POPULATION ESTIMATES BY ETHNIC GROUP

METHODOLOGY PAPER

Authors: Pete Large, Kanak Ghosh

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A Methodology for Estimating the Population by Ethnic Group in England

Summary

This article describes the methodology used to produce experimental estimates of the population of England and its local authority districts (LADs), by ethnic group. The approach used is a cohort component methodology with population counts, and each component of population change, constrained to the Office for National Statistics (ONS) Mid-Year Population Estimates. Consideration is given to the modelling of the ethnic dimension of mortality; fertility (and the allocation of ethnic group to infants); switching between ethnic group categories; and the various aspects of migration, with particular attention given to the application of commissioned Census data.

Introduction

There is increasing and substantial interest in up-to-date estimates of the sizes of ethnic groups within the population of England. Some previous estimates have been based on Labour Force Survey results and are thus restricted to high levels of aggregation of geography or ethnic group. Detailed results for each ethnic group, by sex and quinary age-group, were produced as standard output from the 2001 Census in May 2003, but necessarily fail to reflect rapid growth in some groups since 2001.

This article describes a methodology for producing estimates by ethnic group using an orthodox cohort component methodology. The estimates initially cover the period 2001-2003 and are consistent (in both numbers and, where possible, methodology) with the current Mid-Year Population Estimates published by ONS. The methodology constructs estimates for single year of age, sex, and ethnic group at the level of the local authority, though published estimates are aggregated across at least one of these dimensions.

Cohort Component model

The orthodox approach to producing population estimates is the cohort-component method. This is the method used for the ONS Mid-Year Estimates (MYEs) and described in *Making a population estimate* [1] . The overall approach is summarised in p11 of that document as follows:

> "***Summary of the cohort component method***
> *Take the previous mid-year resident population and age-on by one year;*
> *Then estimate the population change between 1 July and 30 June by;*
> *Adding births occurring during the year*
> *Removing deaths occurring during the year;*
> *Allowing for migration to and from the area*
>
> *In addition to the process summarised above, adjustments are also made for some special population groups that are not captured by the internal or international*

migration estimates: members of the armed forces, prisoners and pupils in boarding schools. These populations have specific age structures, which remain fairly constant over time. Therefore these groups are not aged-on with the rest of the population. '

The cohort component method as applied to population estimates by ethnic group has the advantages that it:

- is consistent with the Mid-Year Estimate methodology;
- allows estimates for small groups to be produced;
- can be extended easily to produce projections consistent with the ONS Sub-National Projections;
- allows analysis of the relative importance of the components of population change for each ethnic group.

The adoption of the cohort component approach requires the development of a variety of demographic rates and propensities specific to each ethnic group. The methods used to derive these factors are discussed below. The approach places great reliance on using the results of the 2001 Census to identify differences between ethnic groups, and Appendix 1 provides a list of commissioned Census tables used for this work.

Definition of Ethnic Group

The complexities of defining and describing ethnic group are discussed in *Ethnic group statistics* [2]. For the purposes of this article it may be sufficient to state that:

- Ethnic group is self-assigned - that is, chosen by the respondent from a list of categories (including an 'other' option).
- The classification used in National Statistics is the 16-way classification adopted in the 2001 Census (see, for example, Table 1).
- A person's ethnic group can change over time;
- Description of ethnic group can change in different contexts. Reliance on the Census data in the modelling process has the *de facto* effect that the estimates will accord with the context of the Census – in particular, this will reflect any effect due to proxy responses by the form-filler on behalf of another household member.

Base Population

Before discussing components of change it is necessary to estimate the starting population for the estimates. Following the approach of the Mid Year Estimates, the initial base population for the estimates is taken to be the 2001 Census population. A specially commissioned table provides Census counts by ethnic group, sex and single year of age for each LAD in England[1]. Table 1 provides a summary of the Census results for each ethnic group.

