Office for National Statistics

Article

Quarterly mortality report, England: January to March 2017

Provisional death registration and death occurrence data for England broken down by sex, age and underlying cause. The report is produced with Public Health England and Department for Health and Social Care.

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Next release:
To be announced

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1 . Main points

- Provisionally, 131,592 deaths occurred between 1 January and 31 March 2017 in England.

- The estimate is based on best available data, but following late registrations the estimate is likely to increase to be between 136,900 and 138,500 deaths (based on late registrations from the previous 5 years).

- Provisional Quarter 1 (Jan to Mar) 2017 death occurrences are higher than the average of the Quarter 1s of the previous 5 years in England; they are also likely to be higher than Quarter 1 of the previous year following late registrations but should remain lower than Quarter 1 2015.

- From Quarter 1 2001 there was a predominant decrease in age-standardised mortality until Quarter 1 2010; since then the trend has been more volatile.

2 . Things you need to know about this release

The purpose of this report is to provide timely surveillance of mortality in England. This report serves as a snapshot of deaths that occurred within the most recent quarter using the best available data. Through comparative analyses with previous quarters, it aims to inform patterns of change in mortality; specifically whether mortality has increased, remained stable or decreased.

The deaths data in this report are based on death occurrences rather than death registrations. Typically, mortality statistics are based upon the date on which a death was registered (death registrations) rather than the date it occurred (death occurrences). The use of death occurrences allows for better surveillance of trends in mortality, measuring the number of deaths that actually occurred within a specific time period. Death registrations, on the other hand, are subject to variation in the number of working days within a period and do not suitably reflect temporal trends in mortality.

The median registration delay is 5 days for all causes of death. Further information about registration delays can be found in the document impact of registration delays on mortality statistics and also in the "Background information" section of this report.

As this report mostly uses death occurrences, the numbers reported here are provisional (for the most recent periods) and will increase over time as further deaths that occurred in the period are registered. The "Background information" section at the end of the report provides detail on the data sources used.

The quarterly populations used in rate calculations are adjusted using mid-year population estimates or a combination of mid-year population estimates (2001 to 2015) and population projections (2016 and 2017) to estimate what the likely population would have been at the mid-point of the quarter. More detail is provided in the "Background information" section at the end of this report.

The statistics reported here are Experimental Statistics, which allow us to demonstrate to users some of the analyses possible in the future and to seek feedback to inform the future presentation of timely mortality data. We welcome feedback from users on this report via email at mortality@ons.gov.uk.

This publication was produced with support from Public Health England.

3 . Provisionally, 131,592 deaths occurred in England in Quarter 1 2017

From 1 January to 31 March 2017 (Quarter 1 (Jan to Mar) 2017), 131,592 deaths occurred in England and were registered by 28 April 2017. When compared with final occurrence data for Quarter 1 of the previous 5 years, this Quarter 1 2017 provisional estimate is 312 deaths higher than the average of the previous 5 years (Table 1).

We anticipate the provisional Quarter 1 2017 estimate of death occurrences to increase by approximately 5,400 to 6,800 deaths based on late registration of deaths occurring in the previous 5 years. At the lower estimate this would increase the number of deaths to approximately 136,900 and at the higher estimate the number of deaths would increase to around 138,500. An increase within this range would position the number of deaths that occurred in Quarter 1 2017 as the second-highest in comparison with the first quarters of the previous 5 years.

Table 1 also shows the number of death occurrences in Quarter 1 for each year from 2012 to 2016 and the average of these 5 years if the data were extracted on 28 April in each year. This is to mirror the data collection time for Quarter 1 2017 data and to improve comparability. This is calculated as the number of deaths that occurred in the period 1 January to 31 March and were registered on or before 28 April in each year. When compared with data from a similar extraction date, this Quarter 1 2017 provisional estimate is 6,423 deaths higher than the average of the previous 5 years (Table 1).

