

Statistical bulletin

# Past and projected period and cohort life tables, 2018-based, UK: 1981 to 2068

Life expectancy (e), probability of dying (q) and numbers surviving (l) from the period and cohort life tables, past and projected, for the UK and constituent countries.



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# 1 . Main points

- Baby boys born in the UK in 2018 can expect to live on average to age 87.6 years and girls to age 90.2 years, taking into account projected changes in mortality patterns over their lifetime.
- In 25 years, cohort life expectancy at birth in the UK is projected to increase by 2.8 years to reach 90.4 years for boys and by 2.4 years to 92.6 years for girls born in 2043.
- People aged 65 years in the UK in 2018 can expect to live on average a further 19.9 years for males and 22.0 years for females, projected to rise to 22.2 years for males and 24.2 years for females in 2043.
- In 2043 in the UK, 20.8% of newborn boys and 26.1% of newborn girls are expected to live to at least 100 years of age, an increase from 13.6% for boys and 18.2% for girls born in 2018.
- In comparison with the 2016-based projections, cohort life expectancy at birth is 2.6 years lower for males and 2.7 years lower for females in 2043 than previously projected.

## 2 . Things you need to know about this release

Our period and cohort life tables give historical and projected statistics by single year of age and sex, from 1981 to 2018 and then 50 years into the future to 2068. They are produced biennially for the UK based on the assumptions for future mortality from the national population projections (NPP). This release relates to the [2018-based NPP](#) published on 21 October 2019.

Period life expectancies use mortality rates from a single year (or group of years) and assume that those rates apply throughout the remainder of a person's life. This means that any subsequent changes to mortality rates would not be taken into account. A period life expectancy is therefore the average number of additional years a person would live if he or she experienced the age-specific mortality rates of the given area and time period for the rest of their life.

For example, a period life expectancy at age 65 years in 2018 would use the observed mortality rates for 2018 for ages 65, 66 and 67 years and so on. A period life expectancy at age 65 years in 2025 would use the projected mortality rates for 2025 for ages 65, 66 and 67 years and so on.

Cohort life expectancies make allowances for future changes in mortality by taking into account observed and projected improvements in mortality for the cohort throughout its lifetime. For example, cohort life expectancy at age 65 years in 2018 would be worked out using the observed mortality rate for age 65 years in 2018 and the projected mortality rates for age 66 years in 2019, for age 67 years in 2020 and so on.

Cohort life expectancy at age 65 years in 2025 would be worked out using the projected mortality rates for age 65 years in 2025, for age 66 years in 2026, for age 67 years in 2027 and so on. In this bulletin cohort life expectancies have been used for the main projection figures, because these are regarded as a more realistic measure of how long a person of a given age would be expected to live on average than period figures.

In this respect, cohort life expectancy helps inform policy-makers of the best way to deliver public services. For example, the setting of the State Pension age or the appropriate quantity of social care services to provide. For individuals, these statistics can be used to predict the likelihood they might survive to a given age and as such act as a powerful indicator of health patterns at the population level. To some, cohort life expectancy can be a more meaningful measure of life expectancy, as the alternative measure – period life expectancy – is often more reflective of the population health of the past rather than the present.

A more detailed explanation of the difference between period and cohort life expectancies can be found in [Period and cohort life expectancy explained](#).

It should be noted the projections are not forecasts and will inevitably differ to a greater or lesser extent from actual realised future figures. The further ahead from the projection base year (2018) the more uncertain the projection becomes.

### 3 . How long can you expect to live?

Enter your details into our life expectancy calculator for the UK to find out how long you are expected to live given assumed future mortality improvements (your cohort life expectancy). You can also find out your chances of surviving to age 100 years.

#### Life expectancy calculator

Source: Office for National Statistics

### 4 . How have recent trends in mortality affected projected life expectancy at birth?

#### Period life expectancy

Period life expectancy is calculated from mortality rates in a given year. As such, life expectancy is reflective of the past health environment in a geographical area. After decades of steady and gradual growth of period life expectancy in the UK, [observed gains in life expectancy have become smaller since 2011](#). Period life expectancy at birth is projected to reach 82.6 years for males and 85.5 years for females in 2043, representing an increase of 3.3 years for males and 2.6 years for females compared with 2018 (Figure 1).