Table 1: Population by ethnic group: England, 2001

	Total (thousands)	Per cent of total	Median age	Per cent of female population aged 15-44
All people	49139	100.0%	36	40.7%
White				
White: British	42747	87.0%	38	39.1%
White: Irish	624	1.3%	50	33.5%
White: Other White	1308	2.7%	32	57.3%
Mixed				
White and Black Caribbean	231	0.5%	12	40.1%
White and Black African	76	0.2%	17	46.9%
White and Asian	184	0.4%	16	43.3%
Other Mixed	151	0.3%	17	46.3%
Asian or Asian British				
Indian	1029	2.1%	30	52.5%
Pakistani	707	1.4%	21	51.5%
Bangladeshi	275	0.6%	20	50.8%
Other Asian	238	0.5%	29	51.4%
Black or Black British				
Caribbean	561	1.1%	34	52.7%
African	476	1.0%	26	59.2%
Other Black	95	0.2%	21	55.9%
Chinese or other ethnic group				
Chinese	221	0.4%	28	59.1%
Other Ethnic Group	215	0.4%	30	61.8%

Source: 2001 Census, Tables KS06, C0533

[1] Data taken from Table C0538. Separate counts for the City of London and Isles of Scilly are estimated using C0538 in conjunction with Table S102.

The base population is rolled forward to mid-2001 using the same methodology used for later years as described below. In addition, further adjustments are made to the mid-2001 counts to correspond with adjustment made in the Mid Year Estimates.

Subtraction of Special Populations

As noted above, certain special populations are subtracted from the Mid Year Population Estimates before ageing-on the population and applying the components of change. A similar approach is adopted in the Population Estimates by Ethnic Group.

Armed Forces

In general, the ethnic composition of the Armed Forces in an area is estimated by applying the ethnic composition of Armed Forces in that area recorded in the Census to the total Armed Forces population used in the Mid-Year Population Estimates. Home and Foreign Armed Forces (which latter includes dependants) are treated separately in recognition of the different ethnic profiles of the two populations.

Prisoners

A similar approach is taken in estimating the ethnic composition of prisoners. Again, the ethnic composition of prisoners in that area recorded in the Census is applied to the population of prisoners used in the Mid-Year Population Estimates. Calculations are carried out separately for male and female populations.

School Boarders

As no reliable information on the ethnic group of school boarders is available, it is assumed that these share the ethnic characteristics of people of that age and sex in that area.

Components of change and ethnic group

This section describes the methods adopted in estimating the various components of change in the model. Detailed discussions of issues relating to each component of change are contained in *Population projections by ethnic group: A feasibility study* [3].

Mortality

The standard method of calculating mortality rates is to use counts of death from the death register and estimates of the population at risk from the Mid-Year Estimates. However, neither of these sources includes data on ethnic group. Studies using country of birth as a proxy for ethnic group are becoming less informative as in-migrant populations move to second or third generation. Analysis of Longitudinal Study data did not provide evidence on which differences in mortality rates between groups could be reliably posited.

The methodology adopted thus takes the age-specific mortality rates estimated for each area using registered deaths and the estimated mid-year population and applies them to each ethnic group. It will be noted that, as these rates vary by area, and ethnic groups are not distributed evenly across areas, this method will produce implied different mortality rate profiles for each ethnic group across England as a whole.

Fertility

Age-specific fertility rates (ASFRs) will be an important determinant of relative growth rates of ethnic groups. It seems intuitively likely that cultural factors, (and the immigration of spouses), have a substantial effect on both the number and timing of births.

The conventional method of estimating fertility rates is to divide the number of births by women of a particular age (provided by Birth Register statistics) by the number of women of that age in the population (derived from the Mid-Year Estimates). This approach is not immediately possible for estimates by ethnic group as the Birth Register does not record ethnic group of mother (note: fertility is here discussed in the context of the ethnic group of the mother: ethnic group of the child is considered below) and the Mid Year Estimates do not provide separate counts by ethnic group to act as the denominator for the fertility rate.

The method adopted uses 2001 Census data on the age and ethnic group of mothers of 0 year olds, together with the counts of all women of that age in that ethnic group, to derive an estimated 'mothering ratio' for each ethnic group. Conceptually, these ratios are divided by the overall ratio to provide the differential profile for each group. Since a mother (of an infant) aged x at Census day may have been aged x or x-1 at the time of the infant's birth, the differential fertility profile for each group is approximated as the mean of the mothering ratios for the two applicable years. These profiles are estimated for ages 15-44, with the profile for each group then scaled up to allow for the small proportion of mothers aged outside this age band. To allow for the possibility of different patterns in differential fertility within England, the calculation of differential fertility profiles is carried out separately for London and England (excluding London).