Table 1: Provisional and final number of deaths that occurred or were registered, England, Quarter 1 (Jan to Mar) 2012 to Quarter 1 2017 and Quarter 1 2012 to Quarter 1 2016 average [1,2,3]

	Provisional		Final				
	Q1 2017 [p]	Q1 2016 [p]	Q1 2015	Q1 2014	Q1 2013	Q1 2012	Q1 2012 - Q1 2016 average
Death occurrences							
Number of deaths	131,592	134,132	143,063	120,196	133,279	125,729	131,280
Difference compared with Q1 2017 deaths		2,540	11,471	-11,396	1,687	-5,863	-312
Death occurrences with similar extraction date							
Number of deaths	131,592	127,450	136,256	114,821	127,203	120,116	125,169
Difference compared with Q1 2017 deaths		-4,142	4,664	-16,771	-4,389	-11,476	-6,423
Death registrations							
Number of deaths	143,516	132,728	145,570	123,068	132,409	127,042	132,163
Difference compared with Q1 2017 deaths		-10,788	2,054	-20,448	-11,107	-16,474	-11,353

Source: Office for National Statistics

Notes:

1. Data for 2016 and 2017 are provisional.

2. An average of 1,452 deaths occurred each day in England over the period Quarter 1 2012 to Quarter 1 2016. The years 2012 and 2016 are leap years so have 1 extra day in the Quarter 1 period.

3. Q1 refers to Quarter 1 (Jan to Mar)

This similar extraction date data shows Quarter 1 2017 had the second-highest number of deaths when compared with the number of deaths captured by 28 April on each of the previous 5 years. Quarter 1 2017 was only second to Quarter 1 2015.

Data based on death registrations further confirm this pattern and show that the number of deaths that were registered in Quarter 1 2017 was higher than the average of the previous 5 years by 11,353 deaths. Quarter 1 2017 also had the second-highest number of death registrations compared to the previous 5 years, second only to Quarter 1 2015. However, it must be noted that the death registration data will include deaths that occurred prior to Quarter 1 2017 but were registered between 1 January 2017 and 31 March 2017.

The following sections report final death occurrence data for Quarter 1 2001 to Quarter 1 2015 and provisional death occurrence data for Quarter 1 2016 and Quarter 1 2017.

4 . Trends in Quarter 1 age-standardised mortality rates since 2001

Overall, there was a steady decline in mortality rates for both males and females from Quarter 1 (Jan to Mar) 2001 to Quarter 1 2011 (Figure 1a). This is with the exception of an increase from Quarter 1 2004 to Quarter 1 2005 in both sexes but the increase was more prominent in females. Since Quarter 1 2011, mortality rates have been more volatile.

Relative to Quarter 1 2001, there has been a greater percentage decrease in Quarter 1 2017 for males than for females. For males there was a 30% decrease in overall mortality rate across the 17-year period, whereas for females there was only a 21% decrease in overall mortality rate over the same period.

Figure 1a: Difference in age-standardised mortality rates compared with Quarter 1 (Jan to Mar) 2001, by sex, all ages[1]

England, Quarter 1 2002 to Quarter 1 2017

Figure 1a: Difference in age-standardised mortality rates compared with Quarter 1 (Jan to Mar) 2001, by sex, all ages[1]

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England, Quarter 1 2002 to Quarter 1 2017
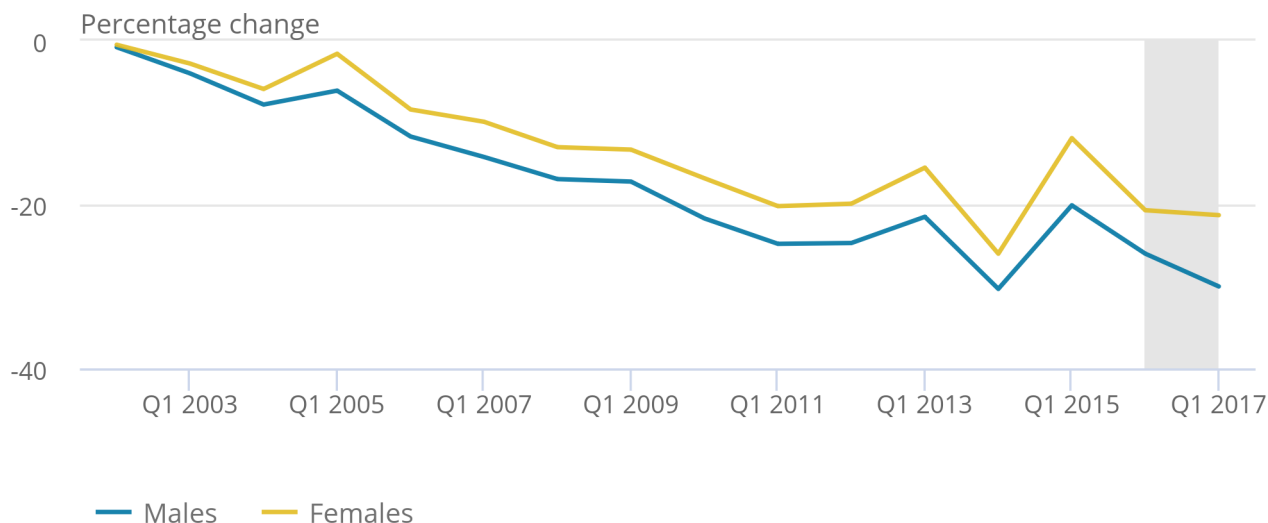
Source: Office for National Statistics