Improvements in period life expectancy are lower than those in the [2016-based projections](#), where projected period life expectancy at birth in 2043 was 83.7 years for males and 86.4 years for females. This is a difference of 1.1 years for males and 0.9 years for females in comparison with the 2018-based projections.

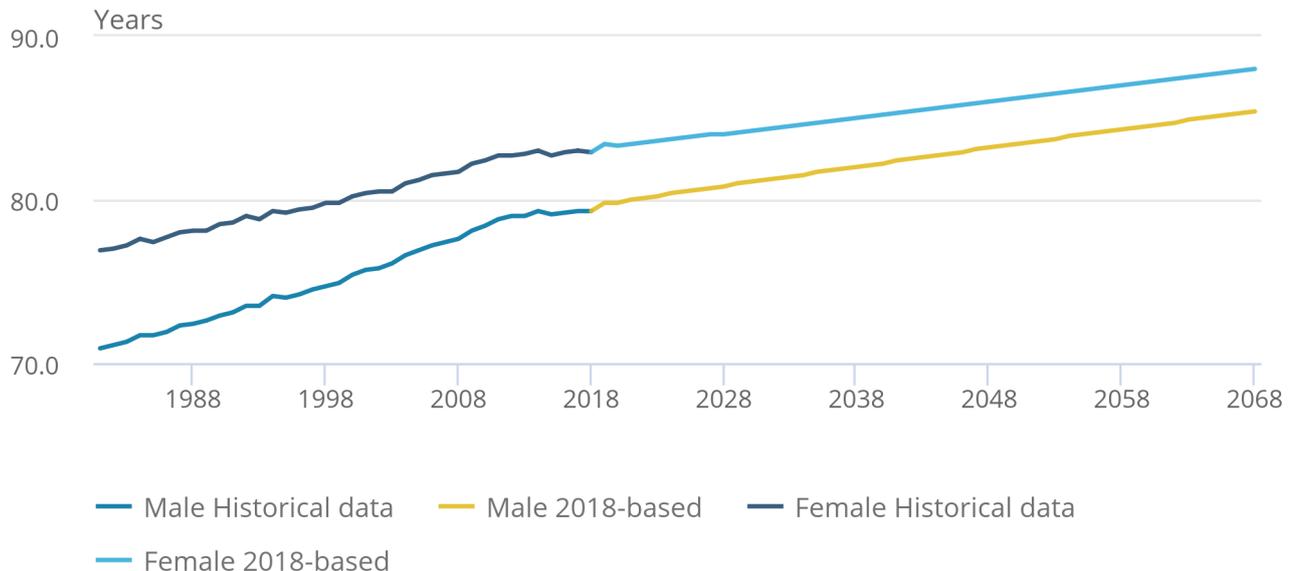
This lowering of projected life expectancy follows a comparable reduction seen between the 2014-based and 2016-based projections of period life expectancy in the UK, which is explained in further detail in the national population projections [mortality assumptions article](#). Lower levels of mortality improvements have been observed from 2011 to 2018, which is reflected in the relatively low gains of period life expectancy in successive sets of projections produced during those years.

## Figure 1: Period life expectancy at birth is projected to increase by six years for males and five years for females by 2068

Male and female period life expectancy at birth, historical data and 2018-based projection, United Kingdom, 1981 to 2068

### Figure 1: Period life expectancy at birth is projected to increase by six years for males and five years for females by 2068

Male and female period life expectancy at birth, historical data and 2018-based projection, United Kingdom, 1981 to 2068



Source: Office for National Statistics

There has been considerable public debate about the causes of the slowdown in life expectancy improvements, as well as whether it represents an abnormality in the long-term pattern of improvement or a substantive change in the underlying trend. Researchers have suggested a range of possible explanations for the slowdown. Much of the research literature suggests that several factors are at play, none of which can be singled out as being the most important with any certainty. The Health Foundation has published [a report on the recent slowdown](#), which explores this topic further.

## Cohort life expectancy

Cohort life expectancy at birth for the UK, which allows for assumed future improvements in mortality, was 87.6 years for males and 90.2 years for females in 2018. In 25 years' time, by 2043, this is projected to rise by 2.8 years to 90.4 years for males and by 2.4 years to 92.6 years for females.

Although cohort life expectancy is projected to continue to increase in the future, as for period life expectancy, the rate of improvement is slower than projected in the [2016-based projections](#).