Example: Calculation of the number of births to women within an ethnic group

In LAD A (in London) there are 200 Asian Bangladeshi females aged 23 and 1000 White British females aged 23; and no other females aged 23 (at end of year).

The (Census based) estimated fertility rate for Asian Bangladeshi (aged 23) in London is 0.05.
The (Census based) estimated fertility rate for all ethnic groups (aged 23) in London is 0.025.

Thus 23 year old Bangladeshi women in LADs in London will initially be assumed to have an ASFR twice as high as the average for that area.

The (MYE based) estimated age-specific fertility rate for 23 year old women in LAD A is 0.06
Therefore, the initial estimate of the ASFR for 23 year old Bangladeshi women is 0.06 x 2 = 0.12

And the number of births to Bangladeshi women aged 23 is 200 x 0.12 = 24.

Carrying out similar calculations for all ages and ethnic groups produces an estimate of 500 births in LAD A.

The birth registration figures show that the actual number of births in the area was 400. Thus, the scaling factor = 400/500 = 0.8.

The scaled estimate of births to Asian Bangladeshi women aged 23 in LAD A is thus 0.8 x 24 = 19.2

It should be stressed that the fertility rates are initially applied to the female population before taking account of mortality and migration. This approach is consistent with that of the ONS Sub-National Population Projections but has the weakness that slightly too few births will be generated for groups which have relatively high net in-flows of women of child-bearing age (and similarly slightly too many births generated for groups with relatively low net in-flows). In addition, the 7.1% of infants in households (and infants in Communal Establishments) not linked with their mother on the Census records will not be reflected in the estimates of fertility differentials. This latter weakness would lead to an underestimate of fertility rates for groups with a disproportionate number of mothers not linked with their infants. In practice, these weaknesses are likely to have a relatively small impact on the quality of the estimates compared to the uncertainty in the estimates of international migration.

The above calculations allows estimates to be made of the number of babies born to women of each ethnic group. However, to estimate the number of babies of each ethnic group account must be taken of heteroethnic infancies – that is, the propensity for mothers to have different ethnic characteristics from their children. This is done using factors derived from Census data linking ethnic group of mother to ethnic group of child - for example, showing that 5% of White: Other 0 year olds have a White British mother. These factors can be expected to change over time as the ethnic composition of the population changes. This effect is reflected, to some extent, by calculating similar factors for children aged 1, 2, 3, and 4, and assuming that it is appropriate to linearly extrapolate factors for 2002 and 2003.

Calculating such factors is problematic for individual local authority districts, where many combinations of mother's and infant's ethnic group will contain very small numbers. Thus, it was initially assumed that modelling separate rates for London and for the rest of England provided an appropriate level of detail. However, this approach would fail to take into account the effects of different concentrations of ethnic groups as potential fathers in different areas within London or the rest of England. This has a small impact on the estimates for some groups in some areas, and small adjustment is made by applying further factors to the estimated number of births in each ethnic group in each local authority. These factors are derived by comparing the estimated distribution of births using the above methodology for that part of 2001 between Census day and mid-year with the Census distribution. While this is not exact (the timing is different and the Census includes migrants, for example) it should provide factors which adjust the modelled data closer to reality. The factors are further adjusted to ensure that their application does not change the overall number of births in each ethnic group for England as a whole. Further research on this aspect of the estimates is planned.

Ethnic Switching

An interesting aspect of modelling population by ethnic groups is the possibility of changes in ethnic affiliation. Some research into this was conducted using Longitudinal Study data for people included in both 1991 and 2001 Censuses. Unfortunately, the difference in ethnic classifications used in the two censuses (with, for example, no 'Mixed' categories included in the 1991 classification) makes it difficult to identify genuine changes of affiliation over time. A more detailed investigation of stability in ethnic group affiliation has been provided by Platt, Simpson and Akinwale [4]. Although the model has been set up to allow for the incorporation of such a switching effect, it is assumed that change in ethnic affiliation is not a significant effect in demographic changes in ethnic groups.

