

Article

Quarterly mortality report, England: October to December 2019 and year-end review

Provisional death registration and death occurrence data for England, broken down by sex and age.

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1 . Main points

- There were 129,821 deaths registered in England in Quarter 4 (Oct to Dec) 2019; this was 6,752 more deaths than the five-year average (2014 to 2018) for this quarter.
- The age-standardised mortality rate in Quarter 4 2019 increased to 948.1 deaths per 100,000 populations from 902.0 deaths per 100,000 population in Quarter 4 2018, an increase of 5.1% and the first increase in Quarter 4 mortality rate since 2016.
- Age-specific mortality rates statistically significantly increased in Quarter 4 2019, for all age groups aged 75 years and over, in comparison to Quarter 4 2018.
- The provisional annual mortality rate for deaths registered in 2019 decreased to 919.8 deaths per 100,000 population, from 956.3 deaths per 100,000 population in 2018, the lowest annual mortality rate since 2001.
- Statistically significant decreases were seen in the provisional annual age-standardised mortality rates of circulatory diseases, influenza and pneumonia, and other respiratory diseases, for both sexes and all age groups over 75 years, in comparison with 2018.
- Provisional estimates of life expectancy show increases, for both males and females, at birth and all other ages in 2019 compared with 2018.

2 . Death registrations in Quarter 4 2019

In Quarter 4 (Oct to Dec) 2019, there were 129,821 deaths registered in England. This was 8,674 more deaths than Quarter 4 2018 and 6,752 more deaths than the five-year average (2014 to 2018) for this quarter. Of the deaths registered in Quarter 4 2019, the number of male deaths was 64,264 (60,304 in 2018) and female deaths was 65,557 (60,843 in 2018).

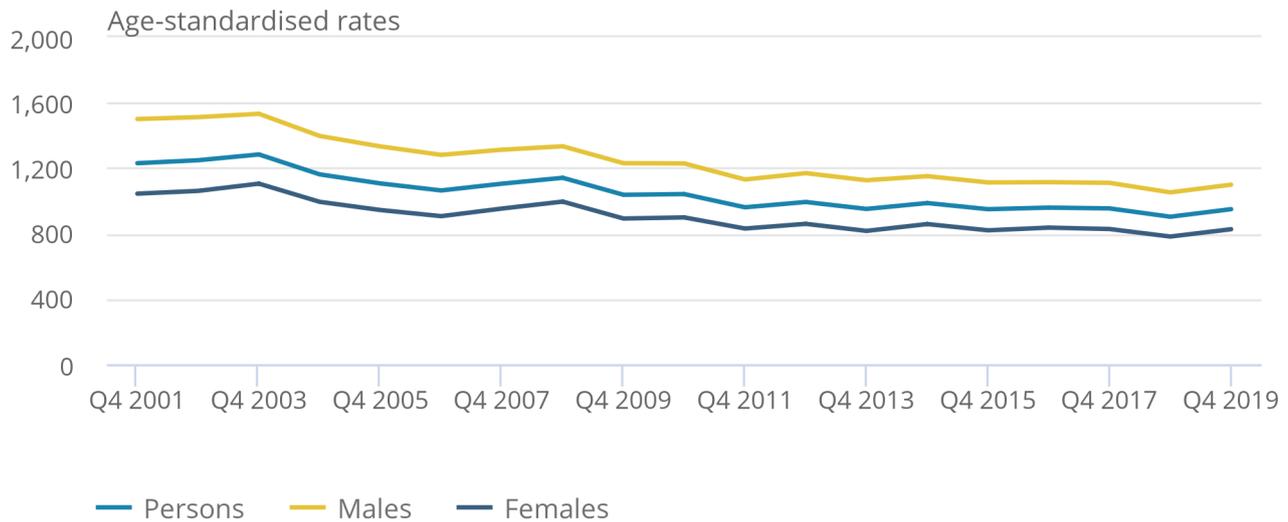
When we are looking at comparisons over time, we express the number of deaths registered as age-standardised mortality rates. Since Quarter 4 2001, age-standardised mortality rates had statistically significantly decreased from 1,229.6 deaths per 100,000 population to a low of 902.0 deaths per 100,000 in Quarter 4 2018. However, the rate of decline in the mortality rate had been slowing since 2011 and in Quarter 4 2019 the age-standardised mortality rate statistically significantly increased to 948.1 deaths per 100,000. This is the first increase in Quarter 4 mortality rate since 2016 and a similar rate to that seen in 2017 (Figure 1).

Figure 1: Mortality rates in Quarter 4 2019 have increased since Quarter 4 2018

Age-standardised mortality rates by sex, deaths registered in Quarter 4 (Oct to Dec) 2001 to 2019, England

Figure 1: Mortality rates in Quarter 4 2019 have increased since Quarter 4 2018

Age-standardised mortality rates by sex, deaths registered in Quarter 4 (Oct to Dec) 2001 to 2019, England



Source: Office for National Statistics – Quarterly mortality report

Notes:

1. Age-standardised mortality rates per 100,000 population, standardised to the 2013 European Standard Population.
2. Q4 refers to Quarter 4 (1 October to 31 December).
3. Figures are for deaths registered rather than deaths occurring in each period.
4. Figures for 2019 are based on provisional mortality data and projected populations.
5. Figures exclude non-residents.