Notes:

1. Q1 refers to Quarter 1 (Jan to Mar).

For completeness, this time series was also analysed using the same extraction date of 28 April for each Quarter 1 from 2001 to control for any registration delay effect (see the datasets accompanying this report). Age-standardised rates on the basis of a similar extraction date were higher in Quarter 1 2017 than in Quarter 1 2016 for males and significantly higher for females, meaning the size of improvement since Quarter 1 2001 may be smaller once final data become available.

To further explore the trend in Quarter 1 death occurrences since 2011 and to set the pattern of improvement since 2001 in context, Figure 1b shows the percentage change in age-standardised mortality rate since 2011 for death occurrences taken at a similar extraction date to Quarter 1 2017 (28 April). Since 2011 there is no evidence of a continued decrease in mortality as occurred pre-2011. For example, the mortality rate for Quarter 1 2017 was 1.5% higher than Quarter 1 2011 for females and only 2.1% lower than Quarter 1 2011 for males.

Overall, the picture is extremely volatile since Quarter 1 2011 and clearly distinct from the pattern of continuous improvement observed between Quarter 1 2005 and Quarter 1 2011. Similar volatility is observed at older ages and also in trends in excess winter mortality statistics since 2011.

Figure 1b: Difference in age-standardised mortality rates using similar extraction date compared with Quarter 1 (Jan to Mar) 2011, by sex, all ages[1,2]

England, Quarter 1 2012 to Quarter 1 2017

Figure 1b: Difference in age-standardised mortality rates using similar extraction date compared with Quarter 1 (Jan to Mar) 2011, by sex, all ages^1,2^

England, Quarter 1 2012 to Quarter 1 2017
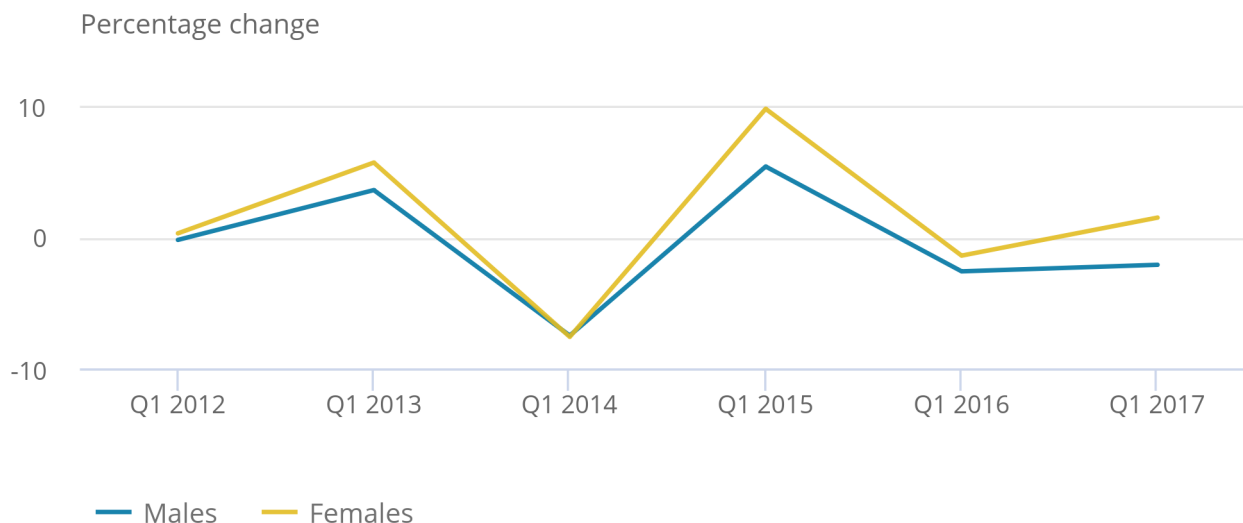
Source: Office for National Statistics

