

Article

# Review of the current evidence base for population estimates by ethnic group: December 2021

Evaluation of the current evidence base for population estimates by ethnic group produced by the Office for National Statistics.

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# 1 . Main Points

- Census data remain our “gold standard” source for population estimates by ethnic group in England and Wales and are recommended to be used for analysis, especially when considering more detailed population groups than the 18 ethnic groups by age (10-year age bands), sex and region.
- 2021 Census data will provide a detailed and accurate picture of the population of England and Wales by ethnic group, but these estimates will not reflect change since census day.
- [Population estimates by ethnic group and religion, England and Wales: 2019](#) have been produced as experimental statistics, which include estimates by age (10-year age bands) and sex for each of the 18 ethnic groups at the national level for England and Wales, and for England’s regions; the estimates aim to provide a timelier picture between censuses and as we move away from the 2021 Census.
- Results obtained from Annual Population Survey (APS) data alone are recommended when more timely population estimates by ethnic group at a national level for the overall UK population are required.
- While [admin-based population estimates by ethnic group](#) for England at the national, regional and local authority level for the 5 and 18 ethnic groups have shown early promise, further work is needed before we can produce robust population estimates by ethnic group; the new annual estimates provide a timely picture, with information on accuracy, in the interim.

## 2 . User need for population estimates by ethnic group

Previously, the most up-to-date official estimates of the population by ethnic group and religion were from the 2011 Census. There is a strong user need for more timely official estimates by both ethnic group and religion.

New [Population estimates by ethnic group and religion, England and Wales: 2019](#) have now been published for the first time as [experimental statistics](#). Providing these estimates meet user requirements and are proven to be reliable against 2021 Census data, they will be produced annually. Further information on our journey to produce annual population estimates by ethnic group within the Office for National Statistics (ONS) can be found in [Section 4](#).

While this research has been developing alongside research into producing admin-based population estimates by ethnic group, there has remained a strong user need for population estimates by ethnic group. Consequently, there are various estimates that have been produced both within and outside of the ONS, including the [ETHPOP](#) ethnic populations projections produced at the University of Leeds.

This article evaluates the current evidence base of population estimates by ethnic group produced within the ONS only, including consideration of strengths and limitations. The article aims to provide guidance to users as to which estimates to use for what purpose, and how the ongoing annual production of estimates will fit in with the upcoming 2021 Census release, as well as wider transformation work.

## 3 . The Office for National Statistics’ population estimates by ethnic group

## 2011 Census population by ethnic group

Prior to our publication of [Population estimates by ethnic group and religion for England and Wales, 2019](#), the latest official statistics for populations by ethnic group were from the 2011 Census.

The 2011 Census is considered our most reliable data source for a point in time estimate. The census aims to count all people in all households and communal establishments (such as care homes or prisons).

One of the main limitations is the changes to the size and structure of the population since Census day. These include different birth rates, deaths, immigration and emigration between ethnic groups. Further to this, it will not reflect that an individual's ethnic identity can change over time, as found in research into the [Stability of ethnic-identity in England and Wales 2001-2011](#).

### Recommendation

Census data remain our "gold standard" source for population estimates by ethnic group in England and Wales. Census data are recommended for analysis, especially when considering smaller population groups than the 18 ethnic groups by age (10-year age bands), sex and region. Caution should be taken when using the census to obtain population estimates by ethnic group as we move away from census day, as the estimates will not reflect change.

## 2018 population denominators by ethnic group

These estimates are neither National Statistics nor standard published experimental statistics.

The denominators have been produced as an ad-hoc in response to a specific user request for aged-on census distributions applied to standard population estimates. There are two publications using this method: [Population denominators by ethnic group, regions and countries: England and Wales, 2011 to 2018](#) for 18 ethnic groups by region, single year of age and sex, and [Population denominators by broad ethnic group and for White British, local authorities in England and Wales: 2011 to 2019](#) for six ethnic groups by local authority, single year of age and sex.

The method assumes that the ethnic group distribution observed on census day remains constant. To produce estimates for the following year, the ethnic group distribution for each age becomes the distribution for those one year older.

This assumption ignores factors that could affect ethnic group distributions, such as the influence of migration (both internally within the UK and internationally) and changing birth and death rates. It does not consider groups that do not "age-on", for example, students may move region or enter and leave the UK as they begin and end their studies. In addition, ethnic group is self-identified and we know how someone chooses to identify can change over time.