More information about how mortality rates have changed over a longer time period can be found in [Office for National Statistics \(ONS\)](#) and [Public Health England \(PHE\) \(PDF, 2.93MB\)](#) analyses of the changing mortality trends in England.

Age-standardised mortality rates, by sex and age group, in Quarter 4 2019

Most deaths registered typically occur in those who are aged 75 years and over. For this reason, age-standardised mortality rates for those aged under 75 years and those aged 75 years and over have been analysed separately. A total age-standardised mortality rate was analysed for those aged 0 to 74 years, then age-specific mortality rates were analysed for ages 75 to 79 years, 80 to 84 years, 85 to 89 years, and 90 years and over.

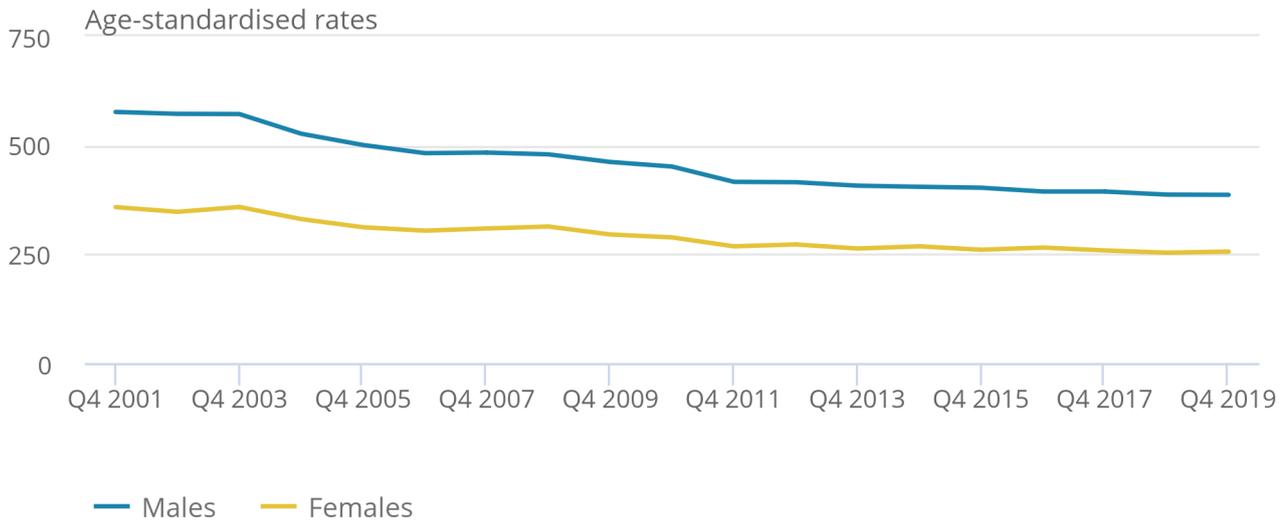
Generally, since 2001, the age-standardised mortality rate of both males and females aged 0 to 74 years had been decreasing. However, the mortality rate for females aged 0 to 74 years in Quarter 4 2019 increased compared to Quarter 4 2018 (255.8 deaths per 100,000 compared to 253.3 deaths) whereas for males it decreased slightly (386.5 deaths per 100,000 males in 2018 to 386.0 deaths in 2019). This marks the first increase in Quarter 4 since 2013, for females under the age of 75, and narrows the difference in mortality rates between males and females (Figure 2).

Figure 2: Mortality rates in Quarter 4 2019, for those aged 0 to 74 years, decreased for males and increased for females compared with Quarter 4 2018

Age-standardised mortality rates by sex, ages 0 to 74 years, deaths registered in Quarter 4 (Oct to Dec) 2001 to 2019, England

Figure 2: Mortality rates in Quarter 4 2019, for those aged 0 to 74 years, decreased for males and increased for females compared with Quarter 4 2018

Age-standardised mortality rates by sex, ages 0 to 74 years, deaths registered in Quarter 4 (Oct to Dec) 2001 to 2019, England



Source: Office for National Statistics – Quarterly mortality report

Notes:

1. Age-standardised mortality rates per 100,000 population, standardised to the 2013 European Standard Population.
2. Q4 refers to Quarter 4 (1 October to 31 December).
3. Figures are for deaths registered rather than deaths occurring in each period.
4. Figures for 2019 are based on provisional mortality data and projected populations.
5. Figures exclude non-residents.

