



**Improving Migration and Population Statistics**

**2007 Local Authority Case  
Studies: Final Report**

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## Executive Summary

ONS conducted studies of four local authorities to investigate the scope for using local information to improve the sources and methods used in making population estimates. The purpose of these studies was to look at national sources used in a local context and whether there is better information available locally. The studies were undertaken in partnership with each of the four local authorities: Welwyn Hatfield, Derby, Hammersmith & Fulham and Barnet. The findings were discussed at workshops which were open to all local authorities. This report summarises the conclusions drawn from this work.

These studies identified a number of data sources which have the potential to be used in the population estimation processes in addition to those already in use. These sources include the School Census, student data and data based on National Insurance numbers. Further investigation is needed of their potential uses and limitations for making population counts, for example quality and coverage issues.

A number of recommendations resulted from the four local authority case studies and some of these required modification following the user consultation via the workshops (recommendations are summarised in Box One). These recommendations are being taken forward as part of ONS programme of work to improve population and migration statistics. Their implementation is being linked, where appropriate, to the work to take forward the recommendations of the Interdepartmental Task Force on Migration Statistics.

### Box One: Summary of Recommendations

**1. Students:**

Investigate the feasibility of making a student adjustment or treating students as a special population group in population estimation.

**2. International Migration:**

To address the measurement of international migrants:

- The use of data on the allocation of National Insurance numbers to overseas nationals in conjunction with other sources should be pursued, for example the Work and Pensions Longitudinal Study should be investigated;
- Methods to improve survey coverage of international migrants used in the estimation of international migration should be investigated.

**3. Quality Assurance:**

Further investigation should be made into nationally available data sources which may be used to assess the plausibility of the population estimates. The feasibility of using nationally available data sources in the estimation process should also be investigated.

**4. Short-term migrants:**

Further efforts to improve the migration estimates should be made to reconcile figures from survey and administrative sources, between long and short-term migrants.

**5. Ethnicity:**

Further analysis should be undertaken of information on ethnicity collected as part of the School Census. Sources of data on children in independent schools should be pursued.

**6. Babies:**

Further work should be taken to assess whether it is possible to improve the migration

## Chapter 1 Introduction

ONS is responsible for producing estimates of population and migration for local authorities in England and Wales. These are used for a wide range of purposes including the planning and delivery of services by central and local government. Changes in society, particularly increased mobility both within England and Wales and internationally, mean that the population structure can change rapidly in some areas. It is becoming increasingly difficult to make timely and accurate estimates of the population. Coinciding with this, increasingly demanding requests for population estimates for policy purposes necessitate greater precision in the figures, as well as for increasingly localised levels of geography.

For these reasons, ONS is investigating ways of improving the quality of its population estimates. The aim is to find better ways to track population changes, to reduce the gap between future population estimates and the count from the 2011 Census and to improve our understanding of any discrepancy that may occur.

The need to make these improvements was highlighted by discrepancies between population estimates rolled forward from the 1991 Census and those based on the 2001 Census. Following studies to understand the discrepancies in Manchester and Westminster, the Improving Migration and Population Statistics (IMPS) project was set up to specifically investigate these issues and to establish where changes to sources and methods could improve the quality of these statistics in the future<sup>1</sup>.

Local authority case studies formed a key component of this project. These involved ONS working in partnership with local authorities to look at national sources used in a local context, and to consider whether there is better local information available about local population, or data sources, that might be used to improve population estimates. A further purpose of the case studies work was to gain a better understanding of how local authorities use the population estimates and what particular issues affect these estimates.

Four representative local authorities were selected for study:

- Welwyn Hatfield was selected to represent a cluster of 17 local authorities from university cities and towns spread widely across England and Wales. The main factor affecting estimates in these areas is the high proportion of students in the population.
- Hammersmith & Fulham was selected to represent a cluster of eight central London Boroughs. The main factors affecting estimates in these areas were high levels of migration and high proportions of young males, students and people who belong to a non-white ethnic group.
- Derby was selected to represent a cluster of 12 local authorities from large cities in the North and Midlands. The main factors affecting the accuracy of population estimates in these areas were above average proportions of young adult males, students and non-white ethnic groups.
- Barnet was selected to represent a cluster of 15 local authorities, mainly Outer London boroughs together with some areas outside London. The main factors

affecting estimates in these areas were the high population density, high levels of migration and high proportions of young males, students and particularly people from non-white ethnic groups.

The overall aim of the local authority case studies was to investigate data sources and methods from a local perspective and to see if any improvements can be developed that would have potential impact on either all local authorities, or a group of similar local authorities.

## Chapter 2 Background

This section provides a description of how ONS produce mid-year population estimates and how and why the four case study areas were chosen. A summary of the initial analyses of each area's population characteristics is also included. Full details can be found in the four individual local authority case study reports<sup>2,3,4,5</sup>.

### 2.1 Making a population estimate

The annual mid-year population estimates are an estimate of the usually resident population of England and Wales. The method used to calculate population estimates takes the most recent Census as the base, then updates the mid-year estimates annually by adding births, subtracting deaths and allowing for net migration. This is called the cohort component method.

#### 2.1.1. 2001 Census base

The results from the 2001 Census identified a difference of approximately 1.1 million people (2.2 per cent) between the 2001 population estimates for England and Wales, rolled-forward from the 1991 Census, and those based on the 2001 Census. Following this, ONS undertook an extensive programme of work to identify the reasons for this difference, which resulted in a number of adjustments to the population estimates for some local authorities in England and Wales<sup>6</sup>.