Further information on the methodology and its limitations can be found in the supporting information accompanying each publication.

### Recommendation

As the method is limited, because of no adjustments being made to account for factors which could affect ethnic group distribution, these estimates will not be updated. We would not recommend the use of these population denominators for analysis.

## Annual Population Survey population estimates by ethnic group

Population estimates by ethnic group are available to download from the [Annual Population Survey \(APS\)](#) on Nomis. These estimates are neither National Statistics nor standard published experimental statistics. These estimates will be referred to as “raw APS estimates”.

The APS is the UK’s largest continuous household survey with a sample size of approximately 320,000 residents from across the UK. The Labour Force Survey (LFS), from which the APS is derived, is supplemented by sample boosts in England, Wales and Scotland to ensure small areas are sufficiently sampled. The [Labour Force Survey \(LFS\) weighting methodology](#) uses the most up-to-date official population data to reflect changes to the population including international migration.

The data are disseminated quarterly, with each dataset covering 12 months’ data.

The population estimates produced on Nomis are for six ethnic groups: Black, Indian, Pakistani/Bangladeshi, White, Mixed, and Other Ethnic group by broad age groups, sex and economic activity. It is important to note that these ethnic groups are not consistent with the 5 and 18 ethnic groups in the [Ethnicity harmonised standard](#). Therefore, these estimates will not be directly comparable with other official data sources.

Results derived from surveys are always estimates, not precise figures. As the number of people in the sample gets smaller, the variability of the estimates that can be made from that sample get larger. The data available to download include confidence intervals to highlight uncertainty in estimates for smaller population groups.

The LFS sample does not include most people living in [communal establishments](#) (such as those living in care homes or prisons). This is a key limitation of these population estimates by ethnic group, as the ethnic diversity within communal establishments differs to household populations.

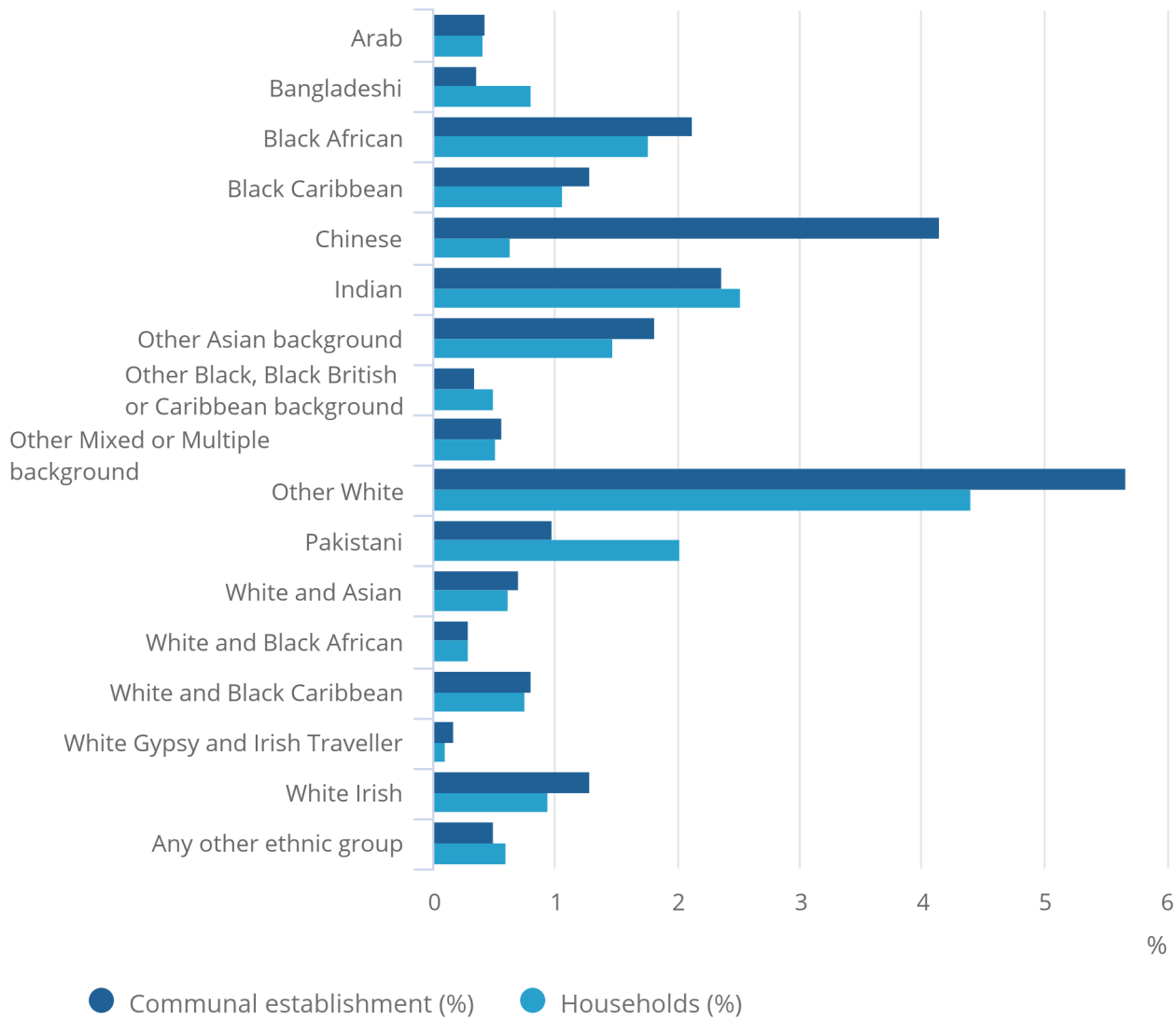
In 2011, communal establishment residents represented 1.7% (937,000) of all usual residents (56.1 million) in England and Wales. Analysis of 2011 Census data found that 76.2% of usual residents living in communal establishments, in England and Wales, were White British. This is 4.4 percentage points lower than the household population (80.6%).