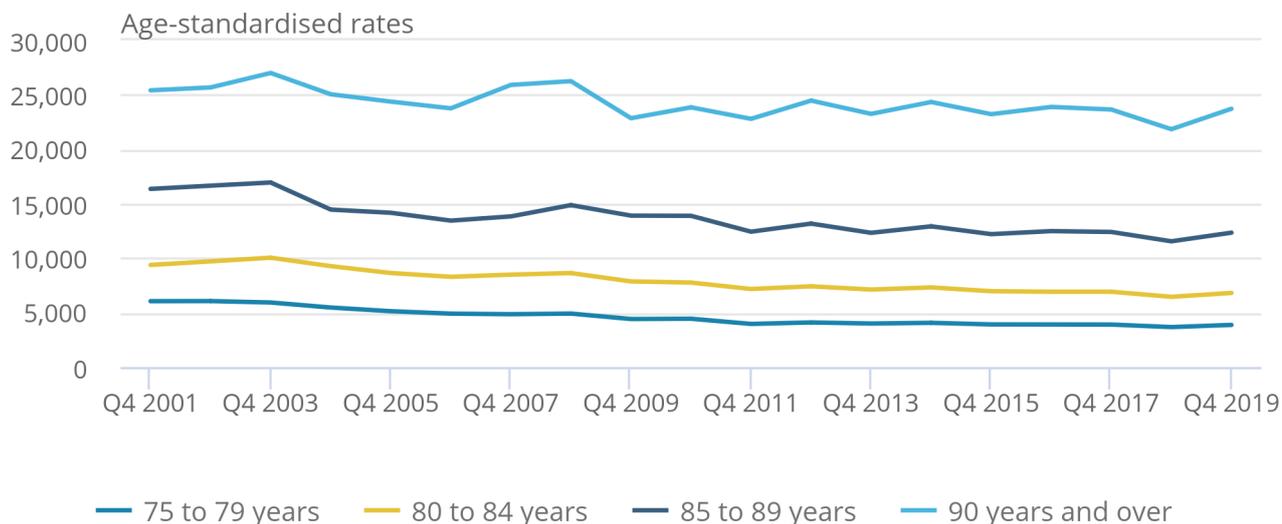
Figures 3 and 4 show that age-specific mortality rates had been generally decreasing among those aged 75 years and over, with Quarter 4 2018 recording the lowest mortality rates seen since the data series began in 2001. However, there were statistically significant increases in mortality rates in Quarter 4 2019, for both males and females, in all age groups 75 years and over. The mortality rate for those aged 90 years and over has fluctuated year-on-year since 2009 making findings difficult to interpret.

Figure 3: Mortality rates in Quarter 4 2019, for males aged 75 years and over, have increased compared to Quarter 4 2018

Age-specific mortality rates, males aged 75 years and over, deaths registered in Quarter 4 (Oct to Dec), 2001 to 2019, England

Figure 3: Mortality rates in Quarter 4 2019, for males aged 75 years and over, have increased compared to Quarter 4 2018

Age-specific mortality rates, males aged 75 years and over, deaths registered in Quarter 4 (Oct to Dec), 2001 to 2019, England



Source: Office for National Statistics – Quarterly mortality report

Notes:

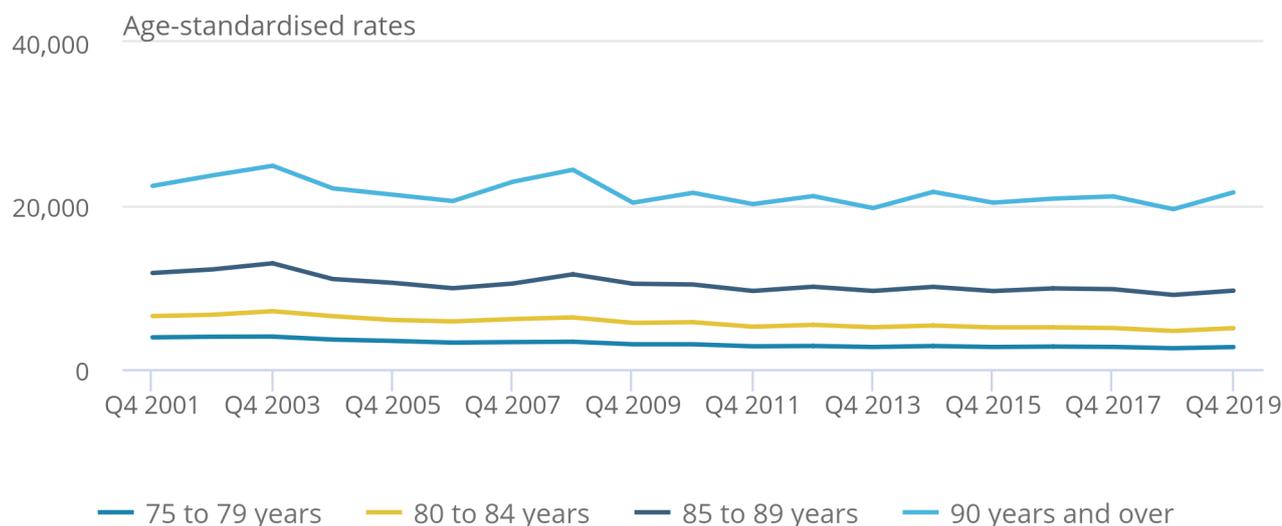
1. Age-specific mortality rates per 100,000 population.
2. Q4 refers to Quarter 4 (1 October to 31 December).
3. Figures are for deaths registered rather than deaths occurring in each period.
4. Figures for 2019 are based on provisional mortality data and projected populations.
5. Figures exclude non-residents.