Domestic Migration

The estimation of migration between areas within England is the most involved part of the methodology. It can be broken down into four steps:

First, the numbers of migrants of each ethnic group from each LAD is estimated by applying an age-migration propensity profile for that group to the current population. These profiles are estimated from Census data showing the number of people of each ethnic group and quinary age who moved between local authorities in England.

Second, these notional migrants are allocated to a destination LAD using Census data on the origin-destination patterns of people of each (quinary) age.

Third, these flows are adjusted to allow for higher/lower flows of some ethnic groups to particular destinations (the so-called 'ethnic effects'). The ethnic effects are estimated by comparing Census data on flows of each ethnic group into each LAD with the flow that would be expected based solely on the age and geographical distribution of that ethnic group

Finally, the matrix of flows by single year of age and sex (summed by ethnic group) is constrained to the matrix of flows for that year used in the Mid-Year Estimates.

Migration to and from other parts of the UK

Outflow

Calculation of ethnic differentials in propensities to migrate to other parts of the UK is complicated by the use of different ethnic classifications in the Scottish and Northern Ireland censuses, and the important influence of location in determining migration destination. The method adopted is as follows:

For Scotland and Wales (separately), an arbitrary age-migration curve is applied to the population of each area, with the estimated number of migrants by age and sex then constrained to the Mid Year Estimate figure for the area. Thus it is assumed that there is no difference in the probabilities of migrating to Scotland (say) for the various ethnic groups (for a given sex, age, and LAD of residence).

For Northern Ireland a different approach is adopted to allow for the expected greater probability of White: Irish to migrate to the area. In essence, it is assumed that the ethnic distribution of out-migrants to Northern Ireland is similar to that of in-migrants. The estimated number of out-migrants in each ethnic group (across England as a whole) in 2001 is divided by the Census population by ethnic group to estimate the proportion of each group which would migrate to Northern Ireland. These proportions are used to scale the standard age-migration curve. As with Scottish/Welsh migration, the results of applying the standard curve are then constrained to the Mid-Year Estimate LAD/age/sex totals for migration to Northern Ireland.

The application of propensity to migrate curves means that changes in the ethnic composition of outmigration is a natural result of changes in the ethnic composition of the resident population. While assumptions made on cross-border flows are unlikely to greatly affect the estimates the additional assumptions made to model the White: Irish component of outmigration to Northern Ireland protect against systematic underestimation of this flow which would result from applying the methodology used for Scotland and Wales.

Inflow
The ethnic composition of in-migration from each other part of the UK is assumed to be the same as that for the relevant quinary age group in the 2001 Census. Results are calculated separately for each part of the UK (so a large increase in migration from Northern Ireland, say, would be accompanied by a corresponding increase in the number of White: Irish in-migrants).

In contrast to the international and internal migration components, no attempt is made to reflect differential propensities to migrate to different LADs by ethnic groups. The relatively ethnically homogenous nature of the populations of the other parts of the UK means that attempts to model such effects would be based on very small counts (at the LAD level) and would be unlikely to materially change the estimates.

International migration
International migration is treated as having four components: migration measured by the International Passenger Survey (IPS), Visitor Switchers, Asylum Seekers and migration to and from Ireland (formerly referred to as the Republic of Ireland). Each of these components has both an inflow and an outflow. The methodology for each component is set out below.

IPS/Visitor Switcher migration
The IPS provides a measure of the number of people migrating to England and staying for at least 12 months. For the purposes of this article 'IPS migration' will be taken to refer to this flow after correction for temporary visitors who stay longer than initially planned (so called 'visitor switchers') and intended migrants who leave before 12 months ('migrant switchers'). In the absence of any evidence that the assumption is unjustified, the ethnic composition of visitor switchers is assumed to be the same as that of intended migrants measured by the IPS.

Modelling the ethnic group of this component of international migration relies on the IPS data on country of birth of migrants and Census data on the relationship between country of birth and ethnic group.

Inflow

The 'IPS inflow' by age and sex into each LAD has already been estimated for the Mid-Year Population Estimates. The ethnic composition of these flows is estimated as follows.

