What happens when international migrants settle? Ethnic group population trends & projections for UK local areas

The components for projection

Paul Norman

Plus: Phil Rees, Pia Wohland, Peter Boden
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Regional Health Intelligence Forum
Monday 8th December, York University

Why populations by ethnic group?

Data needed in ethnic-relevant applications

• Plan services: housing type, language support, health
• Targets for the composition of employment and service take-up: discrimination measures can be better targeted
• Contribute to debates about immigration, identity and diversity in UK

Quality of estimates / projections improved

• Need to account for demographic behaviour of sub-group
  ~ Institutions, students, armed forces, etc
  ~ Ethnic group
What are estimates & projections?

Past
- Based on available evidence of population counts or indicators of change

Census 1991
- Intercensal estimates

Census 2001
- Postcensal estimates

Now
- ‘Latest available data’

Future
- Forecasts
- Projections

Some predictions are made about what will happen to demographic trends

What are projections?

- Different composition & rates leads to different composition …
Ethnic populations: the components for projection

Presentation outline
1. Aims, projection framework
2. Mortality / survival
3. International migration
4. Internal migration
5. Fertility, Infant Mortality & next steps

Aim
• To project the ethnic populations of local areas (local authorities) in the UK over the next 50 years

Technical overview
• State space of model
• Model structure
• Evidence base
State Space
UK: Zones (432)
(O origins, D destinations)
• England 352 LAs (City of London with Westminster; Isles of Scilly with Penwith)
• Wales 22 UAs
• Scotland 32 CAs
• Northern Ireland 26 DCs

Ages (102 period - cohorts) (A)
• Bio0, 0to1, 1to2, …, 99to100, 100+to101+ (102)

Sexes (2) (S)
• Males, Females

Ethnic Groups (16) (E)
• Groups from the 2001 Census (as relevant to UK countries)

Time intervals (T)
• 2006-7, …, 2050-51 (projections)

Components for projection

<table>
<thead>
<tr>
<th>Initial database</th>
<th>Populations</th>
<th>Fertility</th>
<th>Mortality</th>
<th>Internal migration</th>
<th>International migration</th>
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<tr>
<th>Projection outputs</th>
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<tr>
<td>Mortality assumptions</td>
<td>Survival</td>
<td>Emigration</td>
<td>Projected deaths, survivors</td>
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<td>Emigration assumptions</td>
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<td>Migration conditional on survival within UK</td>
<td>Projected surviving emigrants</td>
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<td>Internal migration assumptions</td>
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<td>Projected surviving internal migrants</td>
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<td>Immigration assumptions</td>
<td>Immigration</td>
<td></td>
<td>Projected surviving immigrants</td>
</tr>
<tr>
<td>Fertility assumptions</td>
<td>Births</td>
<td></td>
<td>Projected final populations and births</td>
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</tbody>
</table>
Ethnic populations: the components for projection

Evidence base
Develop initial database: 1980s to 2006 (-ish)
Most demographic components not available by
  • Consistent ethnic groups (if at all) at local authority geography
Estimation of rates & trends by ethnic group
  • Mortality
  • International migration
  • Internal migration
  • Fertility, Infant Mortality

Ethnic mortality
Phil Rees, Pia Wohland & Paul Norman

UK projections
  • Ethnic groups calculated in projection models but no ethnic mortality differences utilised

US, New Zealand projections
  • Different life expectancies by race

There are strong individual and area relationships between self-reported health & mortality
  • Can ethnic-specific limiting long-term illness be used to estimate mortality?
Estimating ethnic mortality