**Figure 1: A higher percentage of the communal establishment population were Chinese compared to the household population**

All usual residents in England and Wales by ethnic group and type of residence, 2011 (excluding White British)

**Figure 1: A higher percentage of the communal establishment population were Chinese compared to the household population**

All usual residents in England and Wales by ethnic group and type of residence, 2011 (excluding White British)



Source: Office for National Statistics, 2011 Census

Notes:

1. White British has been excluded for greater clarity in the visual across the remaining 17 ethnic groups.
2. Ethnic groups have been ordered alphabetically.

## Recommendation

Now that [Population estimates by ethnic group and religion in England and Wales: 2019](#) have been produced, they account for some of the limitations derived from estimates from the APS alone. We would recommend not using raw APS in sub-national statistical analyses below the national level.

As variability in estimates reduces as sample size increases, we do recommend using population estimates by ethnic group derived from the APS alone for timely UK wide estimates. This is because they are not available in the new population estimates by ethnic group. However, this should be done with caution noting that the data will not cover most people living in communal establishments, and that the ethnic groups are not in line with the Government Statistical Service harmonised standard for ethnicity.

## 2019 population estimates by ethnic group

Based on previous research and user feedback, we have produced [Population estimates by ethnic group and religion in England and Wales: 2019](#) which have now been published as [Experimental statistics](#).

The estimates are for the 5 and 18 ethnic groups at the country and region level by age (10-year age bands), sex and age and sex combined. A previous [research report on population estimates by ethnic group and religion](#), found that it was not possible to produce these estimates at a local authority and unitary authority level as sample sizes were not large enough. A full timeline detailing the development of the combined method are outlined in [Section 4](#).

The method combines data from the three-year-pooled [Annual Population Survey \(APS\)](#), [Mid-Year Population Estimates \(MYEs\)](#) and the 2011 Census. In this article we will now refer to this method as the “combined method”.

By utilising the MYEs, we can account for population change including births, deaths and migration; the estimates are therefore consistent with existing National Statistics which have supporting quality information.

Estimates have been produced for the 18 ethnic groups in England and Wales. The estimates are in-line with the [Government Statistical Service ethnicity harmonised standard](#), and comparable to the 2011 census ethnic groups. However, caution should be taken when comparing results between the combined method estimates and census estimates by ethnic group because of the differences in data collection outlined below.

The three-year pooled APS contains a sample size of around 550,000 respondents and is weighted to the UK population totals. The three-year pooled dataset was designed to provide more robust analysis at lower-level geographies that is not always possible using the single-year APS. Data are released annually, allowing us to obtain timely estimates with sample sizes large enough to produce population estimates by ethnic group between censuses and as we move away from the 2021 Census.