Firstly, IPS data on Country of Birth (COB) of in-migrants is combined with a Census distribution of COB against ethnic group. This provides an estimate of the ethnic composition of the total IPS inflow. Applying these factors directly to the total inflows used in the Mid-Year Estimates for each local authority district would fail to reflect differential propensities of ethnic groups to migrate into a particular district (for example, the Census suggests that Bradford attracts 7% of all international in-migrants of the Asian: Pakistani ethnic group). This effect is dealt with as follows.

The proportion of international migrants of each ethnic group going to each LAD is calculated using Census data. These proportions are applied to the England level estimates by ethnic group described above to produce initial estimates of the ethnic group international in-migrants in each LAD. These estimates (by age, sex, ethnic group and LAD) are then scaled back to the Mid Year Estimates flows for that age, sex and LAD.

The adjustment for differential propensities of ethnic groups to migrate into a particular district results in final estimates of IPS in-migration by ethnic group which do not accord precisely with the initial estimates. This discrepancy is removed using iterative proportional fitting to allow consistency with both the IPS-derived estimates of ethnicity and the IPS in-migration constraints used in the Mid-Year Estimates.

Outflow

The calculation of the ethnic composition of 'IPS outflow' is simpler than that for inflow. Again, information on country of birth of migrants is used to estimate the ethnic composition of the outflow from England as a whole. These estimates are divided by estimates of the size of the total population of that group to produce a measure which can be most easily understood as a probability of a person of that group emigrating. These 'probabilities' can thus be applied to the populations of each group within each LAD to provide initial estimates of the number of people of each age, sex and ethnic group within each LAD who emigrate. As with other components, these counts, summed across ethnic groups, are then scaled to the counts used in the Mid-Year Estimates.

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 of UK-born persons to the Caribbean Commonwealth and the Indian sub-continent, which are those generally identified as being of concern in this context, are relatively small as set out in Table 2 below.

Table 2: IPS 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

Asylum Seekers

The estimation of the ethnic composition of asylum-seeker flows is based on combining the detailed nationality figures for net flows of asylum-seekers (including both Principal Applicants and Dependants) for each year with the Census cross-tabulation of country of birth and ethnic group. This ethnic composition is then applied to the flows, by age and sex, into, or from, each area. As a matter of practicality, and in contrast to the calculation of the characteristics of IPS migration, it is assumed that no asylum-seekers are White British. Whilst this assumption can scarcely fail to be incorrect, it is likely to reflect the composition of asylum-seeker flows more accurately than the raw country of birth - ethnic group data (which typically show substantial proportions of people with each country of birth having White: British ethnicity).

Several points should be made in reference to the estimation of this component.

Firstly, the assumption that the 2001 Census data on country of birth is a fair proxy for nationality of asylum seeker should be acknowledged. This assumption can be criticised on several grounds - country of birth is, of course, different from nationality (and this is a prime reason why the *ad hoc* assumption that no asylum seekers are White: British is made); it does not take account of changes in the ethnic composition of a country between the initial migration (of the population with that country of birth recorded in the 2001 Census) to England and the asylum-seeker flow; and it does not allow for the possibility that ethnic group is itself a prime determinant of whether somebody of a particular nationality becomes an asylum-seeker.

Secondly, whilst the distribution of asylum-seekers between local authority districts follows that used in the Mid-Year Estimates, the additional assumption is made that the calculated ethnic distribution of asylum seekers for England applies for each local authority (thus, if 10% of asylum seekers were Asian: Pakistani, for example, 10% of the asylum seeker flow into each LAD will be Asian: Pakistani).

Irish Flows

These small flows are disaggregated by assuming an ethnic composition for both inflows and outflows similar to that of inflows from Ireland recorded in the Census.

Further Adjustments to Mid-2001 Counts

Although the experimental estimates by ethnic group are based on the 2001 Census, they do incorporate the revisions made to the MYEs made since the Census results were first published. These adjustments are described below.

Unprocessed forms

Corrections were made in the Mid Year Estimates for about 5,500 people in England who were included on unprocessed Census forms. As these forms were largely concentrated in particular wards within certain LADs, the ethnic composition of this adjustment is assumed to be the same as the ethnic composition for that age/sex group within that ward.

Longitudinal Study adjustment

This major adjustment, of about 184 thousand sought to correct a believed underestimation of (mostly) males aged 25-34. It is assumed that the ethnic composition of this adjustment is the same as the ethnic composition for that age/sex group within that local authority. The possibility of further research on this component using Longitudinal Study data is being considered.