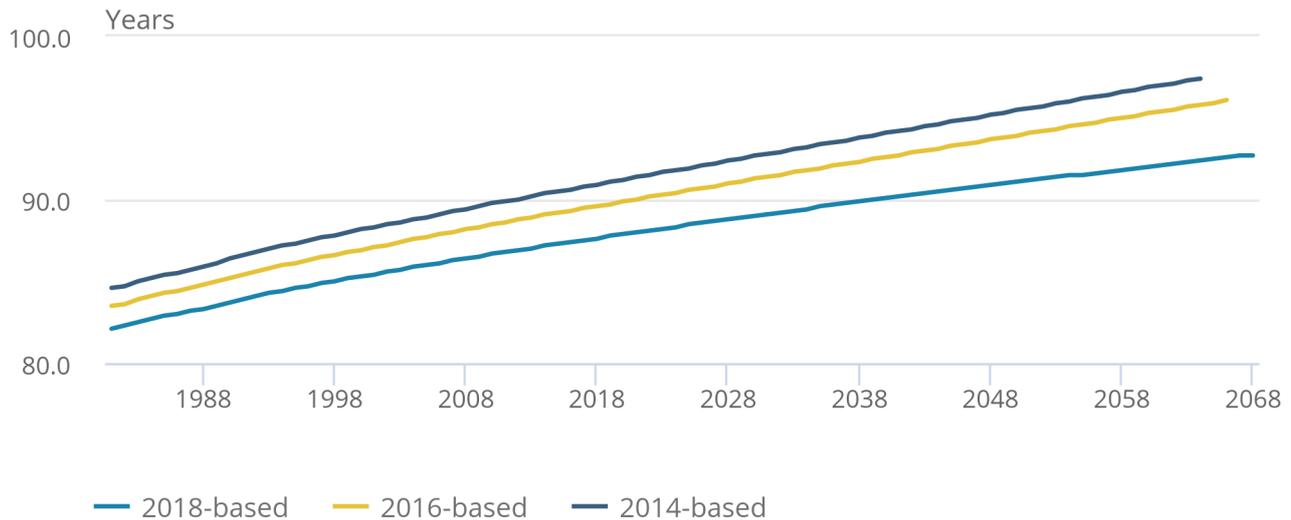
As shown in Figures 2 and 3, projected life expectancy at birth in 2043 in the 2016-based projections was 93.0 years for males and 95.3 years for females; this is a difference of 2.6 years for males and 2.7 years for females in comparison with the 2018-based projections. This difference is because of the lower mortality improvements experienced in 2016 and 2017 than were previously projected. As such, life expectancy has been projected from a lower base value than in the 2016-based projection.

**Figure 2: Cohort life expectancy is projected to be lower in the 2018-based projection than in the 2016-based projection**

Male cohort life expectancy at birth, selected projection periods, UK, 1981 to 2068

Figure 2: Cohort life expectancy is projected to be lower in the 2018-based projection than in the 2016-based projection

Male cohort life expectancy at birth, selected projection periods, UK, 1981 to 2068



Source: Office for National Statistics

Notes:

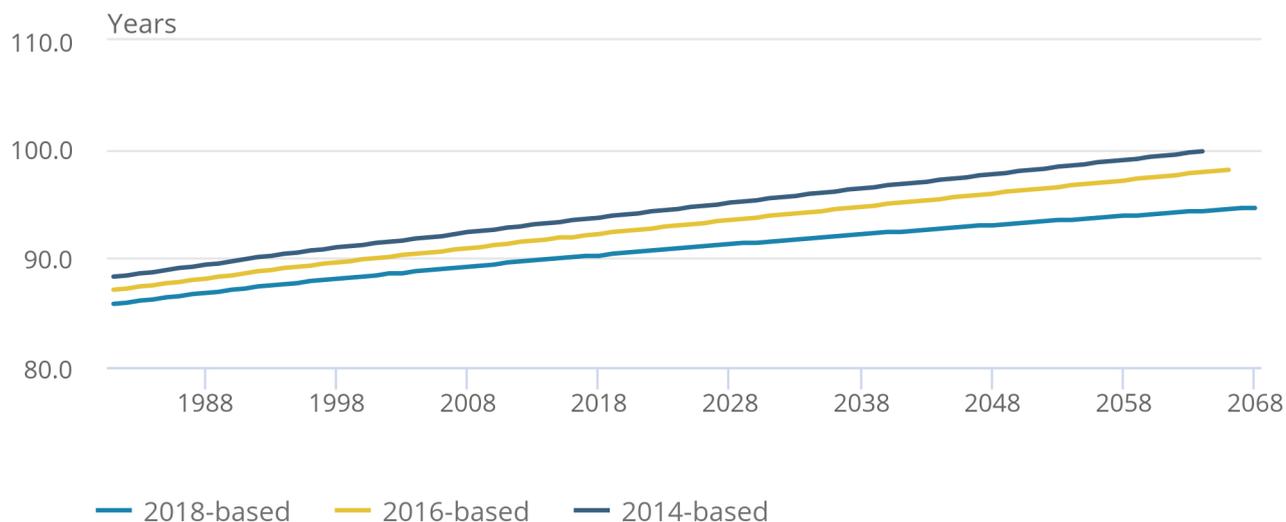
1. Unlike period life expectancy, projections of cohort life expectancy also vary historically, therefore cohort figures for years prior to 2018 will differ from those in previous sets of projections. This is because members of these cohorts are still living and assumptions about their future improvements in mortality have changed.