Figure 4: Mortality rates in Quarter 4 2019, for females aged 75 years and over, have increased compared to Quarter 4 2018

Age-specific mortality rates, females aged 75 years and over, deaths registered in Quarter 4 (Oct to Dec), 2001 to 2019, England

Figure 4: Mortality rates in Quarter 4 2019, for females aged 75 years and over, have increased compared to Quarter 4 2018

Age-specific mortality rates, females aged 75 years and over, deaths registered in Quarter 4 (Oct to Dec), 2001 to 2019, England



Source: Office for National Statistics – Quarterly mortality report

Notes:

1. Age-specific mortality rates per 100,000 population.
2. Q4 refers to Quarter 4 (1 October to 31 December).
3. Figures are for deaths registered rather than deaths occurring in each period.
4. Figures for 2019 are based on provisional mortality data and projected populations.
5. Figures exclude non-residents.

3 . Provisional annual death registrations

To monitor year-to-year mortality rates, we have calculated provisional annual mortality rates based on the number of deaths registered between 1 January and 31 December from 2001 to 2019. The finalised annual death registrations for 2019 will be presented in the updated [Death registrations](#) publication, expected in summer 2020.

In 2019, there were 496,354 deaths registered in England, a decrease of 9,505 deaths compared with 2018 and the lowest number registered since 2016. The end of year age-standardised mortality rate for 2019 has also statistically significantly decreased to 919.8 deaths per 100,000 population from 956.3 deaths in 2018. This sharp decrease in the annual mortality rate in comparison with 2018 was driven by the statistically significantly lower mortality rates from Quarter 1 (Jan to Mar) 2019 and Quarter 2 (Apr to June) 2019 in comparison with the same quarters from 2018 (Figure 5).

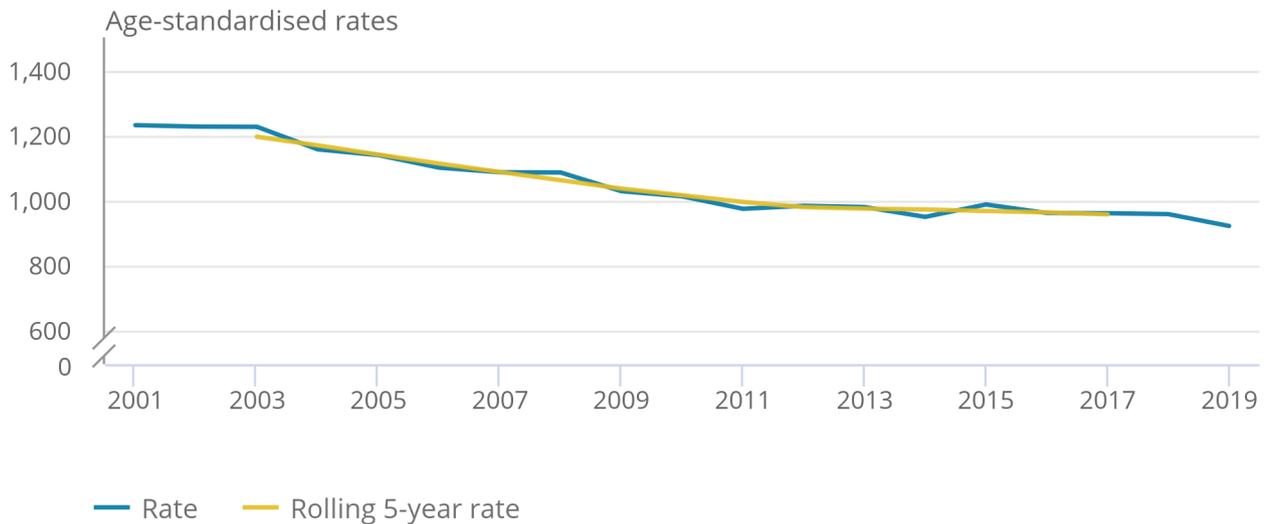
Further age-standardised mortality rates have been created for rolling five-year periods to reduce the variance that can occur between individual years. When comparing the 2019 annual mortality rate (919.8 deaths per 100,000 population) to the previous five-year average from 2014 to 2018 (961.6 deaths per 100,000 population) the decrease is statistically significant (Figure 5).

Figure 5: Year-end mortality rate for 2019 statistically significantly lower than 2018

Provisional annual age-standardised mortality rates, deaths registered between 2001 to 2019, England

Figure 5: Year-end mortality rate for 2019 statistically significantly lower than 2018

Provisional annual age-standardised mortality rates, deaths registered between 2001 to 2019, England



Source: Office for National Statistics – Quarterly mortality report

Notes:

1. Age-standardised mortality rates per 100,000 population, standardised to the 2013 European Standard Population.
2. Figures are for deaths registered rather than deaths occurring in each period.
3. Figures for 2019 are based on provisional mortality data and projected populations.
4. Figures exclude non-residents.
5. Rolling five-year averages are displayed at the midpoint, for instance 2003 denotes 2001 to 2005, 2004 denotes 2002 to 2006 and so on.