Notes:

1. Data for 2016 and 2017 are provisional.

2. Q1 refers to Quarter 1 (Jan to Mar).

Looking at the oldest ages, there was a larger percentage change in mortality rate from Quarter 1 2001 to Quarter 1 2017 for those aged 75 to 79 than any other age group in the aged 75 and over range. Those aged 90 and over saw the smallest percentage change over this period (Figures 1c and 1d). However, the 90 and over age group is open-ended and encompasses a wider range of ages, which introduces more uncertainty to the age-specific rate.

Since Quarter 1 2011, there has been a sizeable fluctuation in mortality rates across all age-groups of the older ages and for each sex. Decreases in rates were observed from Quarter 1 2013 to Quarter 1 2014 followed by increases from Quarter 1 2014 to Quarter 1 2015. From Quarter 1 2015 to Quarter 1 2016, a decrease was again observed.

For the most recent years, there was a decrease in mortality rates from Quarter 1 2016 to Quarter 1 2017 for males, apart from those aged 90 and over where there was an increase. For females, mortality rates for those aged 85 to 89 and 90 and over have increased whereas for those aged 75 to 79 and 80 to 84 the mortality rates have remained relatively stable. However, as Quarter 1 2017 and 2016 data are provisional, their comparison with earlier periods is likely to change.
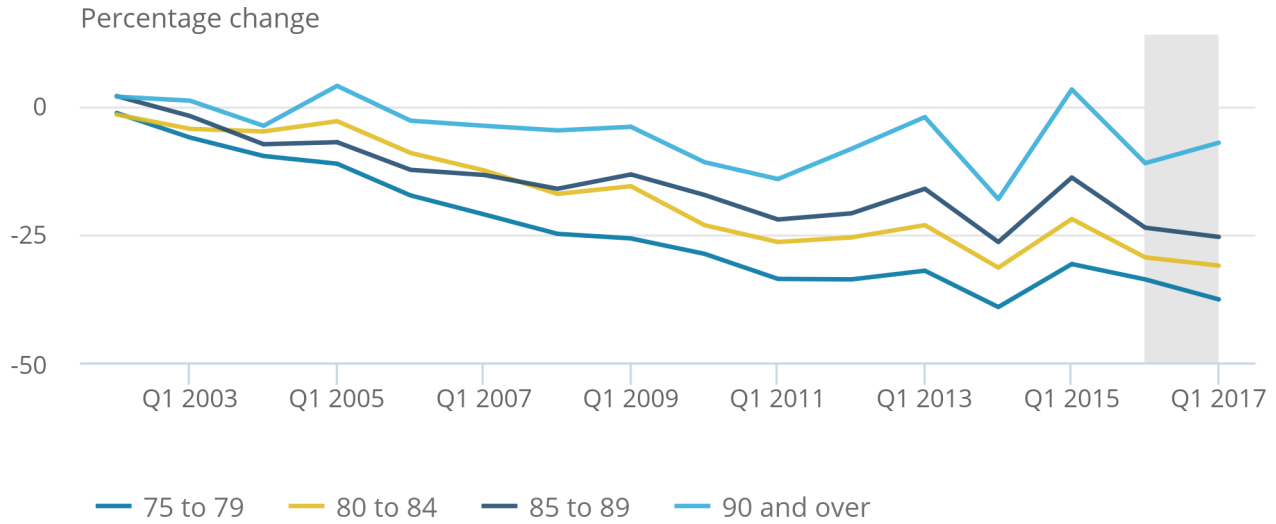
Figure 1c: Difference in age-specific mortality rates compared with Quarter 1 (Jan to Mar) 2001, males, 75 and over[1]