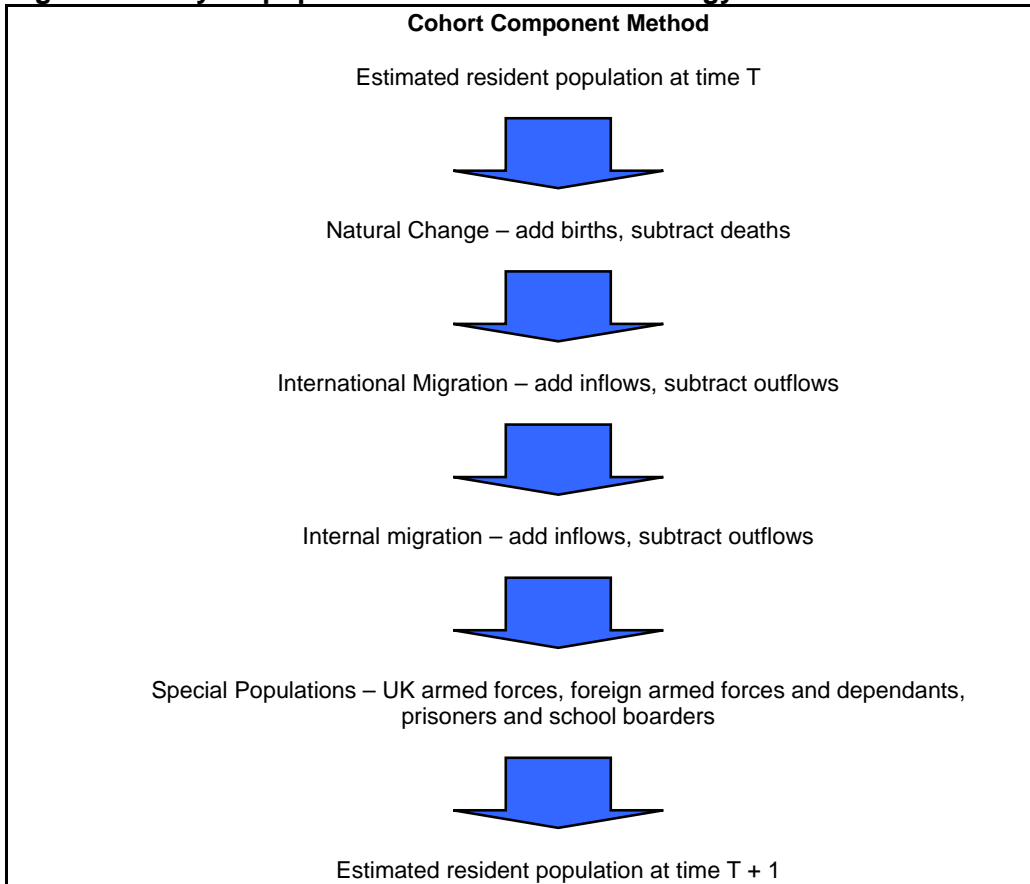
The difference has largely been explained and ONS are not continuing to explore the remaining discrepancy (0.4 per cent) but the aim of current and ongoing work is to improve population estimation over the next inter-censal period.

#### 2.1.2. Cohort Component Method

During each inter-censal period estimates of the population are made using a cohort component method. This updates the previous mid-year estimate, by 'ageing' the population by one year, allowing for natural change due to births and deaths in the past year and adding on net migration (see Figure 1). This is a standard demographic method and is used by most other national statistics institutions in Census taking countries.

Mid-year population estimates are made for the population resident on 30 June of the reference year. The starting point for the estimate is the resident population on 30 June in the previous year. This population by single year of age and sex is aged on by one year, before incorporating the individual components of population change. In addition, adjustments are also made for some special population groups (referred to as 'static populations') that are not captured adequately by data sources currently used to estimate internal and international migration. These are home and foreign armed forces, prisoners and pupils in boarding schools. These populations have age structures which remain fairly constant over time, i.e. the population profile stays static although individuals move on. For this reason these groups are not aged on with the rest of the population.

**Figure 1: Mid-year population estimates methodology**



## 2.2 Selection of local authorities for study

The selection of local authorities for study was carried out using an evidence-based method<sup>7</sup>. The first stage of the selection process involved constructing a framework for identifying potential risks to the accuracy of the population estimates.

Eight variables were identified for use in the cluster analysis, where local authorities were grouped into clusters of areas with similarity across a number of demographic characteristics that were identified as relevant to improving migration and population statistics. These variables are listed below:

- i) Gross international migration, 2002-03
- ii) Gross internal migration, 2002-03
- iii) Armed forces, 2002-03
- iv) Non-white population, 2001 Census
- v) Students aged 18-74, 2001 Census
- vi) Population density, Regional Trends
- vii) Prisoners, 2002-03
- viii) Men aged 20-39, 2003 mid-year estimate

In the cluster analysis, all English and Welsh local authorities were grouped into one of 15 clusters using the values for these eight variables. Four clusters that had high levels for some of these variables were selected for study.

Given that the study aimed to see if improvements could be made for a group, or cluster, of similar local authorities, it was important that each local authority included in the study was representative of the cluster as a whole. For this reason, it was necessary to use an objective statistical method to select each case study area. The local authority closest to the centroid of each cluster was selected for study. The centroid is the point defined by the average value of each variable across local authorities within the cluster.

### **2.3. Analysis of population change characteristics**

Some components of population change present challenges to estimating the population of an area well. This varies by component and by area. In each of the studies the level of complexity each component introduces to the population estimates were considered.

#### **Components 1 and 2: Births & Deaths**

Births and deaths data used in the compilation of mid-year population estimates are obtained from the General Register Office through compulsory registrations of all births and deaths occurring in England and Wales. The data are reliable and of high quality.

For each of the four areas there were no significant issues affecting the use of births and deaths in population estimates. However, there are challenges in estimating the movement of babies aged under one year between areas of the UK and between the UK and other countries.

#### **Component 3: International migration**

International migration is a significant factor that has potential to affect the accuracy of population estimates in all four areas but was of particular consequence in both Barnet and Hammersmith & Fulham as these included high proportions of overseas migrants. The main impact on population estimates from international migration is linked to the ethnic diversity of the established population and the migration of international students.

In Welwyn Hatfield the main factor affecting the accuracy of its population estimates was the migration of students, including many international students, whereas in Derby it was the presence of established Asian and Polish populations that acted as attractors for new migrants.

#### **Component 4: Internal migration**

Each of the four local authority studies had high proportions of students and a young population. These were reflected in the age-distribution of internal migrants. As these are groups with high levels of internal migration, this may present a challenge in estimating the population well. In Welwyn Hatfield and Hammersmith & Fulham, the large student populations posed a challenge in estimating both internal and international migration accurately.

#### **Component 5: Special Populations**

These special populations include prisoners, home and foreign armed forces and children in boarding schools. There were some special populations in the case studies areas for example, Wandsworth prison in Hammersmith & Fulham. In general numbers are small and details of the special populations in each local authority can be found in the individual reports.