4 . Death occurrences in Quarter 4 2019

This section is based on the date a death occurred, rather than the date of registration as in the previous sections, to monitor current mortality trends in England. Analysis of deaths by date of registration is useful as the data are comparable across time and geography.

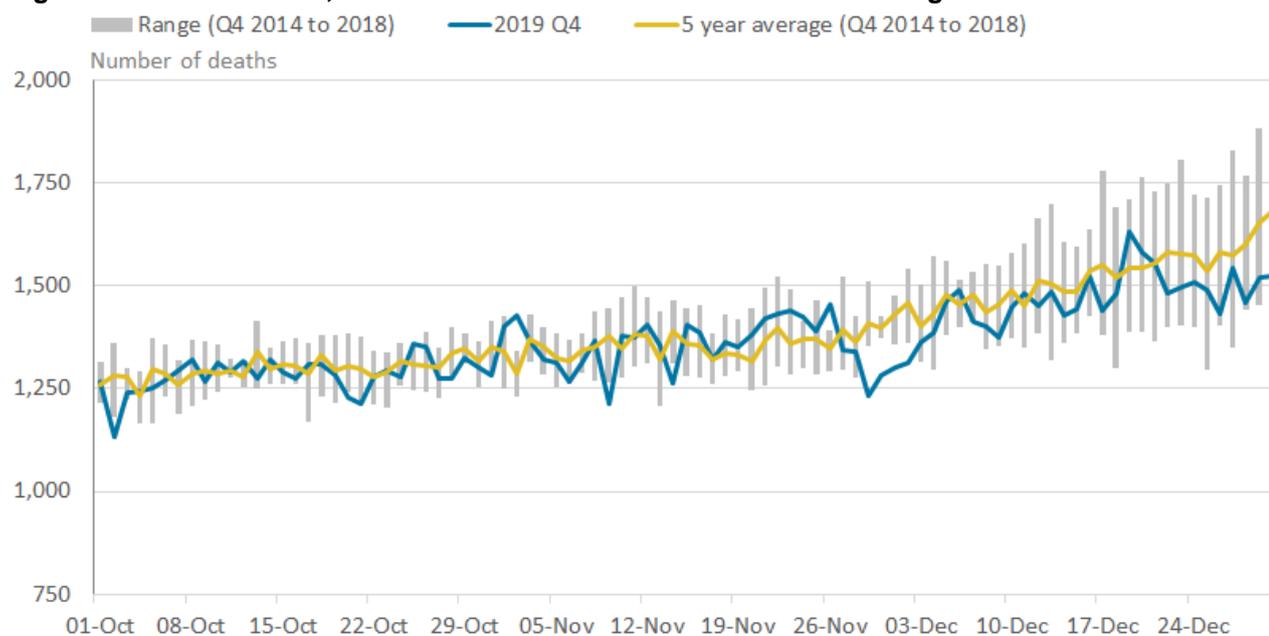
Because of the length of time that it takes a death to be registered, it can mean that we are not monitoring current death trends. For example, a death registered in Quarter 4 (Oct to Dec) 2019 could have occurred in a previous quarter or even a previous year. Further information regarding death occurrences and registration delays can be found in the most recent [Impact of registration delays](#) publication.

Between 1 October and 31 December 2019 there were 125,950 deaths that occurred in England, 2,274 fewer than the five-year average (2014 to 2018) for that quarter. It is important to note that the number of death occurrences is incomplete as it is likely more deaths need to be registered, therefore all data within this section is likely to change and interpretations should be treated with caution.

Figure 6 displays the number of deaths occurring per day in Quarter 4 2019 compared to the five-year average (Q4 2014 to 2018). It also shows the range of death occurrences for each day, which refers to the difference between the lowest and highest number of deaths observed on each day during Quarter 4 in 2014 to 2018. The highest number of deaths in Quarter 4 2019 occurred on the 19 December (1,634 deaths) and the lowest number of deaths occurred on the 2 October (1,131 deaths).

Where the number of death occurrences on an individual day fell outside of the range from the previous five years, it is likely due to one of two reasons. First, is that the most recent figures used for analysis were incomplete. This could be a result of the death occurring close to the end of the period and not leaving enough time to be registered before the data extract was created. Second, could be that there was an external influence that affected the data on individual days, such examples include extreme weather or an illness epidemic.

Figure 6: There were 125,950 death occurrences in Quarter 4 2019 in England



Source: Office for National Statistics – Quarterly mortality report

Notes:

1. Figures are for deaths occurring on each day rather than deaths registered, up to 31 December 2019.
2. Figures for 2019 are based on provisional mortality data.
3. Q4 refers to Quarter 4 (1 October to 31 December).
4. The range is the difference between the minimum and maximum value observed on each day during the five-year period (Q4 2014 to Q4 2018).
5. Figures exclude non-residents.

