

Population Estimates by Ethnic Group: Issues and Guidance

The Population Estimates by Ethnic Group were released as experimental statistics in January 2006. The methods used to produce the estimates are described in the *Population Estimates by Ethnic Group Methodology* paper. This Issues and Guidance paper, which makes explicit some of the assumptions underlying the estimates, is intended to help users to understand the limitations of the estimates, and to highlight areas where the methodology may be improved following the initial release.

General

Status as Experimental Statistics

The Population Estimates by Ethnic Group released in January 2006 are experimental statistics. This means that they have not yet been shown to meet the quality criteria for National Statistics, but are being published to involve users in the development of the methodology and to help build quality at an early stage. More information on Experimental Statistics and National Statistics is provided in the National Statistics Code of Practice: Protocol on Data Presentation, Dissemination and Pricing available at http://www.statistics.gov.uk/about/national_statistics/cop/protocols_published.asp.

Reliance on 2001 Census Data for Parameter Estimation

Whilst the absolute level of demographic flows for each age and sex are taken from the Mid-Year Population Estimates, the estimation of the ethnic composition of flows is generally achieved using 2001 Census data on ethnic differentials in, for example, fertility. The method is robust to changes in the size of the population of an ethnic group - for example, if the White: Other group grew by 10%, the number of births would increase appropriately, rather than being constrained to the level in the 2001 Census, but cannot track changes in differentials in the demographic rates - that is, if the Census data suggests that White: Other females are 10% more fertile at a particular age than average, that differential is assumed to continue over the period of the estimates (an exception to this is in the allocation of infants to ethnic groups, where changes over the 5 years prior to the Census are extrapolated to provide slightly different factors in subsequent years).

The Census data used in the parameter estimation processes relates to all usual residents. It thus includes people employed in the Armed Forces and prisoners, though these groups are excluded from the demographic transitions applied to the rest of the population. In practice, this will have a negligible effect except for some inflation of the migration effects for White: Other in LADs with large foreign Armed Forces populations - namely 42UC Forest Heath and, to a lesser extent, 12UC East Cambridgeshire and 33UB Breckland. Since estimates are constrained to the Mid Year Estimates total, the effects on White: Other in these areas will also result in effects on estimates for other ethnic groups in these areas.

Constraint to Mid-Year Estimates

As mentioned above, the components of change applied in the Population Estimates by Ethnic Group are constrained (by single year of age, sex and LAD) to those used in the Mid-Year Population Estimates. Any errors in the Mid-Year Estimates will thus be replicated in the estimates by ethnic group. More information on the methodology used in producing the Mid-Year Estimates is available at <http://www.statistics.gov.uk/about/data/methodology/specific/population/PEMethodology/>.

Base Population and Components of Change

Base Population

The base population is the 2001 Census population. The Census Quality Report, available at <http://www.statistics.gov.uk/StatBase/Product.asp?vlnk=14212>, provides information on variability due to the estimation of people not appearing on Census forms, the imputation of missing answers, and other sources of error.

Mortality

Assumed mortality rates are same for each ethnic group within a particular sex/age/LAD group (this does not imply the same mortality rates for each group across England as a whole as a particular ethnic group may have concentrations in LADs with high or low mortality rates). As mortality rates are applied to the population before taking into account migration, there will be a slight under-estimate of deaths in groups with relatively high net inflows (though the concentration of migrants in the younger age groups (with lower mortality rates) mitigates this).

Fertility and Allocation of Births

There are several aspects of the births component of change which should be considered.

Firstly, fertility rates are applied to the mean of the starting population and the aged-on population for each single year of age (before allowing for mortality and migration). This follows the practice of the current Sub-National Projections methodology, but will lead to a slight under-estimate of births in groups with relatively high levels of net cross-border or international in-migration (results for sub-national areas may also be affected by the exclusion of births to migrants from elsewhere in England). Approximate calculations suggest that this effect in 2003 leads to an under-estimate of around 0.2% for the Other: Chinese and Other: Other Ethnic Group groups, with other groups showing smaller differences. These errors are additive over time.

Secondly, it is acknowledged that differences in estimated mother-infant ratios are not an exact equivalent for differences in fertility rates. In particular, the mother-infant ratios necessarily exclude some mothers/infants - namely, those in Communal Establishments (from whom the necessary information was not collected in the Census), and those who were not linked to their mother/infant on a Household Census form. This might have a practical effect on the results if infants of a group were disproportionately likely not to be linked with their mother (the Census results used show 8% of infants in households were not linked with their mother).

Thirdly, LAD-specific differences in ethnic group age-fertility profiles are not modelled. Thus, while the methodology takes account of the fact that, for example, 20 year old Asian Bangladeshi women in London are more likely to have a child than average, and that 20 year old women in Barnet are less likely to have a child than average, it does not take attempt to model the fertility of 20 year old Asian Bangladeshi women in Barnet separately.