## 2.4 Conclusions of the analyses of population characteristics

Based on the above analysis, the risks to accurate population estimates in each of the four study areas is summarised below. This specification of the local problems refines the range of general issues associated with the four clusters from which the areas were selected.

Welwyn  
Hatfield: A high student population posed a challenge to the accurate estimation of migration both international and internal and hence to the accurate estimation of the population.

Derby: The high proportion of young adults, particularly males, represented the main challenge to accurately estimating population.

Hammersmith  
& Fulham: The high levels of migration, both international and internal, to and from the area represented the main challenge to estimating its population accurately.

Barnet: The ethnically diverse population, high proportion of young adults and international students in the area represented the main challenge to estimating its population accurately.

These issues, while being specific to the four selected areas, were nonetheless consistent with the issues that characterised the cluster from which they were selected.

## Chapter 3 Approach

The general approach taken was to investigate what alternative data sources existed that might provide information about the location and movement of specific subgroups of the population. This was achieved through meetings with representatives from the four city councils and other relevant local organisations such as Primary Care Trusts and local universities. The discussion at these meetings focussed on how the councils used population statistics and what research could be carried out that could identify appropriate local data sources. Liaison with the local authorities was essential to help ONS understand the data sources held at local level.

### 3.1 Obtaining Data

Data sources were investigated that had the potential to estimate either the stock or flow of specific subgroups of the population or to provide information on household numbers. For example, data sources that could be used to estimate the population by ethnic group were investigated. A number of data sources were obtained directly from the relevant council together with an assessment of their quality. Other data sources investigated included those routinely obtained from every local authority by government departments or other organisations and supplied to ONS for IMPS research purposes. For example:

- Data on the allocation of National Insurance numbers to overseas nationals entering the UK
- Data on the number of students at higher education institutions from the Higher Education Statistics Agency (HESA)
- Data collected by the School Census on the number of pupils within Local Education Authority (LEA) schools

Table 1 lists the data sources investigated for each of the case study areas. Most of the sources listed in Table 1 were considered in each of the four case studies. However, for a variety of reasons, not all of the sources were investigated in depth. For example, in Welwyn Hatfield there were no NHS walk-in centres at the time of the case study. Some national sources were not pursued in depth for example, data from Driver and Vehicle Licensing Agency (DVLA) were considered for possible use in international migration. However, these data do not allow identification of persons who emigrated and inform DVLA from persons who inform DVLA that they have lost their licence. Only for the sources marked ✓ were data obtained and analyses performed to assess their relevance to population estimates. Details of individual analyses and the relevance of each data source to estimates of migration and population estimates by area can be found in the individual local authority reports<sup>2,3,4,5</sup>.

**Table 1: Administrative Sources Investigated**

| Administrative Source   | Local Authority |       |                      |        |
|---|-----------------|-------|----------------------|--------|
|   | Welwyn Hatfield | Derby | Hammersmith & Fulham | Barnet |
| Electoral registers   |                 | ✓     | ✓                    | ✓      |
| GP Patient registers  | ✓               | ✓     | ✓                    | ✓      |
| GP Patient register Flag 4 data <sup>*</sup>  |                 |       | ✓                    |        |
| National Insurance Numbers (NINo) Allocations to overseas nationals                     | ✓               | ✓     | ✓                    | ✓      |
| Registered Social Landlords (RSL) Data (CORE)   |                 | ✓     | ✓                    | ✓      |
| PeopleUK  |                 | ✓     |                      |        |
| NHS walk-in medical centres   |                 |       |                      |        |
| School Census   |                 | ✓     | ✓                    | ✓      |
| Data on new arrivals in Schools collected for the social inclusion and development team |                 | ✓     |                      |        |
| Housing Needs Survey  | ✓               | ✓     | ✓                    | ✓      |
| Data on housing requirements of international migrants & asylum seekers                 |                 |       |                      |        |
| Council Tax   | ✓               | ✓     | ✓                    |        |
| Other council services <sup>§</sup>   |                 |       |                      |        |
| HESA Data   |                 | ✓     |                      |        |
| Student records from educational institutions   | ✓               |       |                      |        |
| Other Sources <sup>†</sup>  |                 |       |                      |        |

<sup>\*</sup> Flag 4 records on the patient register indicate persons who resided outside the UK for at least three months prior to their first registration with a GP in the UK.

<sup>§</sup>Other council services include gazetteer property database, social services, council house tenant data etc.

<sup>†</sup>Other sources include Driver and Vehicle Licensing Agency (DVLA), Workers Registration Scheme (WRS), interpreter services etc.

## Chapter 4 Findings

This section summarises the findings and recommendations previously published in each of the four local authority case studies. Full details can be found in the individual local authority case study reports<sup>2,3,4,5</sup>.

### 4.1 Findings from the Welwyn Hatfield Case Study

The case study carried out for Welwyn Hatfield investigated how well students were covered by population estimates and data sources that are or have the potential to be used in population estimation. There was some evidence that the current internal migration data source (GP patient registrations) may not capture all student moves to university at the start of the course of study or moves out of university areas at the end of the course of study. The possible failure to capture all internal in-migration is shown in Table 2. This would suggest an under estimate at ages corresponding to the local student profile. Conversely, under-recording of out migration following graduation would lead to an over estimate of the population at subsequent ages. While the net effect on population would depend on the balance between under and over recording on GP systems, both phenomena lead to an age distribution that does not adequately represent the student population.

The study found that, to improve the estimation of students in the population, data are needed on their term-time addresses. There are plans for HESA to collect term-time address for all students who attended a higher education institution in the UK during the academic year 2007/08. It is anticipated that these data will be finalised early in 2009. ONS plan to investigate their quality and assess their potential use to improve population estimates, e.g. through making a student adjustment or by treating students as a special population group in the estimation process. The aim will be for the results of this work to feed into population and migration statistics released in 2010.

A key issue to be resolved in making use of a separate source of student data, such as HESA, alongside the existing patient register information is the need to exclude duplicate counts. Most students will be registered with a GP. However, the Welwyn Hatfield study indicated that in many cases the information from GP registers is inadequate to separately identify student patients from the rest of the registered population. For this reason, a method would need to be developed to estimate the proportion of students identified by HESA whose migration is also captured using the GP registration methodology. If this is not taken into account, the migration of some will be counted twice.

