We can’t just ‘Call the Midwife’!
Are variations in fertility rates more about ethnicity, country of birth or local geography of residence?

Paul Norman

ESRC, Grant Ref ES/L013878/1: Jan 2015 - May 2016
Principal Investigator: Philip Rees¹ Co-Investigators: Pia Wohland², Paul Norman¹, Nik Lomax¹ & RA Stephen Clarke¹

¹ University of Leeds, ² Hull York Medical School
Outline

- Population projections context
- What we did to estimate fertility by ethnic group
- Reflections on our previous projections and fertility estimates
- What we are doing to find out what works
- What we might do about what may not work!
What are estimates > Projections?

Past

Estimates

\[ \text{Census 2001} \]

\[ \text{‘Jump-Off’} \]

Future

Projections

\[ \text{Census 2011} \]

ETHPOP projections

- England’s local authorities
- Wales, Scotland & Northern Ireland
- Projections by 16 ethnic groups
- 2001 to c. 2008/9 to 2051
Subnational projections by ethnic group

Age structure (& momentum …)
& applying **ethnic** & **geographic** specific
  - Fertility
  - Subnational & international migration
  - Mortality

… leads to different age-sex structures in the future

All components need to be estimated
Choice of 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

a.) TFR = 1.69
b.) TFR = 1.44
Estimating fertility rates by ethnic group

Estimating fertility rates: national
Local variation in ethnic fertility

For each LA ...

Scale local ASFR(aw) by National ASFR (e)

Scale ASFR(e) by local TFR (e)

Calculate births by ethnic groups
Fit births to VS

Recalculate ASFRs

Apply ‘mixing matrix’ on ethnic group of mother and baby
NewETHPOP: Initial interim reflection
2011 projection outputs compared with 2011 Census

- Age 0-15s ‘White British’ slightly over-projected
- Age 0-15s from higher fertility groups under-projected
- Age 0-15s ‘Other White’ under-projected

Differences between ‘expected’ & ‘observed’ due to:
- Fertility estimates by LA in 2001
- Assumptions about post 2001 fertility change
  
  … & elements of other components
NewETHPOP: Initial interim reflection
Strength of previous estimates:
• The number of births in each area across ethnic groups summed to the births in the Vital Statistics
• Part of the estimation included constraints
But maybe …
• Geography of ‘error’ in White British ASFRs / TFRs dominates other ethnic specific ASFRs / TFRs

If WBR ASFRs too high >
• Too many births
• Constraint applied to all groups
• Better estimate of WBR births
• Poorer estimate of non-WBR

• Small adjustment to WBR ASFRs?
• Closer fit between births & VS
NewETHPOP: 2001-2011

12 ethnic groups (cf. 16 previously)
Combines White British and White Irish into WBI
One Mixed group (not four)
• At LA level, more variation across groups & lower WBI births
• Ethnic variation more important
• Constraint suppressed variation
• Full check of outputs with VS yet to be carried out

Mixing matrix recalculated for 12 groups

Trend ASFRs by ethnic group & LA by annual all woman fertility rates 2001-2011
NewETHPOP: 2001 to 2011 accounts

Population accounts?
• Like double-entry book-keeping with people, not money!
NewETHPOP: 2001 to 2011 accounts

Population accounts?

Fig. 1. The system of interest. This modified version of the map of Middle Earth has been produced with permission for this article only from The Lord of the Rings by J. R. R. Tolkien published by George Allen and Unwin Ltd.
NewETHPOP: 2001 to 2011 accounts

Population accounts?

Table 13. A demographic matrix disaggregated by age for the two-region example showing how the items aggregate to Stone demographic accounts table.
NewETHPOP: 2001 to 2011 accounts

Population accounts can help reveal differences between ‘expected’ (projected) and ‘observed’ (annual VS and 2011 Census)

Differences due to:
• Fertility estimations by ethnic group & LA
• Assumptions about variations during 2001-11
• Estimations of subnational migration
• Impact of international migration & country of birth
NewETHPOP: 2001 to 2011 accounts

Subnational migration flows: estimated
NewETHPOP: 2001 to 2011 accounts

Subnational migration & ASFRs …
Projected numbers of children by 2011 may have errors
• If pre 2001 immigrants change their fertility
• If post 2001 immigrants have different fertility to current ethnic groups
• If people arrive post-2001 with children
Influence of non-UK born mothers?

- Commissioned table births to UK cf. non-UK mothers
- 2001 has higher %s in traditional immigration centres
- 2011 shows greater dispersal with many areas at 10 – 30 %
Are variations in fertility rates more about ethnicity, country of birth or local geography of residence?

Population accounts 2001-11 will reveal where *expected* drifts or steps away from *observed*

Due to:

- Choices of base and trended fertility rates
- Subnational migration: high rates for infants & differences by ethnic groups)
- Recent immigrants with and without infants
- Pre-2001 immigrants whose demographic behaviour may / may not alter over time & place

Population accounts appraisal will inform revisions of projection inputs and assumptions of future change & what you can’t anticipate?!?

- NewETHPOP population projection will have
  - 12 Ethnic groups * 2 UK born / Non-UK born fertility rates
  - Mixing matrix for ethnicity of mother and child