Standardised illness ratios (SIRs) from the 2001 Census

<table>
<thead>
<tr>
<th>Sex</th>
<th>Nation</th>
<th>r²</th>
<th>Intercept</th>
<th>Slope</th>
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<tbody>
<tr>
<td>Females</td>
<td>England</td>
<td>0.51</td>
<td>52.1</td>
<td>0.48</td>
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<td>Females</td>
<td>Wales</td>
<td>0.78</td>
<td>43.9</td>
<td>0.37</td>
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<tr>
<td>Females</td>
<td>Scotland</td>
<td>0.69</td>
<td>60.5</td>
<td>0.64</td>
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<tr>
<td>Females</td>
<td>Northern Ireland</td>
<td>0.16</td>
<td>71.2</td>
<td>0.26</td>
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<tr>
<td>Males</td>
<td>England</td>
<td>0.63</td>
<td>47.3</td>
<td>0.52</td>
</tr>
<tr>
<td>Males</td>
<td>Wales</td>
<td>0.56</td>
<td>54.9</td>
<td>0.39</td>
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<tr>
<td>Males</td>
<td>Scotland</td>
<td>0.75</td>
<td>28.3</td>
<td>0.82</td>
</tr>
<tr>
<td>Males</td>
<td>Northern Ireland</td>
<td>0.40</td>
<td>59.9</td>
<td>0.36</td>
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</table>
Estimating ethnic mortality
Modelled SMRs

Projection model uses survivorship
Ethnic group life tables: using ethnic group SMR & all group mortality rate age distribution

Maps of life expectancy at birth, for 16 ethnic groups, England, males, 2001
International migration

Peter Boden

New Migrant databank

Concept, development and analysis

Uncertainty
**Purpose**

- ‘Single view’ of alternative statistics
- Clarity of conceptual and measurement differences
- Framework for analysis of trends and patterns in migration
- Analysis of short-term and long-term migration
- Derivation of ethnic-group migration estimates
- Complement the ongoing programme of work at ONS

**Data sources**

- Local Authority District & Unitary Authority (LADUA) statistics, 2001-2008
- Census (2001)
- Total International Migration (TIM) / International Passenger Survey (IPS)
- GP registrations (NHS-Flag4)
- National Insurance number registrations (NINo)
- Workers Registration Scheme (WRS)
- Work Permits (WP)/Points Based System (PBS)
- Higher Education Statistics Agency (HESA)
- Labour Force Survey (LFS)
England: Change over time

All data are Crown copyright. Sources: 100% data extract from the National Insurance Recording System (NIRS): 2006 Mid-year estimates (ONS, 2007a); GP registration statistics provided by ONS.

GOR profiles

West Midlands

Yorkshire & Humber

All data are Crown copyright. Sources: 100% data extract from the National Insurance Recording System (NIRS): 2006 Mid-year estimates (ONS, 2007a); GP registration statistics provided by ONS.
Local authority profile

Leeds

Newham

Continued analysis of patterns and trends for UK local authorities as new data are released

A model for estimating local immigration which incorporates

• TIM national estimates
• GP registration statistics at intermediate/local level
• NINO evidence on country of origin
Internal migration

John Stillwell, Serena Hussain, Paul Norman

Ethnic composition of internal migration in Britain at national level

Migration propensities and patterns at district level

Spatial patterns of ethnic net migration evident in London at ward level and processes of ethnic concentration or dispersal

Evidence in London of ethnic groups moving away or towards wards of higher deprivation

Main data sets

Special Migration Statistics 2000-01
  • No cross-tabulation of ethnic group by age

Tables commissioned from ONS including:
  • District-district matrix
  • Ward-related flows
    ~ Ward to region flows
    ~ Region to ward flows

For 7 age groups (0-15, 16-19, 20-24, 25-29, 30-44, 45-59, 60+) by 7 ethnic groups

Sample of Anonymised Records
Migration rates by ethnic group, 2000-01

![Graph showing migration rates by ethnic group, 2000-01](image)

Source: Special Migration Statistics Table MG103 and Standard Table

Age-specific migration rates by ethnic group, 2000-01

![Graph showing age-specific migration rates by ethnic group, 2000-01](image)

Source: Commissioned Table CO711

Modelled probabilities of migration

![Graph showing modelled probabilities of migration](image)

Source: SARs 1991 & 2001
### Net migration between local authority types by ethnic group

