Office for National Statistics

National population projections, how the assumptions are set: 2018-based

A summary of how we set the demographic assumptions for the 2018-based national population projections.

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1 . Introduction

This article provides a summary of how we made our decisions when setting the fertility, mortality and migration assumptions for the 2018-based national population projections (NPPs). It also gives an overview of our engagement with key users of the NPPs during the production process and how this helped inform our line-up of variant population projections.

2 . Demographic assumptions

The 2018-based national population projections (NPPs) methods include demographic assumptions on future levels of fertility, mortality and migration. These assumptions should not be interpreted as predictions of the future but as plausible scenarios based on what has happened in the past.

Table 1 lists the long-term assumptions for fertility, mortality and migration, including the high- and low-variant assumptions. Our main projection uses the principal assumptions.

Table 1: Long-term assumptions for the 2018-based national population projections

Long-term assumptions	England	Wales	Scotland	Northern Ireland	UK
High fertility (Total fertility rate by mid-2043)	1.91	1.81	1.6	2.02	1.88
Principal fertility (Total fertility rate by mid-2043)	1.81	1.71	1.5	1.92	1.78
Low fertility (Total fertility rate by mid-2043)	1.61	1.51	1.3	1.72	1.58
High mortality (improvement rate by 2043)	1.9%	1.9%	1.9%	1.9%	1.9%
Principal mortality (improvement rate by 2043)	1.2%	1.2%	1.2%	1.2%	1.2%
Low mortality (improvement rate by 2043)	0%	0%	0%	0%	0%
High net international migration (from mid-2025 onward)	264,500	9,000	14,000	2,500	290,000
Principal net international migration (from mid-2025 onward)	173,000	6,000	9,500	1,500	190,000
Low net international migration (from mid-2025 onward)	81,500	3,000	5,000	500	90,000

Source: Office for National Statistics – National population projections

Notes

1. The UK total fertility rate (TFR) increases slightly to close to 1.79 later in the projection. Back to table

3 . Decision-making process

The Office for National Statistics (ONS) agrees key decisions in the national population projections (NPPs) production process with the NPP committee, which consists of the ONS, the Welsh Government, National Records of Scotland (NRS), and the Northern Ireland Statistics and Research Agency (NISRA).

Setting the assumptions

We produce assumptions for future levels of fertility, mortality and migration by reviewing what has happened in the past and modelling plausible future scenarios. We also consult with a panel of independent academic experts working in the field of demography to discuss the possible forces that may influence future demographic behaviour.

The expert panel does not have any direct influence over the final assumptions, and the decisions lie with the NPP committee. Our consultation with the experts allows us to make informed decisions on the plausibility of proposed assumptions and presents an opportunity for us to validate our proposed assumption-setting methodologies.

The minutes of the 2018-based NPP expert advisory panel meeting are available on request by contacting pop. info@ons.gov.uk.

Final demographic assumptions are produced by the ONS and are approved by the NPP committee once they are satisfied with the robustness and plausibility.

Fertility assumptions

Principal fertility assumptions for the 2018-based projections are based on past trends and advice from our panel of experts.

A number of alternative scenarios for future UK fertility were assessed, representing a range of possible trajectories of UK fertility measures, both on a period (total fertility rate) and cohort (completed family size) basis. We chose the scenario that best reflected the future trends, as suggested by the past trends, expert panel input and research. This scenario suggests:

- a long-term total fertility rate and completed family size lower than the 2016-based projections

- a decline in the total fertility rate (TFR) in the short term but an increase in the long term, reflecting the postponement of childbearing to older ages

- completed family sizes for the 1980 and 1985 cohorts exceeding levels achieved by the 1965, 1970 and 1975 cohorts

- continued rises in the age-specific fertility rates (ASFRs) for the over 40s

- continued declines in the ASFRs for the under 20s

- the 30 to 34 years age group remaining the peak childbearing age group

The selected scenario was applied to each UK country's data to determine proposed long-term principal fertility assumptions for the countries of the UK.

Stakeholders also provided feedback through our user engagement exercise (see Meeting user needs) to confirm that the variant widths around the principal fertility assumptions used in the 2016-based NPPs would meet their needs for the 2018-based projections. Therefore, asymmetric variants based on the principal assumption plus 0.1 (high fertility variant) and minus 0.2 (low fertility variant) have been used for each country of the UK.

The final assumptions were agreed by the NPP committee once they were satisfied the assumptions represented plausible scenarios and met user needs.

Mortality assumptions

The 2018-based mortality assumptions were based upon analysis of past rates and annual percentage changes in mortality rates by age and year. Our expert advisory panel also made recommendations of projected life expectancy scenarios.

For the 2018-based NPPs, we have set our long-term principal annual rate of mortality improvement at 1.2%. This rate is unchanged from the 2016-based NPPs. It was decided that the principal projection should not be disproportionately influenced by the slowdown in life expectancy improvements observed since 2011, as the projections consider long-term data and trends, rather than focusing on recent changes.

The long-term rates of improvement of 0.0% for the low variant and 1.9% for the high variant are the same rates that were used in the 2016-based projections, which is reasonable given the uncertainty indicated by the experts.

Migration assumptions

The NPP committee agreed to continue producing the long-term international migration assumptions using the 25-year average model introduced in the 2016-based NPPs.

We chose this model because of the considerable uncertainty surrounding the future of international migration; we presented our intention to use this method to our expert panel for the 2016-based NPPs in 2017. The panel was supportive of our proposals and advised against the creation of "knee-jerk" assumptions based on the most recent migration trends, highlighting the high level of uncertainty.

We have also broadened the range between our principal projection and our high and low migration variant assumptions. We did so after our expert advisory panel once again highlighted the uncertainty around international migration at our expert panel meeting in April 2019.

The 2018-based high and low migration variant assumptions are 100,000 higher and lower respectively than the principal assumptions.

Further information on demographic assumptions

More information on our demographic assumptions are available in our individual assumption papers:

- National population projections, fertility assumptions: 2018-based
- National population projections, mortality assumptions: 2018-based
- National population projections, migration assumptions: 2018-based

The full methodology for the 2018-based NPPs can be found in our Background and methodology report.

Meeting user needs

The ONS engaged with the main users of the NPPs to ensure the publication can meet their requirements. The Welsh Government, National Records of Scotland (NRS) and the Northern Ireland Statistics and Research Agency (NISRA) held similar engagement exercises within their respective countries.

We held user consultations in June 2019 where attendees were asked to provide feedback on our statistics and whether their needs would be effectively met by our proposed range of variant projections.

The feedback informed our thinking on the variant projections produced as part of the 2018-based NPPs and provided valuable information on how the main stakeholders make use of our projections.

We found there was significant demand from stakeholders for the ONS to produce EU migration scenarios in the 2018-based NPPs and as a result, the NPP committee agreed to publish the 0% and 50% future EU migration variant projections. These statistics remain as user-led variant projections produced to meet specific requirements and are not considered National Statistics.

We also found there was no longer demand for the moderately high and moderately low life expectancy variant projections from the stakeholder who had previously requested them. In consequence, these variants were not produced for the 2018-based NPPs.

4 . How you can also provide feedback

We are always interested in hearing how our users make use of our statistics and ways we can improve our outputs.

You can email us with any comments about this release at pop.info@ons.gov.uk.

5 . Browse our releases

You can use our table of contents tool to navigate through this release. The tool contains links to our full range of data and documentation.

In addition, National Records of Scotland (NRS) and the Northern Ireland Statistics and Research Agency (NISRA) publish summaries of the population projections we create for their countries. These can be found at:

Summary of projections for Scotland

Summary of projections for Northern Ireland