National population projections, variant projections: 2024-based

The variant projections, a range of scenarios with alternative demographic assumptions, used in the 2024-based national population projections.

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Release date:
28 April 2026

Next release:
To be announced

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1 . Purpose of variant projections

We produce population projections for the UK and its constituent countries to understand possible changes in the future size and structure of the population. The projections are based on assumptions that are considered to best reflect demographic patterns at the time they are produced. However, because of the uncertainty of demographic behaviour, any projection will differ to a greater or lesser extent from actual future population change.

We produce a principal projection, and numerous variant projections that offer alternative projection scenarios to the principal projection. The variant projections are based on alternative assumptions of future fertility, migration and mortality. We produce the variants to give users of projections an indication of the uncertainty of demographic behaviour and to show the potential outcomes of different assumptions about future demographic change.

We determine the variants through engagement exercises with a range of users. These variants provide an indication of uncertainty and sensitivity to alternative assumptions, but they should not be interpreted as upper or lower limits of future demographic behaviour. We provide fuller guidance and examples for those wishing to understand and use variant projections in policy and planning in our Variant national population projections for the UK and subnational population projections and household projections for England: user guide.

We publish our Comparing national population projections to estimates report every 10 years, following the reconciliation and rebasing of population estimates and components of population change. This report shows how national population projections releases have compared with outcomes (estimates and components of change) over time. This helps to show the uncertainty in demographic trends and may help users assess their use of variant population projections.

National population projections, including variant projections, are accredited official statistics.

2 . Range of variants

For the 2024-based national population projections (NPPs), we have published 13 variant projections, alongside the principal projection. Some of these are single-component variants, which show the effect of varying one assumption (such as fertility, migration or mortality) while keeping other assumptions the same as the principal projection. Others are combination variants, which look at the effect of varying two or more assumptions. For example, the combination variant “young age structure” contains the high fertility assumption, low life expectancy assumption, and high migration assumption. Similarly, the “old age structure” variant contains the low fertility assumption, high life expectancy assumption, and low migration assumption.

We have updated our interactive UK population projection explorer tool, so you can adjust different factors and see the effect they have on what the population structure may look like in the future and compared with our official projections. This tool allows users to view projections that use additional assumptions to those in our variant projections.

The following subsection describes the variants published in the 2024-based NPPs and the assumptions underlying each variant. Most of the variants use the principal, high and low assumptions for fertility, migration and mortality. These are summarised numerically in Table 1.

The migration assumptions differentiate between cross-border migration (sometimes also known as “internal” or “within UK” migration) and international migration. In the migration variants, cross-border migration is assumed to have the same rate in all variants, whereas net international migration changes between variants. Some variants use “special-case” assumptions, which are described in greater detail in Section 3: Variants that use special-case assumptions.

List of variants available for the 2024-based national population projections, UK

All variants published in the 2024-based NPPs cover the UK, Great Britain, England, Northern Ireland, Scotland, and Wales.

Principal

- Fertility assumption: principal
- Life expectancy assumption: principal
- Migration assumption: principal

High fertility

- Fertility assumption: high
- Life expectancy assumption: principal
- Migration assumption: principal

Low fertility

- Fertility assumption: low
- Life expectancy assumption: principal
- Migration assumption: principal

High life expectancy

- Fertility assumption: principal
- Life expectancy assumption: high
- Migration assumption: principal

Low life expectancy

- Fertility assumption: principal
- Life expectancy assumption: low
- Migration assumption: principal

High migration

- Fertility assumption: principal
- Life expectancy assumption: principal
- Migration assumption: high

Low migration

- Fertility assumption: principal
- Life expectancy assumption: principal
- Migration assumption: low

High population

- Fertility assumption: high
- Life expectancy assumption: high
- Migration assumption: high

Low population

- Fertility assumption: low
- Life expectancy assumption: low
- Migration assumption: low

Zero net migration

- Fertility assumption: principal
- Life expectancy assumption: principal
- Migration assumption: zero (zero cross-border migration and zero international net migration)

Young age structure

- Fertility assumption: high
- Life expectancy assumption: low
- Migration assumption: high

Old age structure

- Fertility assumption: low
- Life expectancy assumption: high
- Migration assumption: low

Replacement fertility

- Fertility assumption: replacement
- Life expectancy assumption: principal
- Migration assumption: principal

No long-term mortality improvement variant

- Fertility assumption: principal
- Life expectancy assumption: zero long-term
- Migration assumption: principal

The methodology used to develop the migration category variant in the 2022-based release has been used in the principal projection for the 2024-based projections.