5 . Annual (provisional) underlying cause of death registrations in 2019 for those aged 75 years and over

The annual provisional age-standardised mortality rates of circulatory diseases, influenza and pneumonia and all other respiratory diseases statistically significantly decreased in 2019, for both females and males, in comparison to 2018. The age-standardised mortality rates in 2019 for these causes are all the lowest they have been since 2001 (Figures 7a and 7b). The 2019 decrease in mortality rate for influenza and pneumonia however was somewhat expected due to the elevated prevalence of influenza and pneumonia in 2018.

When observing Dementia and Alzheimer's disease, the annual mortality rate for females also statistically significantly decreased (1392.1 deaths per 100,000 in 2018 to 1283.9 deaths in 2019). Similarly, the mortality rate for 'all other causes' for females in 2019 statistically significantly decreased to 1254.1 deaths per 100,000 compared to 1310.8 deaths in 2018. Decreases in annual mortality rates for these two causes were also seen for males when compared to 2018, however the decreases were not statistically significant. The mortality rates in 2019 for Dementia and Alzheimer's are the lowest they have been, for both sexes, since 2016.

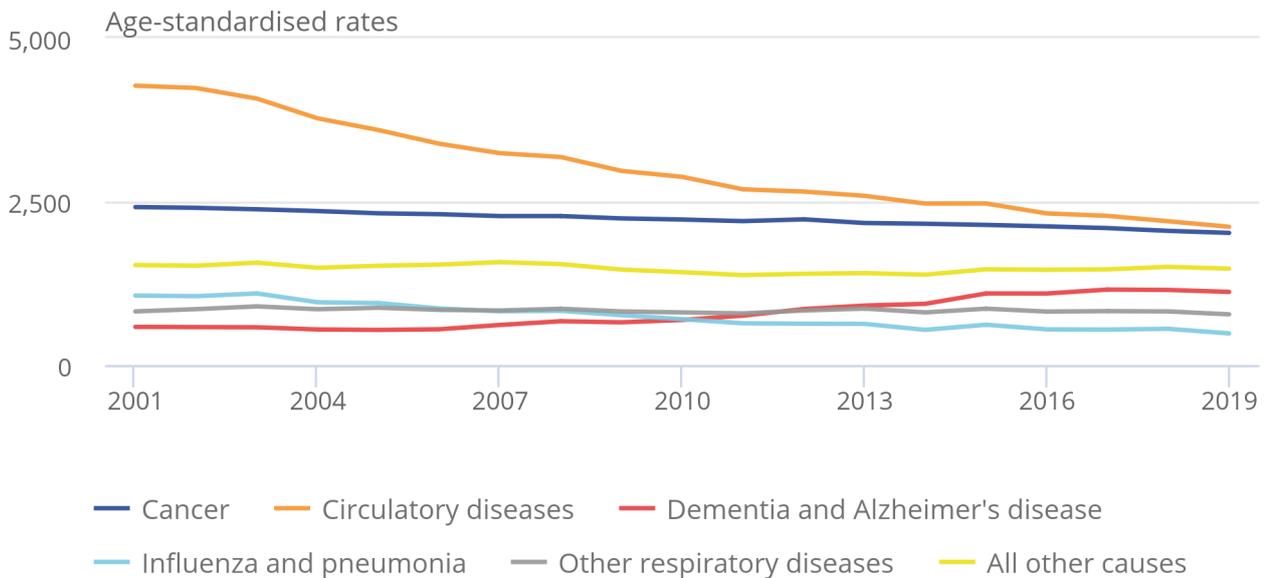
Cancer was the only underlying cause we examined where neither males nor females experienced a statistically significant difference in mortality rates between 2018 and 2019. For males, the mortality rate decreased from 2051.6 deaths per 100,000 in 2018 to 2020.5 deaths in 2019 and for females increased from 1254.8 deaths per 100,000 in 2018 to 1256.2 deaths in 2019. This is the first occasion the mortality rate for cancer has increased for females, aged 75 and over, since 2012.

Figure 7a: Male mortality rates in 2019, for those aged 75 years and over, decreased for circulatory diseases, influenza and pneumonia, and other respiratory diseases

Annual age-standardised mortality rates by underlying cause of death, males aged 75 years and over, deaths registered 2001 to 2019 (provisional), England

Figure 7a: Male mortality rates in 2019, for those aged 75 years and over, decreased for circulatory diseases, influenza and pneumonia, and other respiratory diseases

Annual age-standardised mortality rates by underlying cause of death, males aged 75 years and over, deaths registered 2001 to 2019 (provisional), England