England, Quarter 1 2002 to Quarter 1 2017

Figure 1c: Difference in age-specific mortality rates compared with Quarter 1 (Jan to Mar) 2001, males, 75 and over^1^

England, Quarter 1 2002 to Quarter 1 2017

Shading shows
for 2016 and 2
are provisional

Percentage change

— 75 to 79   — 80 to 84   — 85 to 89   — 90 and over

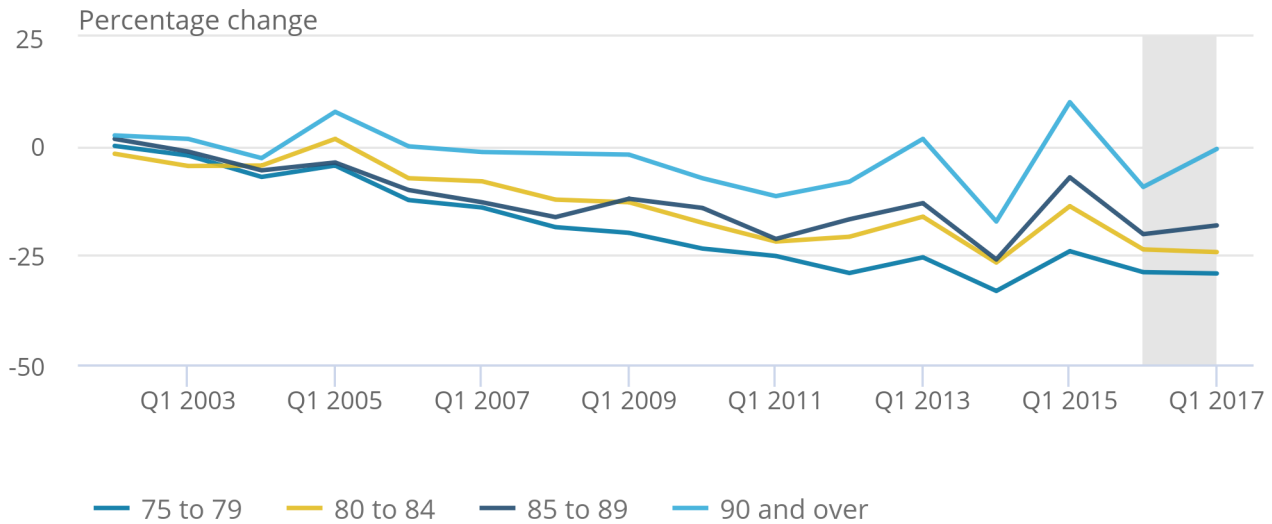**Source: Office for National Statistics**

Notes:

1. Q1 refers to Quarter 1 (Jan to Mar).

Figure 1d: Difference in age-specific mortality rates compared with Quarter 1 (Jan to Mar) 2001, females, 75 and over[1]

England, Quarter 1 2002 to Quarter 1 2017

Figure 1d: Difference in age-specific mortality rates compared with Quarter 1 (Jan to Mar) 2001, females, 75 and over^1^

England, Quarter 1 2002 to Quarter 1 2017

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Source: Office for National Statistics

Notes:

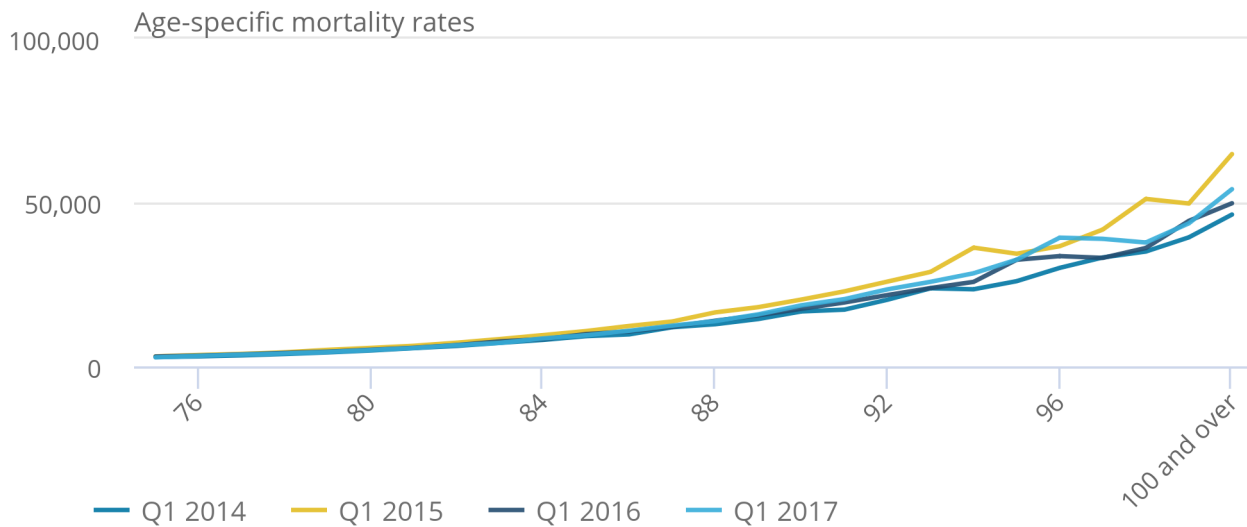1. Q1 refers to Quarter 1 (Jan to Mar).

Differences in rates were also observed when the 75 and over age groups are broken down into single year of age (Figure 2). Quarter 1 2015 had the highest mortality rates in the older ages compared with Quarter 1 2014, which had the lowest. Quarter 1 2017 is observed to have the second-highest mortality rates compared with the previous 3 years and among those aged 96, the highest mortality rate was in Quarter 1 2017.

Figure 2: Mortality rates by single year of age, ages 75 and over [1,2]

England, Quarter 1 (Jan to Mar) 2014 to Quarter 1 2017

Figure 2: Mortality rates by single year of age, ages 75 and over^1,2^

England, Quarter 1 (Jan to Mar) 2014 to Quarter 1 2017

Age-specific mortality rates

Legend: Q1 2014, Q1 2015, Q1 2016, Q1 2017

Source: Office for National Statistics

Notes:

1. Data for 2016 and 2017 are provisional.

2. Q1 refers to Quarter 1 (Jan to Mar).

All mortality rates and 95% confidence intervals can be found in the dataset accompanying this release.

# 5 . Daily death occurrences in Quarter 1 2017

Up until mid-February of Quarter 1 (Jan to Mar) 2017, the number of deaths observed in England was above the 5-year average. After this point the number of deaths moved below the 5-year average (Figure 3a). However, this drop at the end of the quarter is likely to be an artefact of data extraction as not all the deaths that occurred in this period will have been registered and hence will be absent from our dataset. It is expected that the number of deaths in the second half of Quarter 1 2017 will increase and thereby will be closer to the 5-year average.

Figure 3a: Death occurrences (all ages) by day [1,2,3]

England, Quarter 1 (Jan to Mar) 2015 to Quarter 1 2017 and Quarter 1 2012 to Quarter 1 2016 average
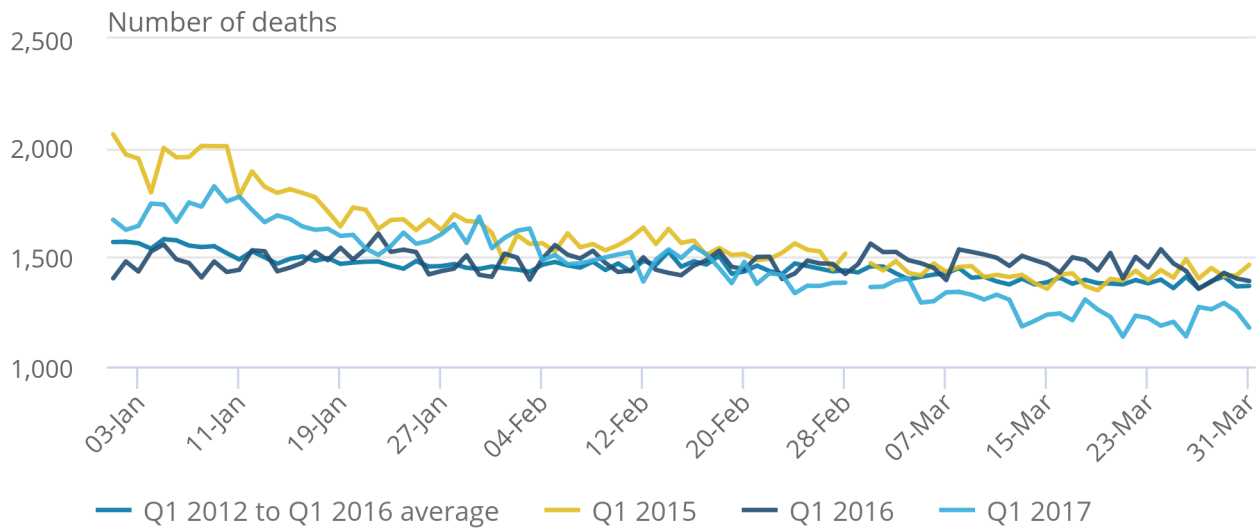
Source: Office for National Statistics