Local Authority Studies (including Manchester adjustment)

Adjustments to the estimates for 14 local authority districts in England were made following the detailed Local Authority Studies. These adjustments totalled 104 thousand for areas in England. As with the Longitudinal Study adjustment, it is assumed that the ethnic composition of this adjustment is the same as the ethnic composition for that age/sex group within that local authority.

More information on these adjustments in the MYEs is available at http://www.statistics.gov.uk/about/data/methodology/specific/population/PEMethodology/ .

Reliability and Variability

The reliability of estimates produced using the above methodology is difficult to quantify owing to the nature of potential sources of error.

Firstly, there is uncertainty inherent in the Mid-Year Population Estimates, to which the estimates by ethnic group are constrained. This uncertainty encompasses, *inter alia*, various sources of variability in the 2001 Census counts [5]; limitations in estimating internal migration from administrative records; and the effect of basing estimates of international migration on sample surveys.

Secondly, assumptions on appropriate proxies may be incorrect. In particular, the attribution of ethnic group to international migration flows is predicated on the assumption that the country of birth-ethnic group distribution recorded in the 2001 Census for existing residents can be appropriately applied to flows of people with that country of birth or, with asylum-seekers, the associated nationality. Further detail on the assumptions underlying the estimates is provided in the *Issues and Guidance* paper, available at

http://www.statistics.gov.uk/StatBase/Product.asp?vlnk=14238

Thirdly, reliance on the 2001 Census data to identify differences in demographic rates between ethnic groups can be expected to become less adequate through the inter-censal period.

The robustness of the estimates to errors in estimated parameters is summarised in Table 3, which shows the effect on the estimate of the total population of an ethnic group of a 1% error in the initial estimated flow for that group (that is, before constraining to the Mid-Year Estimate total for that component). These alternative scenarios are run for 2002-2003 using the published 2002 results, and are compared with the published 2003 estimates. 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 for errors in estimated flows: England, 2003

	Births	Deaths	Flow from rest of UK	Flow to rest of UK	IPS in-migration	IPS out-migration	Asylum Seekers (net flow) **	Irish inflow	Irish outflow
White									
White: British	0.002%	-0.002%	0.000%	0.000%	0.000%	-0.001%	0.000%	0.000%	0.000%
White: Irish	0.004%	-0.014%	0.001%	-0.004%	0.003%	-0.003%	0.000%	0.004%	-0.009%
White: Other White	0.009%	-0.006%	0.001%	-0.003%	0.062%	-0.040%	0.001%	0.000%	0.000%
Mixed									
White and Black Caribbean	0.035%	-0.002%	0.000%	-0.002%	0.004%	-0.003%	0.000%	0.000%	0.000%
White and Black African	0.039%	-0.002%	0.001%	-0.003%	0.022%	-0.010%	0.017%	0.000%	0.000%
White and Asian	0.039%	-0.002%	0.001%	-0.003%	0.017%	-0.008%	0.007%	0.000%	0.000%
Other Mixed	0.036%	-0.003%	0.001%	-0.003%	0.022%	-0.012%	0.008%	0.000%	0.000%
Asian or Asian British									
Indian	0.012%	-0.004%	0.001%	-0.002%	0.030%	-0.010%	0.004%	0.000%	0.000%
Pakistani	0.021%	-0.003%	0.001%	-0.002%	0.014%	-0.006%	0.005%	0.000%	0.000%
Bangladeshi	0.022%	-0.002%	0.000%	-0.002%	0.017%	-0.006%	0.002%	0.000%	0.000%
Other Asian	0.015%	-0.003%	0.001%	-0.002%	0.036%	-0.009%	0.018%	0.000%	0.000%
Black or Black British									
Caribbean	0.011%	-0.006%	0.000%	-0.002%	0.009%	-0.006%	0.001%	0.000%	0.000%
African	0.018%	-0.002%	0.001%	-0.002%	0.034%	-0.011%	0.044%	0.000%	0.000%
Other Black	0.025%	-0.002%	0.000%	-0.002%	0.012%	-0.010%	0.005%	0.000%	0.000%
Chinese or other ethnic group									
Chinese	0.009%	-0.003%	0.001%	-0.003%	0.116%	-0.050%	0.020%	0.000%	0.000%
Other Ethnic Group	0.009%	-0.002%	0.001%	-0.003%	0.071%	-0.022%	0.022%	0.000%	0.000%

Source: Population Estimates by Ethnic Group

Dissemination of Estimates
Results are provided for mid-years 2001-2003 in six standard tables.