The study recommended that the feasibility of making such an adjustment requires further investigation. These findings are also relevant to population estimation in Barnet and Hammersmith & Fulham as they also have significant student populations.

**Table 2: Comparison between GP register and student data based internal migration estimates.**

|                 | GP register based estimate of inflow |        | Student data* based estimate of inflow |        |
|-----------------|--------------------------------------|--------|--|--------|
|                 | Male                                 | Female | Male                                   | Female |
| <b>Mid-2004</b> |                                      |        |  |        |
| <b>18</b>       | 50                                   | 81     | 84                                     | 93     |
| <b>19</b>       | 148                                  | 281    | 434                                    | 489    |
| <b>20</b>       | 144                                  | 203    | 250                                    | 207    |
| <b>Mid-2005</b> |                                      |        |  |        |
| <b>18</b>       | 83                                   | 118    | 100                                    | 105    |
| <b>19</b>       | 316                                  | 481    | 528                                    | 563    |
| <b>20</b>       | 233                                  | 249    | 292                                    | 262    |

\*Student data provided by the University of Hertfordshire & the Royal Veterinary College

#### 4.2 Findings from the Derby Case Study

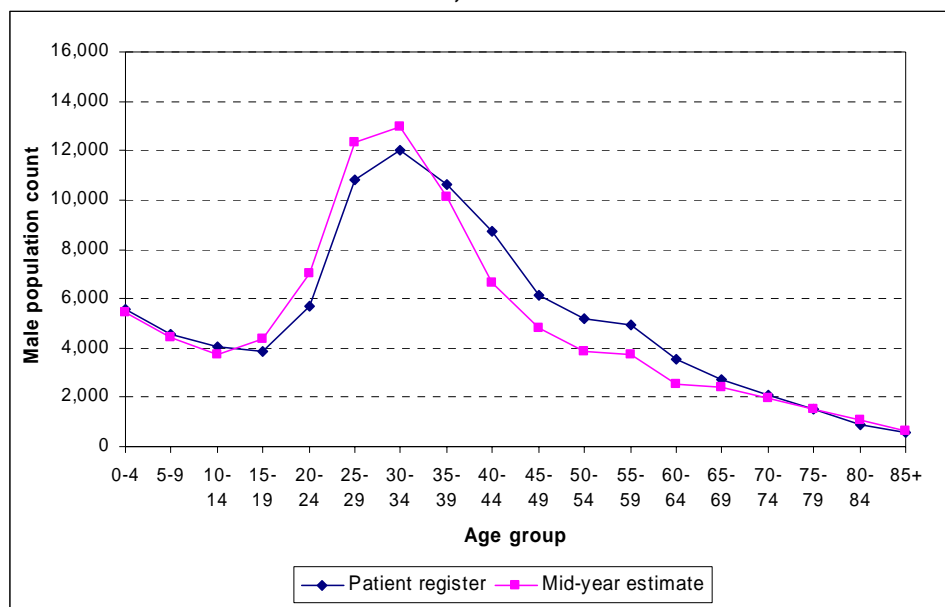
The case study in Derby aimed to investigate whether there were additional data sources or methods to those currently used that could improve the estimation of young adults and in particular, young men. The study identified a number of data sources which may be used in assessing the plausibility of population estimates. These included the classification tool PeopleUK, produced by CACI and based on sources such as electoral registers and lifestyle surveys. Other sources were identified which may have the potential to indicate flows of migrants and help estimate population change over time. These include data on the allocation of National insurance numbers to migrant workers from overseas and data on children arriving in the state school system. Data from the school census can be used as an indicator for migration of migrant families with children by using information on ethnicity and whether English is the pupil's first language. Although these are not direct indicators that a pupil is a migrant, the data can be used to give an indication of change over time.

The study concluded that no single source identified could provide a better estimate of young men than those currently being used. However, further investigation should be made into the potential use of these sources in combination, to get a better understanding of their strengths and limitations as population counts. Further work undertaken as a result of the findings of this case study is likely to be relevant to Barnet and Hammersmith & Fulham.

#### 4.3 Findings from the Hammersmith & Fulham Case Study

The case study included an investigation to identify to what extent the high rates of migration, and high proportions of young men and students may all be interrelated, and to investigate if young men and students were accurately reflected in the population estimates for Hammersmith & Fulham. The patient register counts for young men in the area were below the mid-year estimates, suggesting that young males were not adequately covered by this source leading to a potential undercount of internal migration (see Figure 2). This inconsistency requires further investigation.

**Figure 2: Comparison of mid-year population estimates and patient register data for males in Hammersmith & Fulham, 2005**



The study found no single data source that provided a better estimate of population, particularly subgroups such as young men and students, than those currently used in the population estimates. However, it did identify sources e.g. HESA data which may help to inform the estimation of these groups, as described in Section 4.1.

Substantial levels of migration, both internal and international, have been identified as a feature of central London Boroughs. Data sources such as National Insurance number (NINo) registrations have the potential to improve estimates of international migration. However, it is not currently possible to identify duration of stay, either in the country or in an area, from these registers. As population estimates relate to the usual residents of an area, it is important to distinguish between visitors, short and long term migrants. With no clear indication of duration, NINo registers do not readily provide the information to make this distinction. For this reason they cannot currently be used directly to estimate migration flows or numbers of migrants resident in the country. Investigations currently being undertaken by the Department of Work and Pensions using longitudinal information linked to NINos are intended to improve understanding of duration of stay in the country.

#### 4.4 Findings from the Barnet Case Study

The Barnet case study looked at the implications of having large ethnic minority populations for population estimation in the Borough. The findings are likely to be of interest to other London Boroughs, although the size and mix of the ethnic minority population varies across London. For example, in the 2001 Census there were noticeable differences between Barnet and Hammersmith & Fulham. The proportion of non-British White people, such as Australians and Americans, was larger in Hammersmith & Fulham (20 per cent compared to 14 per cent), as was the proportion of Black and Black British people (11 per cent compared to 6 per cent). Conversely, Barnet

had a higher proportion of Asian people (12 per cent compared to 4 per cent). More recent data published as part of the experimental population estimates by ethnic group are shown in Table 3. These indicate similar proportions.