Notes:

1. Data for 2016 and 2017 are provisional.

2. The gap in the time series is due to the Quarter 1 2016 leap year.
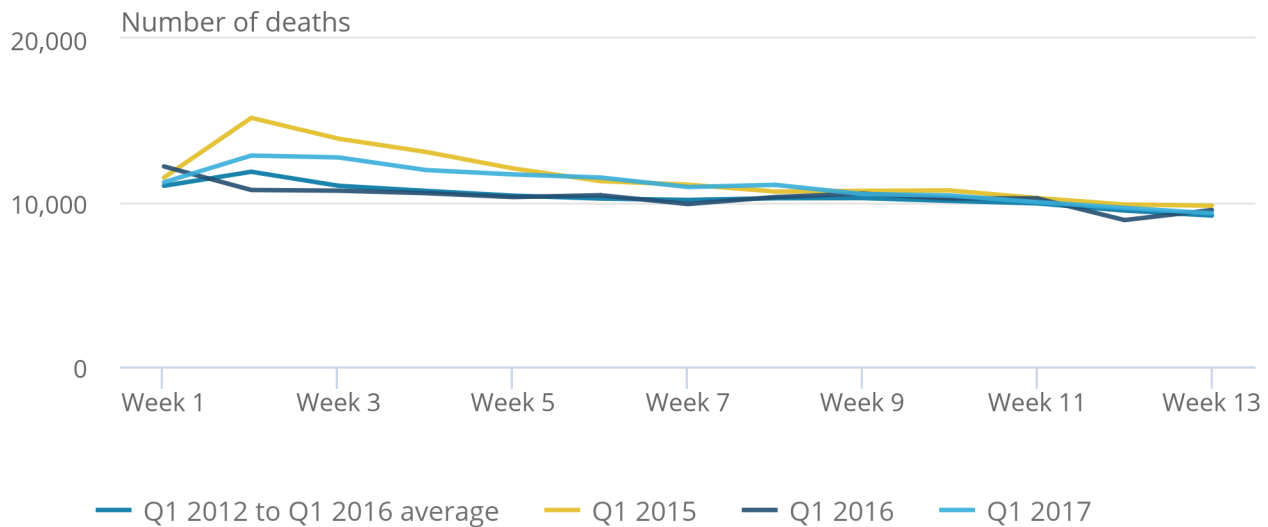
3. Q1 refers to Quarter 1 (Jan to Mar).

Figure 3b represents weekly death registrations and offers a comparative measure of what the data may look like once all late and delayed registrations are received. Quarter 1 2017 is observed to be somewhat higher than the 5-year average during the quarter.

Figure 3b: Weekly death registrations[1,2]

England, Quarter 1 (Jan to Mar) 2015 to Quarter 1 2017 and Quarter 1 2012 to Quarter 1 2016 average

Figure 3b: Weekly death registrations^1,2^

England, Quarter 1 (Jan to Mar) 2015 to Quarter 1 2017 and Quarter 1 2012 to Quarter 1 2016 average

Number of deaths

— Q1 2012 to Q1 2016 average   — Q1 2015   — Q1 2016   — Q1 2017

Source: Office for National Statistics

Notes:

1. Data for 2016 and 2017 are provisional.

2. Q1 refers to Quarter 1 (Jan to Mar).

6 . Background information

Deaths data sources

A provisional extract of death occurrences in Quarter 1 (Jan to Mar) 2017 was created on 28 April 2017, roughly 4 weeks after the end of the reporting period. For this reason, we would expect deaths to increase where any late registrations will not have been accounted for. Data for 2016 and 2017 reported here are provisional. Data for years prior to 2016 are final.

