm processes the data according to a set of rules to ensure replication which is applied in sequence to produce what is defined as a 'confirmed minimum population' resident in an area. Variables such as age, gender, housing tenure and benefit status are then extracted. De-identified geo-referenced demographic variables are converted into households or linked to other data such as social services, hospital admissions, community health services, schools and other services such as library and leisure. Purpose-developed analytical tools are used to process the data using statistical modelling techniques and Geographic Information Systems. A popular additional tool assigns people to different countries of origin based on name recognition and probabilistic assignment.

The utility of the data platform is demonstrated by the wide range of commissions undertaken in education, public health, housing, service design, economic evaluation, transport planning and equality impact assessments, including Eversley and Mayhew (2011). As well as its application to population estimation, nkm was employed in the 2012 Olympic preparations and aftermath, investigations into chronic disease, in epidemiological applications (Sturdy *et al.* 2012) and for Joint Strategic Needs Assessments (JSNA) for Primary Care Trusts.

Development of the research has been funded largely through a concurrent iterative process of commercial exploitation followed by further research. However the underpinning methodology was developed with support from the ESRC (Harper and Mayhew, 2010) and by grants from Asthma UK and The UK Actuarial Profession.

3. References to the research

Eversley J. & Mayhew L. (2011). Using local administrative data to evaluate social and community cohesion. In P. Ratcliffe & I. Newman (Eds.), *Promoting social cohesion: Implications for policy and evaluation*. London: Policy Press.

Harper G. & Mayhew L. (2012a). [Using administrative data to count local populations](#). *Journal of Applied Spatial Analysis and Policy*, 5(2), 97-122.

Harper G. & Mayhew L. (2012b). [Applications of population counts based on administrative data at local level](#), *Journal of Applied Spatial Analysis and Policy*, 5(3), 183-209.

Harper G. & Mayhew L. (2010). [Using administrative data to estimate the population and applications](#), *Understanding Population Trends and Processes (UPTAP)*, September.

Mayhew L., Eversley J., & Harper G. (2003). *Neighbourhood Knowledge Management Pilot Project – Making Neighbourhood Knowledge Accessible*. London: Tower Hamlets Partnership.

Mayhew L. & Harper G. (2010). [Counting with confidence - The population of Waltham Forest](#). London: Waltham Forest Local Authority.

Sturdy P., Bremner S., Harper G., Mayhew L., Eldridge S., Eversley, J., Sheikh A., Hunter S., Boomla K., Feder G., Prescott K., & Griffiths C. (2012). [Impact of Asthma on Educational Attainment in a Socioeconomically Deprived Population: A Study Linking Health, Education and Social Care Datasets](#). *PLoS ONE*, 7(11), e43977.

The *Journal of Applied Spatial Analysis and Policy* is one of the highest-rated journals in its field and applies a stringent peer-review process prior to accepting articles for publication. The research was supported by the ESRC [grant number RES-163-27-0019] 'Using Administrative Data to Estimate the Population and Measure Deprivation'. The end of award report was graded: Good.

4. Details of the impact

The impact of Mayhew's research can be measured by the commercial success of the projects and spin-offs that have resulted; by their influence on the Department of Health, the Office for National Statistics (ONS) and the Greater London Authority (GLA); on professional bodies such as the

British Society for Population Studies; and on other users of statistics, such as 'third sector' organisations, education bodies and law enforcement agencies. The research has also influenced statistical thinking in government agencies around the UK and the decision by the UK Government to discontinue the national Census. More than 20 local authorities and health providers, including Haringey, Enfield, Brent and Tower Hamlets in London, have drawn on this work to create policy, design services and allocate resources more effectively and efficiently.

A successful business, 'Neighbourhood Knowledge Management' or nkm (www.nkm.org.uk) has been established on the basis of the new methodologies [1]. Its website contains information and resources to enable viewers and users to understand the approach, range of applications and potential impacts.

This new approach to counting populations was used to identify the needs of six local authorities preparing for the 2012 Olympics and in the post-Olympic legacy period [2]. The research was timed to coincide with the 2011 Census to enable fair comparisons to be made between the two methodologies. The main findings were that administrative counts using Mayhew's methodology were 3.5% higher than GLA estimates and 9.5% higher than ONS estimates for the same year. The study was used to inform residents of their population size, to guide Borough housing policy for the next five years and to monitor health and wellbeing under the Joint Strategic Needs Assessment of the Primary Care Trusts.

Evidence for changes in approaches to data administration stimulated by Mayhew's work can be found in the media, Council Chambers papers, local authority websites and Parliamentary records. For example, a recent letter to the London Borough of Brent Council printed in *The Guardian* drew attention to the gross miscalculation of population figures by the ONS that underestimated the population of London by around 300,000. In the case of deprived boroughs like Brent, this resulted in the Council receiving hundreds of millions of pounds less from the Government over the last five years, despite constant representations supported by scholarly research by Les Mayhew [3]. Another letter also quoting Mayhew's research stated that the problem of under-counting and its effect on the local government Formula Grant system allocations affects all London Boroughs [4].