### Figure 3: Cohort life expectancy is projected to be lower in the 2018-based projection than in the 2016-based projection

Female cohort life expectancy at birth, selected projection periods, UK, 1981 to 2068

### Figure 3: Cohort life expectancy is projected to be lower in the 2018-based projection than in the 2016-based projection

Female cohort life expectancy at birth, selected projection periods, UK, 1981 to 2068



Source: Office for National Statistics

### What are the chances of survival from birth to age 100 years?

Figure 4 shows the percentage of baby boys and girls born in each year from 1981 to 2068 expected to survive to age 100 years, using cohort life tables.

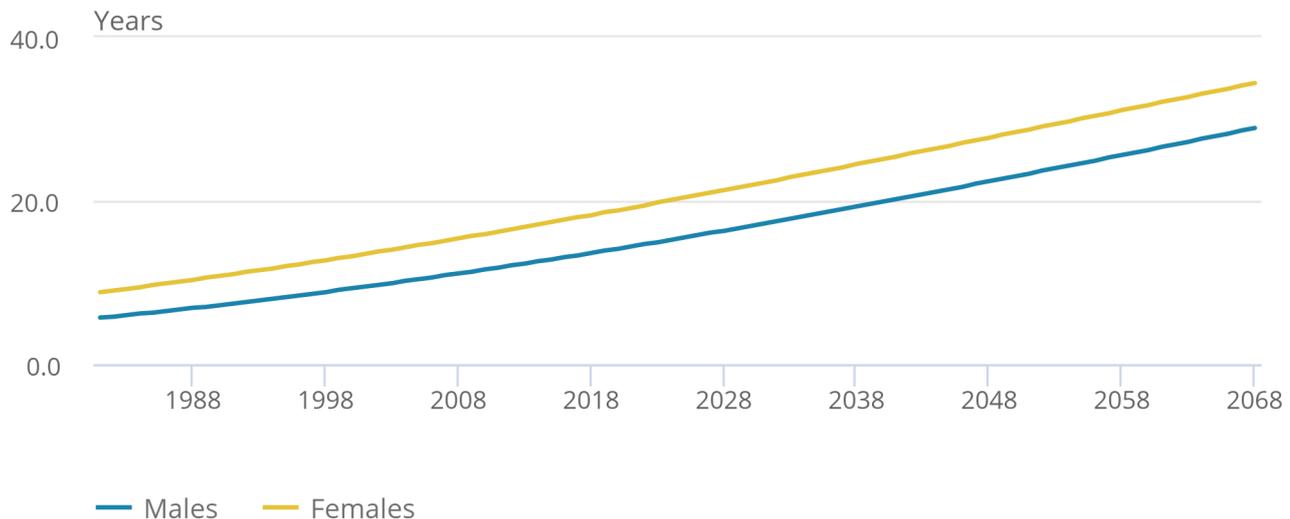
Boys born in 2018 had a 13.6% chance of living to age 100 years, while girls had an 18.2% chance. In 25 years' time, by 2043, 20.8% of newborn boys and 26.1% of newborn girls are expected to live to age 100 years, because of the changes in projected life expectancy. This is lower than the [2016-based projection](#), in which males and females born in 2043 were projected to have a 34.1% and 40.2% chance respectively of surviving to age 100.