Table EE1: Population estimates by sex and ethnic group (LADs and higher administrative geographies)
Table EE2: Population estimates by sex, broad (3 way) age, and (16 way) ethnic group (LADs and higher administrative geographies)
Table EE3: Population estimates by sex, broad (3 way) age, and broad (5 way) Ethnic Group (LADs and higher administrative geographies)
Table EE4: Population estimates by quinary age by sex and ethnic group (England)
Table EE5: Components of population change (births, deaths, net migration) by ethnic group (England)
Table EE6: Population change by ethnic group (LADs and higher administrative geographies)

Following the practice of the mid-year population estimates counts in table are rounded to the nearest 100.

Tables EE4 and EE5, which would contain very small cell counts if produced for local authority districts, are produced for England as a whole only. All other tables are produced for the standard administrative hierarchy of local authority districts, counties, Government Office Regions and England as a whole, and for the Strategic Health Authority areas as currently defined.

Tables EE1, EE2 and EE3 (for administrative geographies) will be made available through the Neighbourhood Statistics website at http://neighbourhood.statistics.gov.uk/dissemination/. All six tables are also available on the National Statistics website through http://www.statistics.gov.uk/StatBase/Product.asp?vlnk=14238. Both sites allow the tables to be downloaded in CSV or Excel formats. Tables can also be provided on CD on request to the authors. The estimates themselves will be the subject of a further article in a future edition of Population Trends.

Further Developments

Whilst the ONS is publishing estimates produced using the methodology described above, it should be stressed that these are not yet considered of sufficient quality to receive National Statistics status. It is hoped that publication of both the estimates and this article will encourage further discussion and investigation of the issues outlined above, allowing us to improve the methodology for future estimates. In particular, we expect to address the following issues:

- The potential role for the Annual Labour Force Survey/Annual Population Survey in benchmarking estimates produced by the cohort-component method;
- Whether the benefits of applying fertility and mortality rates to the true population at risk (taking into account migration during the year) outweigh the disadvantage of adopting a methodology inconsistent with the Sub-National Population Projections;
- Whether Census data on mothers living with their children accurately reflects differences in fertility between ethnic groups;
- Alternative methods of estimating birth allocation probabilities;
- The scope for improving estimation of the 'ethnic effects' for internal migration;
- Whether the assumptions on the ethnic group of international migrants are reasonable;
- The possibility of using a similar methodology to produce population projections.

References

1. Office for National Statistics. *Making a population estimate in England and Wales*, (2005) available through http://www.statistics.gov.uk/StatBase/Product.asp?vlnk=575

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4. Platt, Simpson and Akinwale. Stability and change in ethnic groups in England and Wales, *Population Trends* 121, London: Palgrave Macmillan (2005)

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Appendix 1: Commissioned 2001 Census Tables

The tables below were commissioned from ONS Census Outputs Branch for this project. As with other Census commissioned tables, they are now available free of charge from Census Customer Services.

Commissioned Census tables

C0006	Age by ethnicity
C0009	Sex and age and whether born in UK by ethnicity (migrants from Wales)
C0010	Sex and age and whether born in UK by ethnicity (migrants from Scotland)
C0011	Sex and age and whether born in UK by ethnicity (migrants from Northern Ireland)
C0431	Age, sex and ethnic group by ethnic group of mother
C0527	Sex; ethnicity; and age by migration status
C0528	Origin and destination of migrants by ethnicity
C0529	Age by ethnicity of migrants from England to Scotland
C0530	Age by ethnicity of migrants from England to Wales
C0531	Sex and GOR of residence by ethnicity of international migrants
C0532	Selected country of birth by ethnicity
C0533	Sex and age by ethnicity
C0534	Ethnicity and age of mother of children in households aged 0
C0535	Ethnicity of migrants from Ireland