Source: Office for National Statistics – Quarterly mortality report

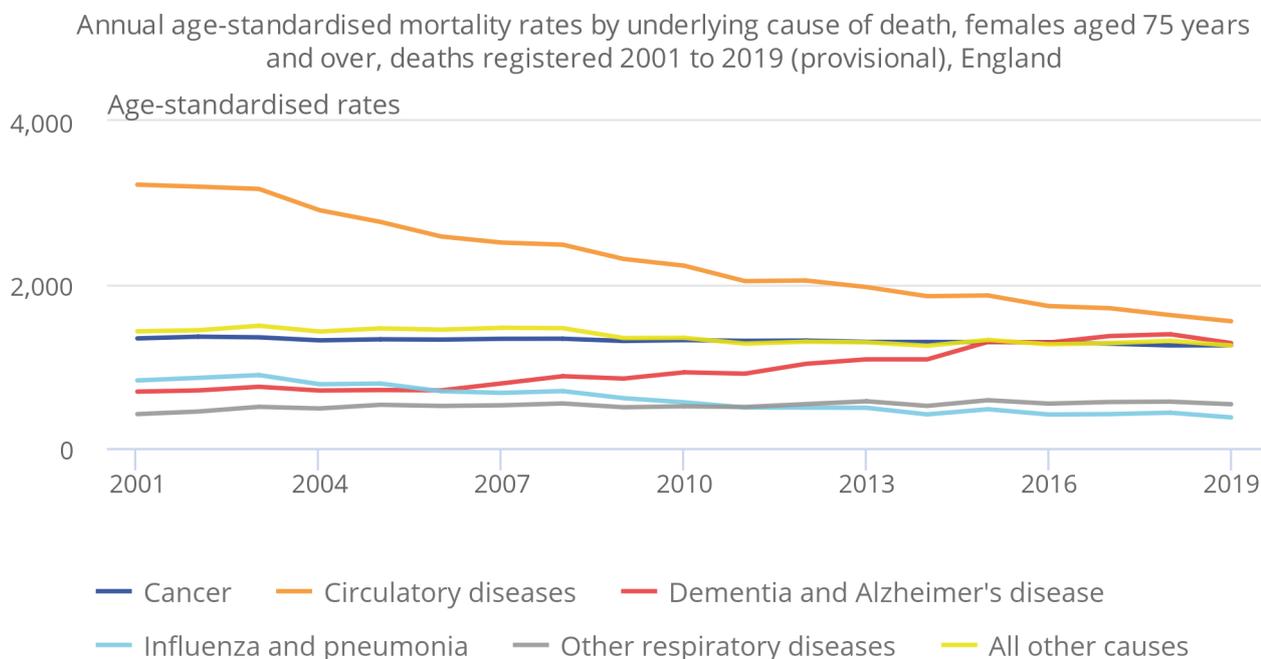
Notes:

1. Age-standardised mortality rates per 100,000 population, standardised to the 2013 European Standard Population.
2. Figures are for deaths registered rather than deaths occurring in each period.
3. Figures for 2019 are based on provisional mortality data and projected populations.
4. Figures exclude non-residents.
5. Changes to the coding of underlying cause of death can have an impact on the number of deaths recorded with a specific underlying cause. Two major coding changes occurred in 2011 and 2014. Comparability ratios have been applied to the number of deaths to account for this impact to allow for a more consistent time trend and can be found in the “Comparability ratios” tab in the accompanying datasets.

Figure 7b: Female mortality rates in Quarter 4 2019, for those aged 75 years and over, decreased for circulatory diseases, dementia and alzheimer's, and other respiratory diseases

Annual age-standardised mortality rates by underlying cause of death, females aged 75 years and over, deaths registered 2001 to 2019 (provisional), England

Figure 7b: Female mortality rates in Quarter 4 2019, for those aged 75 years and over, decreased for circulatory diseases, dementia and alzheimer's, and other respiratory diseases



Source: Office for National Statistics – Quarterly mortality report

Notes:

1. Age-standardised mortality rates per 100,000 population, standardised to the 2013 European Standard Population.
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Provisional life expectancy in 2019

Provisional estimates of life expectancy at birth have increased for both males and females in 2019 (79.9 years for males and 83.6 years for females) in comparison with 2018 (79.6 for males and 83.2 for females respectively). These estimates are the new highest life expectancy figures recorded.

For males, provisional life expectancy estimates reported increases in 2019 of 0.3 years at 65 years and 0.2 years at 75, 85 and 95 years compared with 2018. Similarly, female life expectancy estimates in 2019 increased, by 0.3 years at ages 65, 75 and 85 years, and by 0.1 years at age 95 years compared with 2018.

Single-year life tables should be treated with caution when interpreting due to being typically more volatile in comparison to three-year average life tables. This is because single years are more susceptible to one-off events, such as illness epidemics, which can affect mortality rates for a short period

The accompanying [datasets](#) show life expectancy at birth, age 65, 75, 85 and 95 years, by sex.

6 . Glossary

Age-standardised mortality rates

Age-standardised mortality rates are used to allow comparisons between populations, which may contain different proportions of people of different ages. The [2013 European Standard Population](#) is used to standardise rates.

Age-specific mortality rates

Age-specific mortality rates are used to allow comparisons between specified age groups.

Statistical significance

The term “significant” refers to statistically significant changes or differences. Significance is determined by the 95% confidence intervals, where non-overlapping confidence intervals between figures demonstrate that the difference is unlikely to be a result of random fluctuation. More information is available on our [uncertainty pages](#).