## Figure 4: Survival from birth to age 100 years is projected to nearly double by 2068

Percentage of newborns expected to survive to age 100 years by year of birth, males and females, UK, 1981 to 2068

### Figure 4: Survival from birth to age 100 years is projected to nearly double by 2068

Percentage of newborns expected to survive to age 100 years by year of birth, males and females, UK, 1981 to 2068



Source: Office for National Statistics

## 5 . What are the high and low variants of projected cohort life expectancy?

Variant projections of cohort life expectancy have been produced to illustrate how life expectancy may change under different future scenarios by assuming different levels of annual improvements in mortality. These projections of cohort life expectancy at birth are shown in Figures 5 and 6.

The high life expectancy variant, which assumes greater improvements in mortality in the long-term than the principal projection, projects cohort life expectancy to increase by 4.1 years to 96.3 years for males and by 3.6 years to 98.1 years for females in 25 years' time, in 2043.

The low life expectancy variant, which assumes very little improvement in mortality and has a lower value of life expectancy in 2018 than the principal variant, projects cohort life expectancy to increase by 0.1 years for both sexes to 80.9 years for males and 84.1 years for females in 2043.

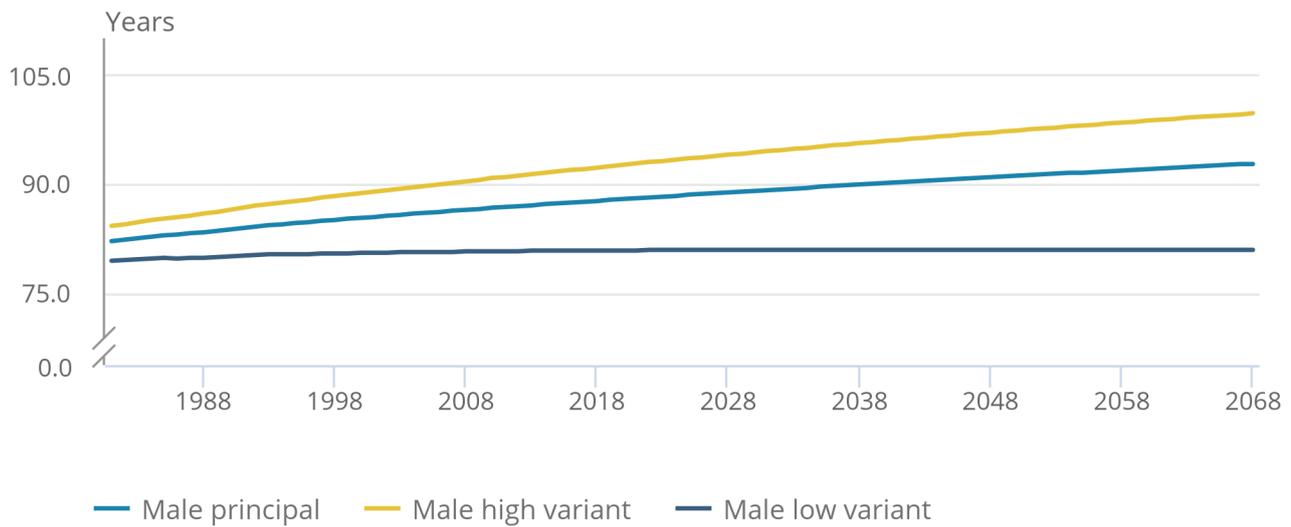
The variant projections are explained in further detail in the national population projections [mortality assumptions article](#).

## Figure 5: Cohort life expectancy is projected to increase under these three scenarios <sup>1</sup>

Cohort life expectancy at birth for males: principal, high and low variants, UK, 1981 to 2068

### Figure 5: Cohort life expectancy is projected to increase under these three scenarios<sup>1</sup>

Cohort life expectancy at birth for males: principal, high and low variants, UK, 1981 to 2068