As results derived from surveys are not precise figures, quality information including confidence intervals and coefficient of variation have been included. Results from 2019 found that the estimates for White Gypsy or Irish Traveller are less accurate than other ethnic groups, as indicated by the wider confidence intervals and higher coefficients of variation. This quality information should be considered when making comparisons with census data. Further information on [Uncertainty and how we measure it for surveys](#) is available.

Most households on the Labour Force Survey (LFS), from which the APS results are derived, are interviewed face-to-face at their first inclusion and telephone thereafter. Whereas the census is self-completion. The varying mode of collection between the two data sources could influence how someone reports their ethnic identity. This could be because of biases introduced by the presence of an interviewer and may account for some of the changes between the estimates.

A strength of the combined method is that it accounts for the differing ethnic distributions in the household and communal establishment population (as previously shown in figure 1). The method incorporates proportions of the household and communal establishment population by ethnic group from the 2011 Census.

The methodology is however limited by the assumption that the proportions of the population groups within England and Wales living in households and communal establishments remain unchanged since the 2011 Census. The validity of this assumption is reduced by several factors such as population change. For example, the ageing population means that we are [Living longer](#) which has implications resulting in an increased demand for services, including in social care and communal living.

The combined method also assumes that the ethnic distribution of the communal establishment population will have changed since the 2011 Census in a similar way to the household population. This assumption would likely impact areas which have seen rapid population change. The decision to not produce these estimates at a lower-level geography, limits the potential impact of these assumptions.

## Recommendation

We would recommend the use of these population estimates by ethnic group and religion for analysis at a country and region level for the 18 ethnic groups. It is important that these estimates are used with consideration of the quality of information, including the confidence intervals and coefficient of variation which provide clarity on uncertainty for some of the estimates.

As experimental statistics, these estimates will be subject to further testing in terms of quality and ability to meet user needs and may be subject to modification and further evaluation. We are seeking feedback on the ability of these estimates to meet user needs, if you have any feedback, please do contact us: [EILR@ons.gov.uk](mailto:EILR@ons.gov.uk).

## 4 . History of population estimates by ethnic group within the Office for National Statistics (ONS)

### 2006 to 2011

- [Population estimates by ethnic group](#) (PEEGs) were produced for 2001 to 2009 as Experimental Statistics. 2012
- Production of PEEGs was discontinued as the estimates were found to diverge from the 2011 Census.

### 2013

- The Office for National Statistics (ONS) commissioned Professor Ludi Simpson, from the University of Manchester, to conduct a review of the PEEGs. 2014
- Professor Simpson's unpublished review was produced in March 2014 and proposed alternative methods for producing population estimates by ethnic group.

### 2017

- The ONS published [Population estimates by ethnic group \(PEEGs\) – external review](#).
- A [Research report on population estimates by characteristics](#), investigated a proposed method which combines the official [mid-year population estimates \(MYE's\)](#) and [Annual Population Survey \(APS\)](#) to produce population estimates by country of birth, by nationality and by ethnic group.
- This coincided with research into the feasibility of using administrative sources to produce [Population estimates by ethnic group](#).

### 2019



- A second [Research Report on population estimates by ethnic group and religion](#), was published. This built on the previous research by using three-year-pooled Annual Population Survey data, rather than for a single year. It was concluded that, even with the pooled APS data, the method does not produce robust estimates for local and unitary authorities. 2021
- A research report, [Admin-based ethnicity statistics for England, feasibility research: 2016](#), was published. This outlines research into using administrative data to produce statistics on the population by ethnic group for 2016 at national and local authority level for England, by five-year age group and sex.
- [Population estimates by ethnic group and religion, England and Wales: 2019](#) were published as experimental statistics. This includes population estimates for the 5 and 18 ethnic groups at the country and region level by age and sex.

## 5 . Glossary

### Ethnic group

The self-reported [ethnic group](#) of the individual, according to their own perceived ethnic group and cultural background.

### Experimental statistics

[Experimental statistics](#) are a subset of newly developed or innovative official statistics that are undergoing evaluation. Experimental statistics are developed under the guidance of the Head of Profession for Statistics. They are published to involve users and stakeholders at an early stage in assessing their suitability and quality. Experimental statistics are, by definition, also official statistics.