<table>
<thead>
<tr>
<th>Ethnic Group</th>
<th>LB</th>
<th>MD</th>
<th>UA</th>
<th>CD/LA</th>
<th>CA</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>-44,405</td>
<td>-20,320</td>
<td>17,266</td>
<td>46,972</td>
<td>487</td>
</tr>
<tr>
<td>Indian</td>
<td>-995</td>
<td>-761</td>
<td>340</td>
<td>1545</td>
<td>-129</td>
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<tr>
<td>POSA</td>
<td>-1,586</td>
<td>387</td>
<td>899</td>
<td>326</td>
<td>-26</td>
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<tr>
<td>Chinese</td>
<td>225</td>
<td>190</td>
<td>76</td>
<td>-361</td>
<td>-130</td>
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<tr>
<td>Black</td>
<td>-4,430</td>
<td>508</td>
<td>2,228</td>
<td>1,769</td>
<td>-75</td>
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<tr>
<td>Mixed</td>
<td>-1,899</td>
<td>-37</td>
<td>677</td>
<td>1,375</td>
<td>-116</td>
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<tr>
<td>Other</td>
<td>57</td>
<td>65</td>
<td>128</td>
<td>-287</td>
<td>37</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>-53,033</strong></td>
<td><strong>-19,968</strong></td>
<td><strong>21,614</strong></td>
<td><strong>51,339</strong></td>
<td><strong>48</strong></td>
</tr>
</tbody>
</table>

### Net migration by ward: White group

Flows within Greater London          Flows between GL & the rest of E&W

[Map showing net migration within Greater London and between GL and the rest of E&W]
Patterns of non-white group net migration within London

Patterns of non-white group net migration outside London
Townsend index for London wards

Quintile 1: least deprived
Quintile 5: most deprived

Net migration rate by ethnic group and deprivation quintile
Internal migration summary

Significant variations in migration propensities by ethnic group and age, but a convergence since 1991

Spatial patterns at district level dominated by white counterurbanisation and large net losses from London as a whole

Decomposing net migration into flows ‘within’ and ‘outside’ London exposes processes of suburban decentralisation, outward dispersal and inward concentration

Non-white migration dispensing rather than concentrating and all ethnic groups are moving from more deprived to less deprived areas

Ethnic fertility

Paul Norman

An informed projection model needs …

Information on past trends for LAs

• All persons
• Estimates by ethnic group

A range of plausible assumptions by ethnic group

• Age-Specific Fertility Rate (ASFR)
• Total Fertility Rate (TFR)

Factors on which to focus, by ethnic group

• Trends in TFRs & ASFRs, ‘ageing’ of curves
• ‘Convergence’ to the White group?
Fertility rates in a projection model

ASFRs in a projection: applied to surviving women

a.) 9,788 babies = 5,013 boys & 4,774 girls
b.) 7,927 babies = 4,060 boys & 3,867 girls

Fertility trends vary across space & time

All persons in Bradford & Leeds: 1982-2006
Estimate TFRs by ethnic group using Child : Woman Ratios (CWRs)

For each LA:

\[ \text{TFR(Eth)} = \text{TFR(AP)} \times \left( \frac{\text{CWR(Eth)}}{\text{CWR(AP)}} \right) \]

- Under-estimates White & over-estimates other TFRs

\[ \text{TFR(Eth)} = \text{TFR(E&W)} \times \left( \frac{\text{SF(Eth)} \times \text{CWR(Eth)}}{\text{CWR(E&W)}} \right) \]
Estimate national ASFRs by ethnic group
Survey data: Labour Force Survey, ‘own child’
Probability of infant by age and broad ethnic group

White

Pakistan & Bangladeshi

Estimate ASFRs by ethnic group & LA

Triangulate
• LA population-based ASFRs for all persons
• LA population-based TFRs by more detailed ethnic group
• National survey-based ASFRs by broad ethnic group
• Smoothing by Hadwiger curve
Next steps

Finish estimation of trends up to 2006
  • Inter-district flows by ethnic group

Develop set of plausible rates & scenarios
  • k-means classification of trends by LA: apply scenarios to ‘cluster’
  • Classifications may be component specific

Computer programming
  • Large arrays, complexity by ethnic group & inter-district migration
  • Ethnic switching

Data dissemination strategy
Acknowledgements, etc

ESRC Research Awards:
“What happens when international migrants settle? Ethnic group population trends and projections for UK local areas” RES-165-25-0032
- Phil Rees: P.H.Rees@leeds.ac.uk
- Paul Norman: P.D.Norman@leeds.ac.uk
- Peter Boden: P.Boden@leeds.ac.uk
- Pia Wohland: P.N.Wohland@leeds.ac.uk

“Internal migration of Britain’s ethnic populations” RES-163-25-0028
- John Stillwell: J.C.H.Stillwell@leeds.ac.uk

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