Source: Office for National Statistics

#### Notes:

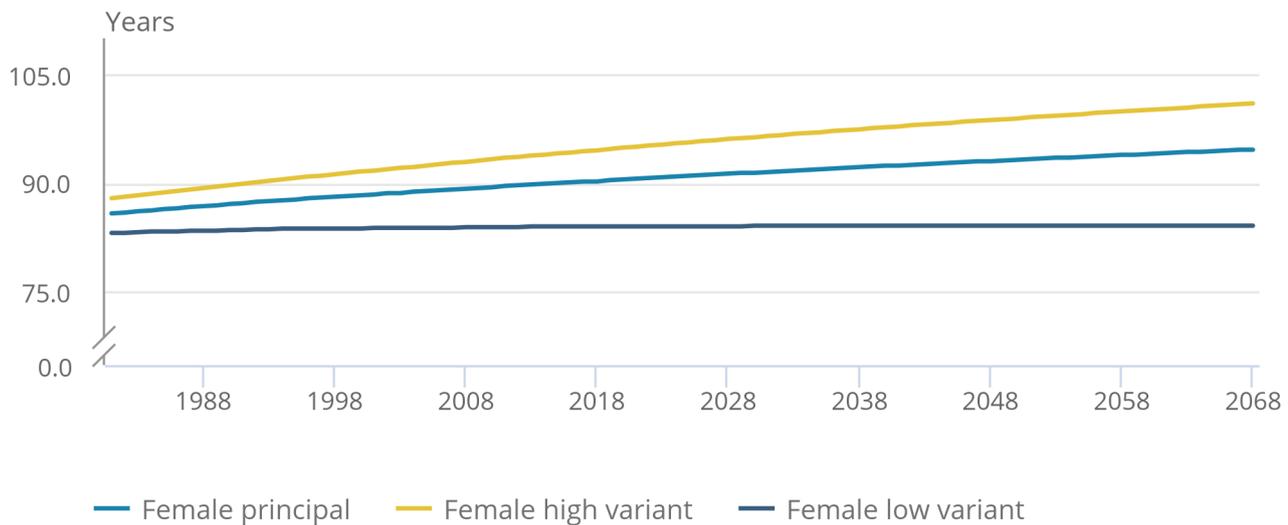
1. Unlike period life expectancy, projections of cohort life expectancy also vary historically, therefore cohort figures for years prior to 2018 will differ from those in previous sets of projections. This is because members of these cohorts are still living and assumptions about their future improvements in mortality have changed.

## Figure 6: Cohort life expectancy is projected to increase under these three scenarios<sup>1</sup>

Cohort life expectancy at birth for females: principal, high and low variants, UK, 1981 to 2068

### Figure 6: Cohort life expectancy is projected to increase under these three scenarios<sup>1</sup>

Cohort life expectancy at birth for females: principal, high and low variants, UK, 1981 to 2068



Source: Office for National Statistics

#### Notes:

1. Unlike period life expectancy, projections of cohort life expectancy also vary historically, therefore cohort figures for years prior to 2018 will differ from those in previous sets of projections. This is because members of these cohorts are still living and assumptions about their future improvements in mortality have changed.

## 6 . How is life expectancy projected to change among the UK constituent countries?

England had the highest cohort life expectancy at birth among the constituent countries of the UK in 2018, while Scotland had the lowest. For males, the gap between cohort life expectancy at birth between England and Scotland was 1.9 years; for females, it was 1.7 years in 2018. This gap is projected to narrow to 1.4 years and 1.2 for males and females respectively by 2068 (Table 1).

Table 1: Cohort life expectancy at birth for selected years, UK and constituent countries

	Years		
	2018	2043	2068
<b>Males</b>			
United Kingdom	87.6	90.4	92.7
England	87.9	90.6	92.9
Wales	87.0	89.8	92.3
Northern Ireland	87.1	89.9	92.4
Scotland	86.0	88.9	91.5
<b>Females</b>			
United Kingdom	90.2	92.6	94.6
England	90.5	92.8	94.8
Wales	89.8	92.3	94.3
Northern Ireland	89.8	92.3	94.3
Scotland	88.8	91.4	93.6

Source: Office for National Statistics – national population projections

## 7 . How has life expectancy changed for those aged 65?

Cohort life expectancy at age 65 in the UK in 2018 was a further 19.9 years for males and 22.0 years for females. In 25 years' time, by 2043, cohort life expectancy at age 65 years is projected to be 22.2 for UK males and 24.2 for UK females. This is an increase of 2.3 years for males and 2.2 years for females.

This is 1.1 years lower for both sexes compared with the [2016-based projections](#), which projected cohort life expectancy at age 65 years in 2043 at 23.3 years and 25.3 years for males and females respectively (Figures 7 and 8).