Mayhew carried out an evaluation of the Partnerships for Older People Projects (Popps) scheme, which tested the effectiveness of different ways of supporting older people to continue living independently in the community. Using administrative data sources held locally, his team tracked older people for a full 12 months before and after they were supported and showed that for each person supported, between 14 and 29 hospital bed days a year and between three and eight A&E attendances were saved. If replicated nationally, the Popps scheme could save 3% of the NHS budget [5].

In February 2012, the London Borough of Waltham Forest published a guide to population sources referring to Mayhew's administrative data population estimation methodology. The report compares Mayhew's method with other major sources of population data: the Census 2011, the ONS mid-year estimates and the GLA population projections. The guide states: "*For internal strategic planning, this is the dataset to use since it is by far the most up to date and accurate source of population data that we have. The ethnic breakdown is also unique and provides a far broader breakdown of ethnicities than those in the census*" [6].

Mayhew's research has significantly influenced the information strategies of several government departments. For example, a recent strategy paper by the Department of Health sets a ten-year framework for transforming information for the NHS, public health and social care. The paper highlights examples of best practice already taking place across England. One of these is Mayhew's work with the London Borough of Tower Hamlets that integrated health care, social care and population data to shape the commissioning and delivery of services [7]. According to the Tower Hamlets Director of Public Health, Somen Bannerjee, the Mayhew Tower Hamlet project "*enables us to put a cost on local health inequalities and provides the evidence base for different and more innovative interventions and delivery structures*" [8].

Mayhew and his research team have achieved a significant and enduring impact on public policy and service delivery by tackling many of the problems that exist with gathering demographic population data. Addressing key criticisms of current methods of estimating the population in the 2008, in the House of Commons' Treasury Committee Report 'Counting the population', Mayhew was able to illustrate with examples how the methodologies employed by nkm could overcome

these criticisms. In written evidence to the Committee, the London Borough of Brent reports: “Our best estimate is that the ONS estimates currently under-count Brent’s population by in excess of 17,000, based on the data matching exercise carried out by Professor Mayhew. The local government Formula Grant system allocates approximately £500 for each additional person in the borough. A difference of 17,000 therefore amounts to an estimated £8.5M loss in the needs element of Formula Grant” [9].

In September 2012, the House of Commons Science and Technology Committee published the report ‘The Census and social science’. The report followed an inquiry by the Science and Technology Committee that sought evidence for the potential impact on social science research of the ending of the Census, with a view to the recommendations feeding into the ONS’ ‘Beyond 2011 Programme’. The report made extensive references to evidence provided by Mayhew, for example, “We consider Professor Mayhew’s evidence as confirmation that there is a credible alternative to the census for the purposes of local government” [10].

Following the Science and Technology Committee’s report, the ONS established ‘Beyond 2011’, a review to identify the best method of providing small area population and socio-demographic statistics as an alternative to running a traditional ten-year Census in 2021. Commentary by the ONS in May 2013 indicated that an initial assessment had found that of the six options under consideration, Option 5 (Administrative data linkages, plus an annual circa 1% coverage survey with a one-off circa 10% coverage survey in 2021 to validate the method) was the most cost-effective and produced the best quality data [11]. This reflects Mayhew’s research. Since then Mayhew has presented his approach to statistical offices in Northern Ireland, to health providers in Scotland and at the British Society for Populations Studies conferences in England. He was also invited to join the National Population Projections Expert Advisory Panel, the body of experts that advises the ONS on the appropriate assumptions to use for national population projections [12].

The Mayhew approach has provided local areas, councils, primary care trusts and commissioning bodies with a more flexible, accurate and timely evidence base for identifying needs, informing policy and designing services. The range of clients and applications established over this 12-year period is testimony to the impact the approach has had on local people and services. In total, Mayhew’s innovative work using local administrative data has resulted in an additional £60M going to local authorities in central government grants and lottery funding.

5. Sources to corroborate the impact

1. nkm Limited (www.nkm.org.uk) ‘neighbourhood knowledge management’.
2. London Borough of Hackney (2012). [Comparative analysis of the resident population of the six Olympic host boroughs: sources and uses of locally owned administrative data](#), A Report by nkm, March.
3. Moher, J (2012). [Local services now a postcode lottery](#), *The Guardian*, 1st August.
4. Hill, Dave (2012). [How to count East Enders](#), *The Guardian*, 27th September.
5. Brindle, David (2009). [Brent care scheme for older people is top of the Poppo](#), *The Guardian*, 9th September.
6. London Borough of Waltham Forest (2012). [A Brief Guide to Population Sources](#), Research & Consultation Strategy & Communications, August, pp. 4-7.
7. Department of Health (2012). [The power of information: Putting all of us in control of the health and care information we need](#), May, pp. 32.
8. Mayhew, Les (2011). [How Tower Hamlets joins up social care and health data](#), *The Guardian*, 9th November.
9. House of Commons Treasury Committee (2008). [Counting the Population Written evidence Volume II](#), Published on 15th January 2008, pp. 78-79.
10. House of Commons Science and Technology Committee (2012). [The Census and social science: Third Report of Session 2012-13](#), London: The Stationery Office Limited p. 23, paragraph 63.
11. Office for National Statistics (2013). [Beyond 2011: Newsletter](#), May.
12. Office for National Statistics (2013). [National population projections expert advisory panel Membership](#), July.