Table 1: Long-term assumptions for the 2024-based national population projections, UK

	Low	Principal	High
Fertility (total fertility rate by 2049)	1.22	1.42	1.62
Mortality (improvement rate by 2049)	0.5%	1.1%	1.9%
Migration (year ending mid-2027 onwards)	105,000	230,000	455,000

Source: National population projections from the Office for National Statistics

3 . Variants that use special-case assumptions

The 2024-based national population projections (NPPs) have been produced using population and migration data sources that have shown substantial population change since mid-2020, following the coronavirus (COVID-19) pandemic. International immigration has also fluctuated during the 2020 to 2024 period. There has also been a decrease in fertility. In the last decade, mortality improvements have slowed, compared with previous decades. We have produced the following variants to offer different projection scenarios.

Replacement fertility

Replacement fertility is the level of fertility required for the population to replace itself in size in the long term, given constant mortality rates and in the absence of migration. The replacement level is estimated to be 2.075 in the UK, meaning women would need to have 2.075 children each, on average, to ensure the long-term “natural” replacement of the population. The replacement fertility level has remained the same as in our 2022-based set of variant projections. The replacement fertility projection combines assumed replacement-level fertility with the principal assumptions of mortality and migration.

No long-term mortality improvement variant

The no long-term mortality improvement variant applies a 0% annual improvement in mortality rates for males and females from 2049 (25 years from the base year). It differs from the low life expectancy assumption, which converges to a mortality improvement rate of 0.5% by 2049 for males and females aged between 0 and 90 years. This projection combines an assumption of no long-term mortality improvement with the principal assumptions of fertility and migration.

4 . Summary of variant projections

Figure 1 and Table 2 show the differences in projected population size for the UK for the principal projection and under the variant scenarios.

Figure 1: The variant population projections offer a range of future demographic scenarios

Estimated and projected total population for 2024-based principal projection and variant projections, UK, mid-1999 to mid-2049

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Table 2 shows the projected population change between mid-2024, the base year, and mid-2049 for the principal projection and the variant projections.

Table 2: Projected population change, UK, mid-2024 to mid-2049

	Mid-2049 population (millions)	Population change (millions)	Percentage change
Principal	72.4	3.1	4.5
High fertility	74.2	4.9	7.1
Low fertility	70.6	1.4	1.9
High life expectancy	72.9	3.6	5.2
Low life expectancy	72.0	2.8	4.0
High migration	78.9	9.6	13.9
Low migration	68.8	-0.5	-0.7
High population	81.3	12.0	17.4
Low population	66.8	-2.5	-3.6
Zero net migration	65.5	-3.8	-5.5
Young age structure	80.5	11.2	16.2
Old age structure	67.6	-1.7	-2.5
Replacement fertility	79.9	10.6	15.4
No long-term mortality improvement variant	71.7	2.5	3.6

Source: National population projections from the Office for National Statistics

5 . Further quality and methodology information

Information about the quality characteristics of the projections, the methods used to generate the data, and information on how we set the demographic assumptions for the 2024-based national population projections is provided in our National population projections quality and methods guide. We have also published more detailed information on the decision-making for each of the variant's fertility, mortality and migration assumptions in:

- our National population projections, 2024-based fertility assumptions methodology
- our National population projections, 2024-based migration assumptions methodology
- our National population projections, 2024-based mortality assumptions methodology

6 . Related links

National population projections: 2024-based fertility assumptions
Methodology | Released 28 April 2026
The data sources and methodology used to produce fertility assumptions in the 2024-based national population projections.

National population projections: 2024-based migration assumptions
Methodology | Released 28 April 2026
The data sources and methodology used to produce migration assumptions in the 2024-based national population projections.

National population projections: 2024-based mortality assumptions
Methodology | Released 28 April 2026
The data sources and methodology used to produce the mortality assumptions for the 2024-based national population projections.

Variant national population projections for the UK and subnational population projections and household projections for England: user guide
User guide | Last revised 4 November 2021
The aims of this user guide are to provide guidance and examples for those wishing to understand and use variant projections in policy and planning.

National population projections: 2024-based
Bulletin | Released 28 April 2026
The potential future population size of the UK. These statistics are widely used in planning, including fiscal projections, health, education and pensions.

National population projections quality and methods guide
Quality and methods guide | Released 28 April 2026
What the national population projections statistics cover, how we produce them, and their quality and comparability. Includes definitions and latest, past and upcoming changes.

UK population projection explorer
Interactive tool | Last updated 28 April 2026
An interactive tool that shows how changes in life expectancy, net migration, and fertility could affect the population over the next 50 years.

7 . Cite this methodology

Office for National Statistics (ONS), released 28 April 2026, ONS website, methodology, National population projections, variant projections: 2024-based