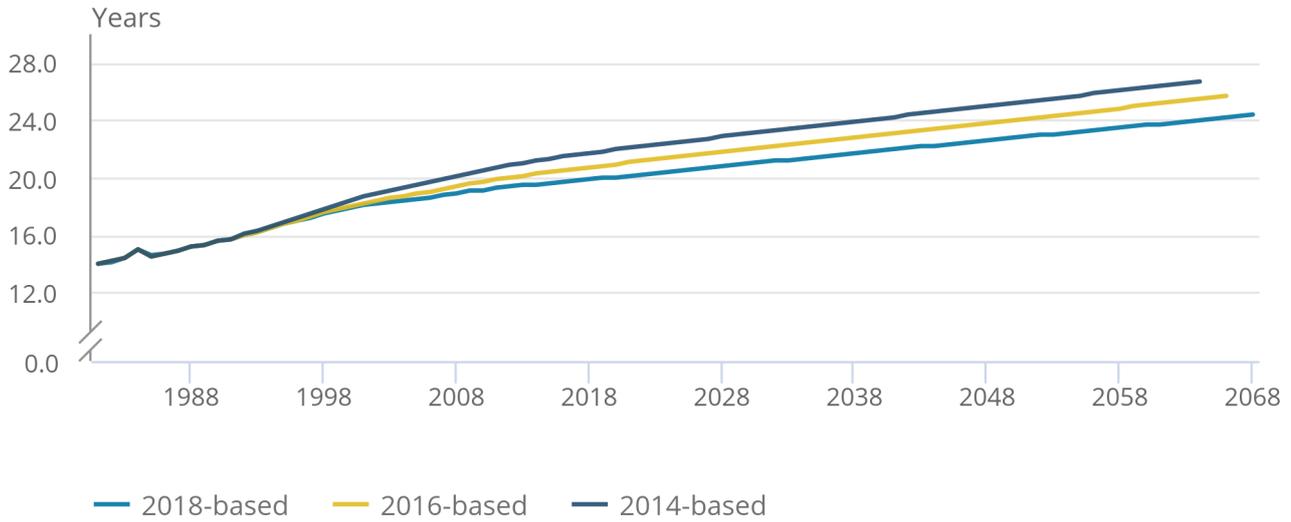
Although the 2018-based projections of life expectancy are lower than in the 2016-based projections, as for life expectancy at birth, life expectancy at age 65 years is still projected to continue to increase from 2018. The lower projections of life expectancy over time reflect the higher mortality rates observed in recent years than were previously projected and the projected lower rates of mortality improvement at older ages. A more detailed explanation of this is presented in the national population projections [mortality assumptions article](#).

**Figure 7: Cohort life expectancy at age 65 years is projected to be lower in the 2018-based projections than in the 2014 and 2016-based projections<sup>1</sup>**

Male cohort life expectancy at age 65 years, UK, 1981 to 2068

Figure 7: Cohort life expectancy at age 65 years is projected to be lower in the 2018-based projections than in the 2014 and 2016-based projections<sup>1</sup>

Male cohort life expectancy at age 65 years, UK, 1981 to 2068



Source: Office for National Statistics

Notes:

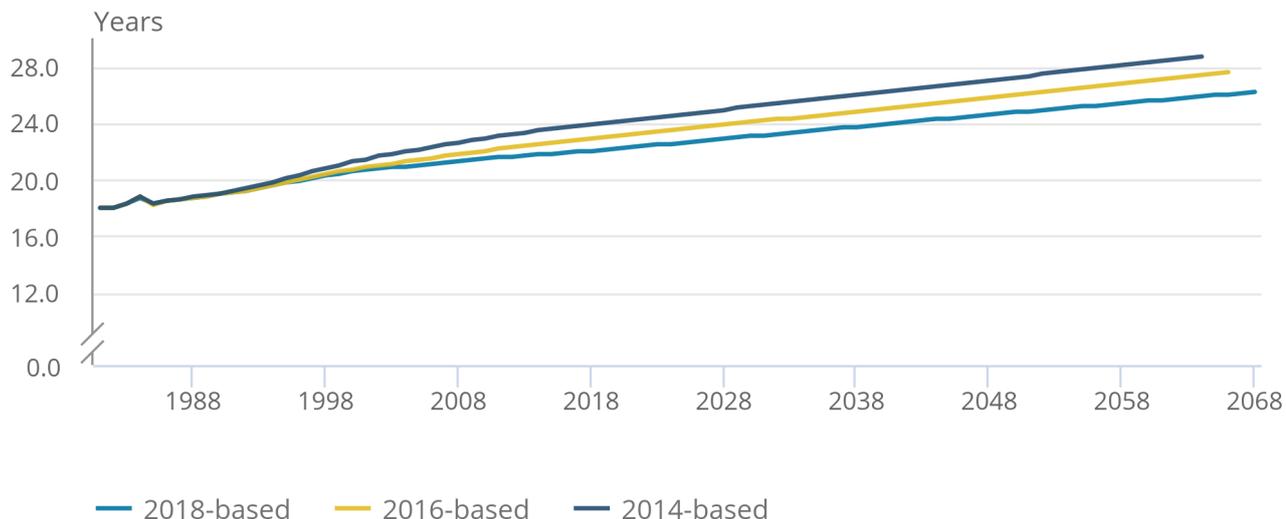
1. Unlike period life expectancy, projections of cohort life expectancy also vary historically, therefore cohort figures for years prior to 2018 will differ from those in previous sets of projections. This is because members of these cohorts are still living and assumptions about their future improvements in mortality have changed.

**Figure 8: Cohort life expectancy at age 65 years is projected to be lower in the 2018-based projections than in the 2014 and 2016-based projections<sup>1</sup>**

Female cohort life expectancy at age 65 years, UK, 1981 to 2068

Figure 8: Cohort life expectancy at age 65 years is projected to be lower in the 2018-based projections than in the 2014 and 2016-based projections<sup>1</sup>

Female cohort life expectancy at age 65 years, UK, 1981 to 2068



Source: Office for National Statistics

Notes:

1. Unlike period life expectancy, projections of cohort life expectancy also vary historically, therefore cohort figures for years prior to 2018 will differ from those in previous sets of projections. This is because members of these cohorts are still living and assumptions about their future improvements in mortality have changed.

## 8 . Quality and methodology

This release contains tables of life expectancy ( $e_x$ ), probability of death ( $q_x$ ) and numbers of persons surviving ( $l_x$ ) from the 2018-based national population projections (NPP). These tables contain historical and projected figures for 1981 to 2068 on a period and cohort basis from life tables calculated using observed and projected deaths and population estimates and projections.

The definitions of life expectancy ( $e_x$ ), probability of death ( $q_x$ ) and numbers of persons surviving ( $l_x$ ) are as follows:

- $q_x$  is the mortality rate between age  $x$  and  $(x + 1)$ , that is, the probability that a person aged  $x$  exactly will die before reaching age  $(x + 1)$
- $l_x$  is the number of survivors to exact age  $x$  of 100,000 live births of the same sex who are assumed to be subject throughout their lives to the mortality rates experienced in the year or years to which the life table relates
- $e_x$  is the average expectation of life at exactly age  $x$ , that is, the average number of years that those aged  $x$  exactly will live thereafter

A more detailed explanation of the difference between period and cohort life expectancies can be found in [Period and cohort life expectancy explained](#).

Further explanation and guidance on how to use the data published in the past and projected period and cohort life tables is available in our [Guide to interpreting past and projected period and cohort life tables](#).

Mortality projections are based largely on extrapolation of past trends in rates of mortality improvement. Expert opinion is used to inform the assumptions made about future mortality rates. Information on the assumption setting process for future mortality patterns is available in [the mortality assumptions chapter of the NPP publication](#).

The [National life tables Quality and Methodology Information](#) report and the [National population projections Quality and Methodology Information report](#) contain important information on:

- the strengths and limitations of the data and how it compares with related data
- uses and users
- how the output was created
- the quality of the output including the accuracy of the data

## 9 . Related links

More information on population projections and life expectancies can be found in the following publications.

[National life tables UK: 2016 to 2018](#)

Statistical bulletin | Released 25 September 2019

Trends in the average number of years people will live beyond their current age measured by period life expectancy, analysed by age and sex for the UK and its constituent countries.

[National population projections: 2018-based](#)

Statistical bulletin | Released 21 October 2019

The potential future population size of the UK and its constituent countries.

[Life expectancy calculator](#)

Use our interactive calculator to find out your life expectancy and your chance of living to 100 years old.