**Table 3: Ethnic distribution of selected London Boroughs, based on mid-2004 population estimates**

| London Borough       | White:  |       |             | Mixed: White & other | Asian or Asian British | Black or Black British | Chinese | Other |
|----------------------|---------|-------|-------------|----------------------|------------------------|------------------------|---------|-------|
|                      | British | Irish | Other white |                      |                        |                        |         |       |
| London               | 58.4    | 2.7   | 8.7         | 3.3                  | 12.8                   | 10.9                   | 1.4     | 1.9   |
| Hammersmith & Fulham | 58.8    | 4.0   | 15.1        | 3.8                  | 5.1                    | 10.0                   | 1.1     | 2.1   |
| Barnet               | 58.0    | 3.0   | 10.7        | 3.3                  | 12.9                   | 6.7                    | 2.3     | 3.1   |

Migration estimation (both internal and international) has been identified as an issue for London Boroughs including Barnet. Data sources identified in this study (e.g. patient register flag 4 information and NINo allocations) may inform international migration estimation to Barnet. These require further work to develop their potential use in the population estimation process. Work currently being undertaken by DWP (described in Section 4.3) may provide better information on duration of stay of migrants.

The ONS population estimates race impact assessment<sup>8</sup> found that there is a relationship between high migration levels in local authorities and high black and minority ethnic populations. Given that migration is the most difficult component of population change to measure, this makes the risk higher that population estimates could be under or over estimated in those local authorities with high black and minority ethnic populations, especially at a time of significant levels of internal and international migration.

There was no single definitive data source that provided information on international migration to and from Barnet.

#### 4.5. Recommendations of individual case studies

Table 4 below summarises the recommendations presented in the reports on each of the separate LA case studies.

**Table 4: Recommendations of the individual local authority case studies:**

|                                  | <b>Recommendation</b>   | <b>Welwyn Hatfield</b> | <b>Derby</b> | <b>Hammersmith &amp; Fulham</b> | <b>Barnet</b> |
|----------------------------------|---|------------------------|--------------|---------------------------------|---------------|
| <b>1. Students</b>               | <p><b>a)</b> Investigate the feasibility of making a student adjustment or treating students as a special population group. This will require a data source on students at their term-time address. Variables needed from student data are date of birth, sex, vacation or parental address and onward address. HESA collects this data from the 2007/08 academic year. An indicator for UK or overseas students is desirable.</p> <p><b>b)</b> To better inform the onward moves of students after completion of their studies, further work needs to be done in linking HESA data to GP registrations.</p> <p><b>c)</b> If students are treated as a special population group, information would be needed on the proportion of students registered with a GP at their term-time address and those who register with a new GP when they leave their area of study to avoid double counting in internal migration estimates.</p> |                        |              |                                 |               |
| <b>2. International Migrants</b> | To address the measurement of international migrants, the use of data on the allocation of National Insurance numbers to overseas nationals in conjunction with other sources should be pursued. This endorses the finding of the Task Force which recommended that the potential of combining analysis of unlinked NINo data with linked sources such as the Work and Pensions Longitudinal Study should be investigated as part of the future work programme. There are a number of issues that need to be researched before these datasets can be used for population estimation purposes e.g. identification of inactive NINos.   |                        |              |                                 |               |
| <b>3. Quality Assurance</b>      | Further investigation should be made into nationally available data sources which may be used to assess the plausibility of the population estimates. These sources include School Census data and two particular data sources identified in the Derby Case Study – data collected for the Council’s School Inclusion and Development team and data from People UK; these sources if available nationally could help indicate population change over time. Further work is needed to understand differences between the numbers obtained from these sources.  |                        |              |                                 |               |
| <b>4. Short-term Migrants</b>    | More work is needed to reconcile figures from survey and administrative sources, between long and short-term migrants, in order to bring enhanced confidence that international migrants are calculated using the very best data sources and are as accurate as possible. ONS is investigating the feasibility of producing short-term migration estimates at local level.  |                        |              |                                 |               |
| <b>5. Ethnicity</b>              | Work should be taken forward to further analyse information on ethnicity collected as part of the School Census to assess the plausibility of the ONS estimates of the population by ethnic group for compulsory school age. It is recognised however, that information on ethnicity of pupils attending independent schools is not currently available.  |                        |              |                                 |               |
| <b>6. Babies</b>                 | Further work should be taken forward at a national level on how babies aged under 1 are estimated in the population statistics, particularly the migration component. This is required for reconciliation with 2011 Census estimates.   |                        |              |                                 |               |

#### **4.6. Conclusions**

The need to improve local estimates of student numbers was identified in all the case studies. The need to improve local estimates of international migrants and to explore the use of local data for quality assurance across groups of local authorities was identified in three of the studies. Further work to improve migration statistics by estimating numbers of short-term migrants was identified in two of the case studies as was the need to look at how the numbers of babies aged under one resident in an area are estimated. The Barnet case study identified work required to analyse information on ethnicity collected as part of the school census.

These case studies were undertaken before the Inter-departmental Task Force on Migration Statistics was convened and the findings fed into the work of the Task Force. The recommendations of each case study are now largely covered by those made by the Task Force<sup>9</sup>.

## 5. Local Authority Workshops

ONS held a series of workshops with local authorities to discuss the recommendations in Table 4. The workshops were widely publicised among local government groups. Local authorities that had similar population characteristics to those studied were encouraged to attend (specifically local authorities in the same cluster and other similar clusters).

The aims of the workshops were to discuss the findings of the case studies with the relevant LAs to provide an overview of the research carried out by the IMPS Local Research project team to validate the findings and generalise the recommendations to other local authorities.

The attendees included representatives working in information, finance and planning with working knowledge of data sources or who could make a contribution to the discussion of their use of population and migration statistics. The workshops provided the opportunity to discuss whether case study findings could be generalised to other areas and how to take forward recommendations and further ideas in order to produce improved population statistics in the future.