Fourthly, the allocation of births by ethnic group of mother to ethnic group of infant is based on extrapolation from patterns recorded in the Census. Further, the adjustment of the allocation of births to take account of differences due to the available pool of partners assumes the population as at Census day 2001. As this adjustment has only a small effect

on the numbers of births in each group and area, this assumption will have a vanishingly small effect on the final estimates (and would not affect the estimates for England as a whole).

Internal Migration

The internal migration system takes into account ethnic differentials in the propensity to migrate, the effect of different age/sex structures within LAD populations, differences in migration levels and patterns from each LAD and differences in the propensity of a particular group to migrate to a specific LAD. It does not attempt to reflect differences in the propensity of a particular group to migrate from specific LADs. Thus if the Asian: Pakistani group is estimated to have a higher propensity to migrate than Asian: Indian across England as a whole, this will also apply for each LAD (though it is quite possible for a higher proportion of Asian: Indian to migrate from an LAD as a result of the age-sex structures of the groups within that LAD). The calculation of ethnic differentials in the propensity to migrate (across England as a whole) takes into account differences in the age structure of the population of each group.

The possibility of incorporating LAD-specific ethnic differentials in the propensity to migrate will be considered in the development of the methodology following the initial release.

Cross-Border Migration

This component covers migration between England and the rest of the UK. The following points should be borne in mind when using the data.

Migration to Scotland and Wales

In contrast to the internal migration methodology, the propensity to migrate to Scotland or Wales is assumed to be equal for each ethnic group.

Migration to Northern Ireland

An assumption is made that the ethnic composition of migration to Northern Ireland is similar to the estimated composition of the inflow. This assumption is intended to reflect that the proportion of out-migrants of White: Irish ethnic group is expected to be higher than the proportion in the resident population.

Migration from the rest of the UK

The ethnic composition of flows from Scotland, Wales and Northern Ireland (separately) are assumed to be the same as those recorded in the 2001 Census. As the ethnic composition of the populations of the other parts of the UK is likely to change only slightly over the period of the estimates there is no *prima facie* reason to expect the ethnic composition of in-migrants from each area to England to vary substantially (though changes in the age distribution as well as the absolute size of the different groups would effect the composition of the inflow).

International Migration

International migration is modelled as three sets of inflows and outflows.

IPS/VS Flows

The largest inflows of international migration are those measured by the International Passenger Survey. As a sample survey, this is subject to sampling error, which has a quantifiable effect on the variability of the estimates of migration for each ethnic group.

Table 1: Standard errors of estimates of IPS in migration for ethnic groups

	2003 Population estimate	IPS immigration estimate	Standard error of immigration estimate	Coefficient of Variation
White				
White: British	42785	1568	101.7	0.065
White: Irish	613	18	0.9	0.049
Other White	1438	1032	70.1	0.068
Mixed				
White and Black Caribbean	251	11	0.8	0.074
White and Black African	90	23	1.4	0.062
White and Asian	209	40	1.9	0.048
Other Mixed	172	43	2.5	0.057
Asian or Asian British				
Indian	1113	380	31.0	0.082
Pakistani	765	125	15.5	0.124
Bangladeshi	302	58	12.8	0.223
Other Asian	280	115	12.4	0.108
Black or Black British				
Black Caribbean	584	61	10.5	0.173
Black African	587	228	18.8	0.083
Other Black	104	14	0.9	0.062
Chinese or other ethnic group				
Chinese	285	376	36.8	0.098
Other Ethnic Group	278	223	21.5	0.096

Source: Population Estimates by Ethnic Group

Note: This table shows standard errors of IPS in-migration estimates for people by country of birth mapped to ethnic group using the Population Estimates by Ethnic Group methodology.

In addition to sampling variability, the estimation of migration by ethnic group relies on the Census mapping of country of birth to ethnicity being an appropriate method of allocating ethnic group to new migrants.

Asylum Seeker Flows

The ethnic composition of the net flow of asylum seekers is estimated using Home Office data on the nationality of applicants and dependants, and the Census mapping of country of birth to ethnicity, and assumes that country of birth is an appropriate proxy for nationality. It is assumed that no asylum-seekers have White British ethnicity.

A natural criticism of this method is that the relationship between country of birth and ethnic group is unlikely to be the same for emigrants as for all residents. For example, it would be expected that, of those people of a given age born in the UK, those of the Asian Pakistani ethnic group would be more likely to travel to Pakistan than those of the White British group. Although this criticism is accepted, there are two mitigating factors which should be considered. Firstly, the COB-ethnic group mapping used is that used in the calculation of inflow. Where emigration is not permanent, then, an underestimate of non-White British group emigrating to a particular country should be mirrored by an underestimate of that group returning from that country (although the two flows would occur at different times). Secondly, the flows which are generally identified as being of concern in this context are relatively small as set out in Table 2. The further assumption that no asylum seekers have White: British ethnicity can scarcely fail to be incorrect, particularly with reference to flows from countries such as Zimbabwe. However, the assumption is made here that there is no defensible assumption on the likelihood of an asylum seeker having White British ethnicity which would make the estimates more accurate.