Registration delays on occurrences

In England and Wales, deaths should be registered within 5 days of the death occurring, but there are some circumstances which result in the registration of the death being delayed. Deaths considered unexpected, accidental or suspicious will be referred to a coroner who may order a post mortem or carry out a full inquest to ascertain the reasons for the death. The coroner can only register the death once any investigation is concluded and they are satisfied that the death was natural and that the cause of death has been certified correctly. If the coroner is not satisfied that the death was from natural causes then an inquest will normally be held to determine the cause of death. The time taken to investigate the circumstances of the death can often result in a death registration exceeding the 5-day grace period and these are defined as registration delays. While delays are commonly only a few days, registration delays can extend into years, particularly for deaths from external causes where inquests are held. We are only aware of a death and able to include it in the statistics once it has been registered.

Those at younger ages are disproportionally affected by registration delays due to external causes of death being more common in these ages. However, in general, deaths at such ages are not very common and make up only a small percentage of all deaths.

We have estimated that we have so far captured around 95% of the deaths that occurred in Quarter 1 2017. To do this we took the final data for each year from 2012 to 2015, and provisional data for 2016 extracted on 28 April 2017, and calculated the proportion of deaths that were registered by a similar 4-week cut-off date.

This report is based upon death occurrences rather than death registrations (apart from the last section of Table 1 and Figure 3b). This means that data are analysed based on when a death occurred rather than when a death was registered. As previously stated, the occurrences dataset will not hold all deaths in Quarter 1 2017 due to late registrations.

We can use complete datasets from previous years to estimate how many of the final number of death occurrences would be captured if an extract was taken on a similar extraction date.

For Quarter 1 2014, out of 120,196 deaths, 114,821 were captured by 28 April – that is 95.5% – and for 2015, out of 143,063 deaths, 136,256 were captured by 28 April, that is 95.2%. Based on these figures we estimate that we have captured approximately 95% of deaths that occurred in Quarter 1 2017.

The proportion captured varies greatly by age group. Those at the oldest ages have a high proportion of deaths captured (around 97%) whereas those in the age groups 15 to 19 up to 35 to 39 have fewer than 70% of deaths captured. This is likely related to the high proportion of these deaths from causes that would be referred to a coroner, delaying registration. However, it's important to note that deaths at these younger ages account for only a small proportion of all deaths that occur within a year.

Quarterly population denominators

We publish the mid-year population estimates used for calculating rates. For 2016 and 2017, the 2014-based ONS population projections were used. Care should be taken when using the 2014-based population projections as they will not take into account the high number of deaths in 2015; the mid-year population estimates for 2016 will be published in June 2017.

For single year of age populations at older ages, we used the Mid-year population estimates of the very old publication, and for 2001 we used Population Estimates for ages 90 and over.

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 mid-point of the quarter using 2 year's worth of population estimates or projections. This is then multiplied by the proportion of the number of days within a quarter 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 morality rates. The method uses the following equation:

$$population = \left(population2016\left(i\right) + \left(\left(population2017\left(i\right) - population2016\left(i\right)\right) \times \left(\frac{m}{M}\right)\right)\right) \times \left(\frac{N}{M}\right)$$

Where m is the number of days from 1 July 2016 (the start of the mid-year for the population estimate) to the midpoint of the relevant quarter, inclusive, N is the number of days in Quarter 1 2017 and M is the number of days in 2017 and (i) is the age group.

This method is very similar to that used to calculate population denominators for Quarterly conception rates.

7 . Quality and methodology

The Mortality Quality and Methodology Information document contains important information on:

- the strengths and limitations of the data and how it compares with related data

- uses and users of the data

- how the output was created

- the quality of the output including the accuracy of the data

The User Guide to Mortality Statistics is also a useful resource when reporting mortality statistics.