### 5.1. Issues raised

The issues raised by participants at the workshops fell into three main strands:

- Understanding discrepancies between local sources and the mid-year population and migration estimates, for example;
  - Which source is the best estimate to use at the local level?
  - How can increases in NINo registrations be reconciled with declining population estimates?
  - Are ONS missing sub-groups of the population e.g. young men?
- Perceived limitations of existing sources of information and administrative sources, for example;
  - International Passenger Survey:
    - Isn't the sample size too small to use for local estimation?
    - Are all migrant routes covered?
    - Isn't intended rather than actual behaviour recorded?
  - Schools data: independent schools are not included;
  - Students: HESA data covers higher education establishments, not those purely for further education or language students; and
  - The Labour Force Survey does not include communal establishments.
- Making better use of administrative sources that are currently available and exploring other potential sources of information, for example;
  - National Insurance Numbers (NINo);
  - Workers Registration Scheme (WRS);
  - Electoral Registers;
  - Council Tax (for dwellings).

## **5.2. How should recommendations in 4.5 be modified following workshops?**

As a result of discussions with users attending the workshops, three of the recommendations in the original study reports (listed in Table 4) require some modification as follows:

### **Students**

Discussion in the workshops highlighted the fact that information on further and higher education students is incomplete in the HESA data. It was recommended that this weakness in the coverage of students needs to be addressed.

### **International migration (including short-term migrants)**

The workshops confirmed the need for improvements in surveys used in the estimation of international migration (specifically the International Passenger and Labour Force surveys and development of a communal establishment survey). Work has begun on the recommendation relating to survey improvements; collecting data on emigrants in the IPS were introduced in 2007 and a Port Survey review<sup>7</sup> has led to further improvements for 2008 such as additional migration filter shifts in three further ports. The feasibility of a communal establishment survey is being reviewed.

### **Quality Assurance**

The recommendation on quality assurance refers to the further investigation of administrative sources to assess the plausibility of population estimates. This recommendation needs expanding to include exploration of the feasibility of using nationally available administrative data sources in the estimation process.

The limitation of schools census data, resulting from the absence of data on children in independent schools was raised in the workshops. It was recommended that sources of data for independent schools need to be investigated to assess reliability and national comparability.

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## 6. Discussion

Since the completion of the four local authority case studies and the Inter-departmental Task Force on Migration Statistics, ONS has initiated a substantial programme of additional work to improve population and migration estimates. Table 5 below shows the work that has been completed and work that is either in the planning process or being carried out now by ONS to improve population and migration statistics. Summary details of work completed and planned can be found in the appendices.

A number of improvements to migration and population statistics were introduced in 2007. These improvements resulted from the IMPS project. These improvements largely relate to the distribution of international migrants between different parts of the country within population estimates. The improved methods were incorporated in the first release of mid-2006 population estimates and in revisions to published estimates for mid-2002 to mid-2005 issued in August 2007.

In 2007, ONS conducted a review of port surveys and an interim report<sup>10</sup> was published in October 2007. This review has made recommendations that can be implemented in the near future that will increase the numbers of migrants captured in the IPS by increasing the number of ports where migration filter shifts take place. This improved information from the port survey will be used in combination with other sources such as the enlarged household survey starting in 2008. The use of improvements to sources will have a progressive impact on improving the quality and precision of estimates.<sup>11</sup>

Recent work has included the publication of national stock and flow estimates of short-term migrants ('experimental statistics'). The need for these statistics was recognised in the recommendations from the Barnet and Hammersmith & Fulham case studies. Work is continuing into developing methods for distributing national level estimates, based on the IPS, to local authority level. IPS based short-term migration estimates are not sufficiently robust at local authority level to use on their own. For this reason, further work is exploring the use of migration modelling, for example to produce local level estimates based on survey and administrative data sources used in combination.<sup>11</sup>

In order to complete work arising from the recommendations in this report ONS need to find, access and evaluate administrative data sources. A paper<sup>12</sup> was published in September 2007 that explored three administrative data sources (National Insurance data, Workers Registration Scheme and the NHS patient register). This paper investigated how the three sources compared to each other and to international migration estimates used for population estimates at local authority level.

Currently, ONS is liaising with organisations to access data sources that may be used in population estimation. These sources include:

- Higher Education Statistics Agency (HESA) – Student data
- Department for Children Schools and Families - Schools Census data
- The Learning and Skills Council – Student data
- Department for Work and Pensions – Longitudinal Data based on NINOs

Work on these data will include assessment on whether they can be used at an aggregate level either as a direct measure or for modelling or quality assurance. Further work will take place on the feasibility of linking data at the individual level. Once the data is available the work will aim to achieve an in depth understanding of the data sources and, as well as identifying their strengths, will investigate methods of overcoming

limitations in the data. New products arising from the work programmes (such as short-term migration estimates) will be released as they become available.

**Table 5: Progress on Recommendations**

| Recommendation number     | Work completed   | Work planned   |
|---------------------------|--|--|
| 1 Students                |  | <ul style="list-style-type: none"> <li>○ Analysis of HESA and PRDS data</li> <li>○ Investigating sources of data for Higher and Further education students not included in HESA</li> </ul>   |
| 2 International migration | <ul style="list-style-type: none"> <li>○ Improvements to methods used in estimating the local distribution of international migration</li> <li>○ IPS additional filter shifts to increase number of emigrants interviewed</li> <li>○ An interim report on a Port Survey review was published in October 2007<sup>10</sup>This recommended a series of short-term enhancements to the IPS) including new migration shifts at Manchester, Stansted and Luton.</li> </ul> | <ul style="list-style-type: none"> <li>○ Work on international migration is being taken forward in the implementation of the recommendations from the Inter-departmental Task Force on migration statistics<sup>9</sup></li> <li>○ The Port Survey report identified areas for further detailed development work, including the feasibility of using administrative data to complement a port survey.</li> <li>○ A report on this work is planned for May 2008. It is intended that this will recommend more significant changes to port data collection which would then be implemented from 2009.</li> </ul> |
| 3 Quality Assurance       | <ul style="list-style-type: none"> <li>○ Research paper investigating administrative sources<sup>12</sup></li> </ul>   | <ul style="list-style-type: none"> <li>○ Quality assurance is used in every aspect of the estimation process work is continuing to enhance procedures.</li> <li>○ Assessment of the potential use of key administrative sources to inform distributions in population estimation (if feasible to replace census data).</li> </ul>  |
| 4 Short-term migrants     | <ul style="list-style-type: none"> <li>○ Port Survey review</li> <li>○ National Short-term migration estimates, experimental statistics<sup>13</sup></li> </ul>  | <ul style="list-style-type: none"> <li>○ Develop methods to produce sub-national short-term migration estimates and assess how to make them timelier.</li> </ul>   |
| 5 Ethnicity               | <ul style="list-style-type: none"> <li>○ Experimental Population Estimates by ethnic group<sup>14</sup></li> </ul>   | <ul style="list-style-type: none"> <li>○ Comparison of experimental estimates with stock estimates in the LFS Investigation of school census data</li> <li>○ Investigation of nationally available reliable local area data</li> </ul>   |
| 6 Babies                  |  | <ul style="list-style-type: none"> <li>○ Under-enumeration of under ones in England and Wales</li> </ul>   |