Table 2: International emigration of people born in UK (selected next country of residence): UK, 2003

Country of next residence	Outflow (thousands)
All	162.3
European Union	67
Australia	36.7
New Zealand	10.4
Bangladeshi, India, Sri Lanka	0.4
Pakistan	1.9
Caribbean Commonwealth	-

Source: Table 3.20, MN30 International Migration, ONS

There is assumed to be no difference between ethnic groups in their assignment to local authority districts (thus, if LAD A receives 2% of asylum seekers, it would also receive 2% of White: Other asylum seekers, 2% of Black: African asylum seekers and so on).

Irish Flows

As with flows to Northern Ireland it is assumed that flows to Ireland have a similar ethnic composition as flows from Ireland.

Prisoners

The proportions of prisoners in each ethnic group within each area are assumed to remain the same as in the Census. Theoretically, this would be expected to underestimate the numbers of prisoners from relatively fast growing groups in post-Census years, though in practice the effect will be insignificant over the period of the estimates.

School Boarders

The Mid-Year Estimates treat School Boarders as a special population, not subject to the demographic transitions of ageing, fertility, death and migration. In the absence of information on the ethnic group of school boarders, a simpler approach is taken the population estimates by ethnic group, with changes in the Mid Year Estimates due to adjustments for boarders simply reflected by constraining to the Mid Year Estimate. Thus for example, if the Mid Year Estimates incorporate a rise of 50 in the number of 14 year old boarders in an LAD, the numbers of 14 year olds in each ethnic group will be scaled up to ensure the estimates by ethnic group accord with the Mid Year Estimates. This simpler approach has two consequences - firstly it is implicitly assumed that the ethnic composition of boarders is similar to that of all people of that sex and age resident in the LAD, secondly, the population of boarders is subject to the demographic transitions described previously. This could have a very slight effect on the ethnic distribution of births for LADs with a large number of female boarders, though in practice the low Age-Specific Fertility Rate for ages to 18 will make the effect insignificant.

The Effect of Errors in Parameter Estimation

With the exception of the IPS international migration data described above, it is difficult to quantify the uncertainty surrounding the estimated components of change for each ethnic group. Table 3, on the next page, does not attempt to do that, but provides estimates of the effect on the published estimates of errors in estimating demographic flows. The table shows, for example, that if assumed mortality rates were increased by 1% at all ages for the Asian: Indian group, holding all other rates constant, the estimate for that group would be 0.004% lower. Small and opposite effects would be seen in other ethnic groups, where the number of deaths would reduce to ensure the total number of deaths remains constant.

Table 3: Sensitivity Analysis: Effect of 1% rise in demographic rates on total population, 2003

	<i>% change in estimate</i>						
	Mortality	Fertility	Cross border emigration	IPS in migration	IPS emigration	Asylum seekers net flow	Irish net flow
White							
White: British	-0.003	0.001	0.002	0.001	-0.001	0.000	0.000
White: Irish	-0.014	0.003	0.004	0.003	-0.003	0.000	-0.005
Other White	-0.006	0.006	0.002	0.061	-0.029	0.001	0.000
Mixed							
Mixed: White and Black Caribbean	-0.002	0.006	0.001	0.004	-0.003	0.000	0.000
Mixed: White and Black African	-0.002	0.006	0.001	0.023	-0.010	0.017	0.000
Mixed: White and Asian	-0.002	0.004	0.001	0.017	-0.008	0.007	0.000
Mixed: Other Mixed	-0.003	0.005	0.002	0.023	-0.012	0.008	0.000
Asian or Asian British							
Indian	-0.004	0.010	0.001	0.028	-0.010	0.004	0.000
Pakistani	-0.003	0.018	0.001	0.014	-0.006	0.005	0.000
Bangladeshi	-0.002	0.018	0.000	0.017	-0.006	0.002	0.000
Other Asian	-0.003	0.010	0.001	0.034	-0.009	0.018	0.000
Black or Black British							
Caribbean	-0.006	0.008	0.000	0.010	-0.006	0.001	0.000
African	-0.002	0.015	0.001	0.036	-0.011	0.042	0.000
Other Black	-0.002	0.008	0.000	0.013	-0.010	0.005	0.000
Chinese or other ethnic group							
Other: Chinese	-0.003	0.008	0.002	0.119	-0.050	0.020	0.000
Other Ethnic Group	-0.002	0.007	0.001	0.072	-0.022	0.022	0.000

Source: Population Estimates by Ethnic Group