Annual

Annual is the period covering 1 January to 31 December.

Quarter 4

Quarter 4 is the period covering 1 October to 31 December.

7 . Measuring the data

The purpose of this article is to provide timely surveillance of mortality in England, based on the best available provisional data. This article focuses on Quarter 4 (Oct to Dec) 2019. [Previous quarterly reports are available](#).

Deaths data sources

This article is based primarily on death registrations, with a section on death occurrences following the annual overview. Death occurrences show the number of deaths that occurred within a calendar period and give a better indication than registrations of exactly when deaths were at their highest. This allows mortality to be related to other factors such as weather patterns.

A provisional extract of death registrations and death occurrences data for Quarter 4 (1 Oct to 31 Dec 2019) was created on 28 January 2020, roughly four weeks after the end of the reporting period.

Death registrations data for 2019 are provisional; however, we would expect only very small changes to total death registration counts once data are made final.

Registration delays

Previously, death occurrences data have been produced using a similar extraction date to ensure the data were consistent throughout the time period. However, for this release and all future releases, this similar extraction date has been removed to ensure the occurrence data we are publishing are the most up to date.

[Because of registration delays](#), deaths that occurred during Quarter 4 2019 may not have been registered by 31 December 2019 when the data extract was created. For this reason, the quarterly occurrences data are always somewhat incomplete and we would expect the number of death occurrences in Quarter 4 2019 reported in future releases to be higher than the number reported here.

Quarterly populations

We publish the [mid-year population estimates](#) used for calculating rates. For 2019, the [2018-based Office for National Statistics \(ONS\) population projections were used](#).

Calculation of mortality rates for quarterly deaths requires adjustments to be made to annual population estimates to calculate rates that are comparable with annual rates.

We calculate an annual population centred on the midpoint of the quarter using two years' worth of population estimates or projections. This is then multiplied by the number of days within the quarter as a proportion of the total number of days within that year. The output is used as the population denominator in calculations of age-standardised and age-specific mortality rates:

Quarter 4 2019 population

$$= \left(population_{2018}(i) + \left((population_{2019}(i) - population_{2018}(i)) \times \left(\frac{m}{M} \right) \right) \right) \times \left(\frac{N}{M} \right)$$

where m is the number of days from 1 July 2018 (the start of the mid-year for the population estimate) to the midpoint of Quarter 4 inclusive, N is the number of days in Quarter 4 2019, M is the number of days in 2019 and (i) is the age group.

Early access for quality assurance purposes

We provide early access for quality assurance purposes to a small number of analysts within Public Health England (PHE) and Department of Health and Social Care (DHSC). The analysts are not permitted to share the findings or the report more widely in their organisations. The report is provided for the analysts to provide technical comment on our findings. However, ONS itself independently produces these statistics, including determining the focus, content, commentary, illustration and interpretation of these measures presented and the comments provided by PHE and DHSC are purely advisory.

Quality and methodology information

More quality and methodology information on strengths, limitations, appropriate uses, and how the data were created is available in the [Mortality statistics in England and Wales QMI](#).

8 . Strengths and limitations

Provisional data are used

Provisional death registrations and death occurrences data are used in this bulletin. This enables timely analysis to be completed to monitor mortality trends. However, as the data are provisional, they are subject to change.

Data coverage and timeliness

Mortality data give complete population coverage. They ensure the estimates are of high precision and are representative of the underlying population at risk. However, because of registration delays, quarterly death occurrence data are always somewhat incomplete. This is especially true for deaths that occurred towards the end of the quarter.

Further information can be found in the [Mortality statistics in England and Wales QMI](#) and the [User guide to mortality statistics](#).

9 . Related links

[Changing trends in mortality in England and Wales: 1990 to 2017](#)

Article | Published 18 June 2018

Analysis of whether there have been recent changes in the trends of mortality rates in England and Wales from 1990 to 2017. Experimental Statistics.

[Changing trends in mortality: a cross-UK comparison, 1981 to 2016](#)

Article | Published 7 August 2018

Analysis of age-specific and age-standardised mortality rates for the UK, England, Wales, Scotland and Northern Ireland from 1981 to 2016.

[Changing trends in mortality: an international comparison: 2000 to 2016](#)

Article | Published 7 August 2018

Analysis of period life expectancies and mortality in selected countries globally from 2000 to 2016.

[A review of recent trends in mortality in England \(PDF, 2.93MB\)](#)

Public Health England report | Published December 2018

Findings from a review of trends in life expectancy and mortality, and suggestions for future work.

[Excess winter mortality in England and Wales: 2018 to 2019 \(provisional\) and 2017 to 2018 \(final\)](#)

Bulletin | Released 27 November 2019

More people die in the winter than the summer. We present data by sex, age, region and cause of death.

[Deaths registered in England and Wales \(series DR\): 2018](#)

Bulletin | Released 6 August 2019

Registered deaths by age, sex, selected underlying causes of death and the leading causes of death; death rates and death registrations by area of residence and single year of age.