## **ONS engagement with local agencies**

ONS keeps users regularly informed about the population statistics improvement work<sup>12</sup>. For example, through discussions with demographic users and the Central and Local Government Information Sharing Partnership (CLIP) population sub-group, on which both local and central government users are represented. ONS reports progress regularly on the National Statistics website and holds seminars to explain the improved methods. For example, for those improvements implemented in 2007, workshops were held on the likely impact in advance of their publication in August 2007. ONS is now keen to work collaboratively with producers of population statistics and with expert users in local areas to identify and take forward further improvements. An interdepartmental structure for governance for taking forward the work programme on population and migration estimates is being developed and this will include plans on involvement of and communication with local authorities via the Local Government Association.

## 7. Recommendations

As a result of the local studies and subsequent workshops, it is recommended that further work is undertaken in the following areas:

### 7.1 Students:

Investigate the feasibility of making a student adjustment to internal migration estimates and/or treating students as a special population group in population estimation. This will require data sources such as HESA and the Learning and skills councils to cover all further and higher education students.

### 7.2 International Migration:

To address the measurement of international migrants:

- The use of data on the allocation of National Insurance numbers to overseas nationals in conjunction with other sources should be pursued, for example flag 4 data on patient registers. Work and Pensions Longitudinal Study should be investigated to give a longitudinal perspective;
- Methods to further improve survey coverage of international migrants used in the estimation of international migration should be investigated e.g. development of a communal establishment survey and to increase the number of interviews with migrants entering or leaving the UK.

### 7.3 Quality Assurance:

Further investigation should be made into nationally available data sources which may be used to assess the plausibility of the population estimates. These sources include School Census data and, for inclusion of all children, sources of data on independent schools should be investigated. The feasibility of using nationally available local data sources in the estimation process should also be investigated.

### 7.4 Short-term migrants:

Further efforts should be made to reconcile migration estimates from survey and administrative sources, between long and short-term migrants. Such reconciliation would bring enhanced confidence that international migrants are calculated using the very best data sources. ONS is investigating the feasibility of producing estimates of short-term migrants at the local level.

### 7.5 Ethnicity:

Work should be taken forward to further analyse information on ethnicity collected as part of the School Census to assess the plausibility of the ONS estimates of the population by ethnic group for compulsory school age. Sources of data on children in independent schools should be pursued.

### 7.6 Babies:

Further work should be taken forward at a national level on how babies aged under one year are estimated in the population statistics particularly in the estimation of the movement on under ones between areas of the UK and between the UK and other countries. This was indicated in the 2001 Census and the work is required for reconciliation with 2011 Census estimates, therefore, is not as an immediate priority as improving international migration estimates work.

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## Appendix A

### Improvements Introduced in 2007

The local authority studies were conducted at the same time as consideration was being given to making improvements to international migration some of the conclusions from these studies informed the changes.

#### International Migration

It is recognised that international migration is one of the most difficult components of population change to measure accurately and has been a particular challenge in the context of the increased volume of migration during the last decade. The programme of work to improve population statistics currently in place highlighted several improvements to methodology that could be made immediately.

Improved methods for estimating international migrations were implemented in 2007. The improved methods were incorporated into the first release of mid-2006 population estimates and in revisions to published estimates for mid-2002 to mid- 2005, issued on 22 August 2007.

The improvements were as follows:

#### International migration

- a) Improved regional distribution of international in-migrants by using household surveys in combination with the International Passenger Survey (IPS). This affects how these in-migrants are shared between the regions of England and the constituent countries of the UK.
- b) Improved distribution of international in-migrants below regional level – by replacing the existing intermediate geography, used in a two stage process of estimating local figures, with one that produces more robust estimates.
- c) An improved method for distributing international out-migrant estimates between local authorities in each region of England and in Wales – by distributing IPS figures to local areas using new factors that reflect propensity to migrate.
- d) An Improved basis for making assumptions about the proportion of people who will not realise their original intentions at the time of travel, in terms of their expected length of stay in the destination country – these are known as migrant and visitor switchers.
- e) Improved age distribution of migrants to and from local authorities in England and Wales.

More information for each of these improvements is available on the National Statistics web site: <http://www.statistics.gov.uk/statbase/Product.asp?vlnk=14834>

## **International Passenger Survey (IPS)**

In January 2007 additional filter shifts were introduced to increase the number of emigrants who are interviewed to strengthen the base for migrant information. With the introduction of migration filter shifts for departing passengers it is expected that there will be similar total numbers of achieved interviews with emigrants as there are for immigrants.

New questions were introduced to the IPS in 2004 that enabled intended and actual lengths of stay to be compared for some migrants and therefore, identify some visitor and migrant switchers<sup>a</sup>.

The new questions are asked of migrants who have been resident in the UK or abroad for 12 months or more and who are now leaving/returning to the UK for three months or more. They are asked how long they initially intended to stay on arrival/departure. Those whose initial intended length of stay was less than 12 months were identified as visitor switchers.

New questions designed to identify migrant switchers are asked of people returning/leaving the UK after spending 3-12 months overseas or in the UK. They are asked how long they initially intended to stay on arrival/departure. Those whose initial intended length of stay was 12 months or more were identified as migrant switchers

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<sup>a</sup> Migrant switchers are people who intend to enter/leave the UK for more than a year, but subsequently return in less than a year; and

Visitor switchers are people who intend to enter/leave the UK for less than a year, but subsequently extend their stays for more than a year.

## **Appendix B**

### **Work Programme for 2008**

The following work is currently being undertaken, drawing on the local authority case studies recommendations.