These estimates are experimental statistics, developed following research into a method for producing population estimates by ethnic group and religion combining Annual Population Survey (APS) and census data published in [2017](#) and [2019](#).

## 6 . Data sources and quality

### 2011 Census

The [census](#) happens every 10 years and gives us a picture of all the people and households in England and Wales.

### Mid-year population estimates

Mid-year [population estimates for the UK](#) (MYEs) are official statistics based on census data and are updated annually to account for estimates of population change from 1 July to 30 June. The two main contributors to population change are natural change (births minus deaths) and net migration (the difference between long-term moves into and out of the UK or local areas). The estimates cover the entire usually resident population, whether resident in households or communal establishments.

## Annual Population Survey

The [Annual Population Survey](#) (APS) is UK's largest continuous household survey, comprising the Labour Force Survey (LFS) supplemented by sample boosts in England, Wales and Scotland to ensure small areas are sufficiently sampled. The three-year pooled dataset was designed to provide more robust analysis that is not always possible using the single-year APS. Specifically, the dataset used for the 2019 population estimates by ethnic group and religion combine data across the years January 2017 to December 2019.

The APS is weighted to the UK population totals to be representative of the whole household population. The APS is a household survey and so does not cover most people living in communal establishments. It is not possible to survey all people resident in the UK, so these statistics are estimates based on a sample of people living in households and therefore is subject to a margin of uncertainty.

## 7 . Future developments

The results for the 2021 Census data are [due to be released in 2022](#), and will provide a detailed picture of the population by ethnic group in 2021. However, as time moves on, these estimates will not reflect change.

If [Population estimates by ethnic group and religion in England and Wales: 2019](#) meet user requirements and are deemed reliable when compared with 2021 Census data, they will be produced annually for use between censuses and as we move away from the 2021 Census.

Following the release of the 2021 Census data, we will publish a comparison of the experimental statistics and the census data to further assess the reliability of the “combined method” methodology used to produce the estimates. We also plan to update our methodology to incorporate 2021 Census proportions for the communal establishment population.

There are many potential uses of the new annual estimates, including the potential for them to be used within health analysis as population denominators for estimating rates of disease prevalence, mortality, and life expectancy by ethnic group. This is especially significant now, as the coronavirus (COVID-19) pandemic has highlighted the urgent need to improve the evidence base around ethnicity and health. Currently, the data sources used to produce National Statistics outputs on mortality for England and Wales do not include ethnicity information. Therefore to meet user-needs for mortality estimates by ethnic group, the Office for National Statistics (ONS) has developed experimental statistics using ethnicity information from the 2011 Census and a cohort design. These new population estimates by ethnic group, if combined with sufficiently good quality estimates of deaths by ethnicity, will enable important triangulation of data sources with scope to publish additional experimental statistics on mortality by ethnic group.

Coinciding with our research into the combined method, there is wider transformation work going on across the ONS into using administrative data to produce statistics. The [Admin-based ethnicity statistics for England, feasibility research: 2016](#) showed early promise for using administrative data from the English School Census, Hospital Episode Statistics and Improving Access to Psychological Therapies. The data was used to estimate the population by ethnic group at national and local authority level in England, but further work is needed before we can produce robust estimates. Research is underway to incorporate additional administrative data sources and explore methods to address the challenges identified in the initial research.

While research into admin data is underway, there remains a strong user need for more timely estimates as we move away from the census, particularly to understand inequalities and disparities by ethnic group, which [Population estimates by ethnic group and religion in England and Wales: 2019](#) aims to meet.

## 8 . Related links

### [Population estimates by ethnic group and religion, England and Wales: 2019](#)

Article | Released 16 December 2021

Experimental statistics of population by ethnic group and religion by age and sex at the national and regional level for England and Wales. This builds upon previous research and user feedback. We are publishing these estimates for the first time to provide a more timely picture of the population between censuses and allow for user feedback.

### [Research report on population estimates by ethnic group and religion](#)

Article | Released 4 December 2019

Research work on a method for producing population estimates by ethnic group and religion between censuses by combining Annual Population Survey (APS) and census data.

### [Research report on population estimates by ethnic group](#)

Article | Released 25 August 2017 Research work on a simple method for producing population estimates by country of birth, nationality and ethnic group.