#### **Port Survey Review**

The Inter-departmental Task Force on Migration Statistics included recommendations to obtain more information about migrants as they enter or leave the country through a port survey with a substantially increased sample of migrants. ONS has conducted a port survey review and an interim report of the review was published on the National Statistics website in October 2007. The review made a recommendation, taking into account the most recent travel patterns, that additional filter shifts should be introduced, to include Manchester, Stansted and Luton airports to better optimise the sample for migration purposes. In addition migration filter shifts will be extended to include short-term migrants, those who intend stay for more than three months. These recommendations will be implemented in 2008.

Further improvements to the port surveys will be recommended for 2009 in the final report. Improved information from a port survey will be used in combination with other sources, such as the Integrated Household Survey (IHS) starting in 2008 and the 2011 Census.

#### **Administrative Sources**

International migration can also be measured through new registrations of people from overseas on administrative data sources. Such sources include where individuals register to access NHS services or register to work. As part of the IMPS project, ONS has been assessing the use of these administrative sources for international migration measurement. Some of these sources are already used for quality assuring the mid-year estimates.

A research paper published in September 2007 explored three administrative sources which can provide estimates of international in-migration. The main focus was how each of the administrative sources compared to each other for international migration measurement at local authority level. These sources were (a) the Worker Registration Scheme (WRS), (b) National Insurance Number (NINo) allocations and (c) the Patient Register Data System (PRDS) recording new registrations with GPs.

Overall a good level of consistency is found between some sources. This indicates that there is scope for using such sources in modelling or linking approaches to improve ONS population and migration estimates. However a number of outliers are identified where estimates are more divergent. These need to be explored further before improvements can be made. Among the most important reasons for differences between estimates are the populations covered by the sources, different length of stay criterion and non-compulsory registration with some sources.

ONS will be taking forward the exploration of administrative sources through the recommendations of the Taskforce on Migration and Population Statistics. This work will include exploration of linking administrative sources records.

### **Short-term migration**

Recently, work on short-term migration estimates has concentrated on the development and publication of national level stock and flow figures. Experimental statistics for the period's mid-2003 to mid-2004 and mid-2004 to mid-2005 were published in October 2007. The stock estimates represent the size of the short-term migrant population at a given time and are supplemented by estimates of average length of stay.

Following the publication in October, research has focussed on the development of methods for estimating sub-national short-term migration estimates and methods for producing more timely data.

### **Students**

The number of Higher Education (HE) students in England and Wales is substantial and many HE students attend an institution away from their usual residence. This migration of students is one of the most important types of internal migration flows. Estimates of internal migration are based on GP registration data and previous research has suggested that a lot of young adults, especially males, do not change their GP registration soon after moving at start or end of stay but rather wait until they require access to NHS services (and not even then if they can be treated as temporary patients).

Students are a particular group of young adults, who are being considered separately because they cluster in certain areas and create a high volume of moves into and out of these areas every year. Anecdotal evidence has suggested that in recent years more higher education institutions are insisting that students register with local GPs as soon as they start their studies. However a recent survey of institutions has shown that this is not the case at all universities and that local GP registration is encouraged rather than mandated.

Research on measuring the extent of the issue and what steps can be taken to improve the coverage of internal migration estimates and population estimates is in the planning stage at present. This work will test two separate approaches:

- Treating students as a special population within population estimates (in the same way as is currently done in estimating the population of prisoners, armed forces and school boarders); and
- Creating a student adjustment (supplementing GP registration data).

Administrative data will be used to inform this work. In particular HESA data will include the term-time addresses of students registered during the 2007/08 academic year. This will be available from 2009. ONS are currently working with the Department for Universities, Innovation and Skills (DIUS) and HESA on issues of data quality, access to the data and the appropriateness of the proposed approaches. It is anticipated that new methods based on these data could be implemented in 2010.

This work will also investigate possible improvements to the coverage of overseas students in the population estimates. Using HESA data on overseas students must be consistent with and complementary to IPS data that ONS currently use to measure all international moves. In addition, HESA data provides very little information on the

subsequent emigration of students at end of their study. Tracking actual moves into and out of the country is therefore problematic, but it may be possible to use term-time address data to identify where overseas students live while they are in the country. It should be noted that there are some students in further education that are not included in the HESA data; work will be done to identify appropriate data sources and attempt to identify their contribution to internal and international moves.

### **Babies aged under-1 year**

Under-ones represent a key part of the population in the population estimation process as they are aged on and form the base of all age cohorts. At census the number born in the year prior to census should closely correspond to the number of under-ones reported in the census. However, the difference between the number of births registered in the year prior to census and the number enumerated at census has grown, with one in seven under-ones born in the year up to the 2001 Census not accounted for by the 2001 Census (in 1991 it was one in ten).

Further study of this discrepancy was required, in particular the identification of any variables relating to the parents of under-ones that might predict enumeration/non-enumeration.

Work has begun in an attempt to identify and describe the key variables related to the under-enumeration of under-ones in England and Wales through the use of the Longitudinal Study.

### **Other relevant work**

In September 2004 the Population Definitions Working Group (PDWG) was established to provide ONS with clear definitional advice on population issues, including preparation for the 2011 Census and the Integrated Household Survey (IHS) from 2008. The group comprised representatives from central and local government, academia, the private sector and topic experts from within ONS. The group met regularly for the next three years, producing a final report in June 2006 containing a series of recommendations on key definitional issues, most notably on usual residence, visitors, second residence issues and the capture of hard-to-define sub-groups within the population such as students, migrants, armed forces and those working abroad. The report was submitted to the Census Population Bases and Definitions Topic Group (CPBDTG) within Census 2011, informing discussion on question design for the forthcoming Census.

Work on alternative bases to the usual resident population was taken forward via work on a population matrix, which identified key sub-groups within the general population as characterised by residence status, citizenship and other variables. Attempts were made to quantify these key sub-groups and ensure that the census procedures and questionnaire will identify and so 'capture' these key groups. The matrix has broader applicability for other data collection instruments such as surveys. This work will be summarised in a paper to be submitted to *Population Trends*, demonstrating how the approach helps to identify the key population groups that should be covered using the more flexible approach to population bases required by modern users. This will indicate how a range of outputs could be provided on a flexible basis.