



Public Health
England

Protecting and improving the nation's health

PHE heatwave mortality monitoring

Summer 2017

About Public Health England

Public Health England exists to protect and improve the nation's health and wellbeing, and reduce health inequalities. We do this through world-leading science, knowledge and intelligence, advocacy, partnerships and the delivery of specialist public health services. We are an executive agency of the Department of Health and Social Care, and a distinct delivery organisation with operational autonomy. We provide government, local government, the NHS, Parliament, industry and the public with evidence-based professional, scientific and delivery expertise and support.

Public Health England
Wellington House
133-155 Waterloo Road
London SE1 8UG
Tel: 020 7654 8000
www.gov.uk/phe
Twitter: [@PHE_uk](https://twitter.com/PHE_uk)
Facebook: www.facebook.com/PublicHealthEngland

For queries relating to this document, please contact: respscidcs@phe.gov.uk



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Executive summary

Heatwaves are predicted to increase in frequency and intensity as a result of climate change. The health impacts of these events can be significant, particularly for vulnerable populations when excess mortality can occur. England experienced 2 heatwaves during the summer 2017. This report summarises the excess deaths observed throughout the heatwaves of summer 2017.

The summer of 2017 saw 2 heatwave periods (1 Level-3 heatwave alert issued by the Met Office and 1 heatwave where the mean Central England Temperature (CET) was greater than 20°C). Excess daily mortality was estimated using baseline death registration data from the Office for National Statistics (ONS). The first heatwave occurred from 16 June to 23 June 2017, when there were an estimated 598 deaths observed above baseline in the 65+ year olds. The second heatwave occurred from 05 July to 07 July 2017, when an estimated 180 excess deaths were observed above baseline in 65+ year olds. This resulted in a total estimate of 778 excess deaths over the summer 2017 period.

Estimated daily excess all-cause mortality by age group and region, England

A heatwave period for the purpose of excess death estimation was defined as previously described ([Green HK and others, 2016](#)):

- a) days on which there was a Met Office defined Level-3 heatwave alert or
- b) days with a mean Central England Temperature (CET) greater than 20°C and 1 day before and after the time period identified through a) and b)

Two heatwave periods were observed in summer 2017

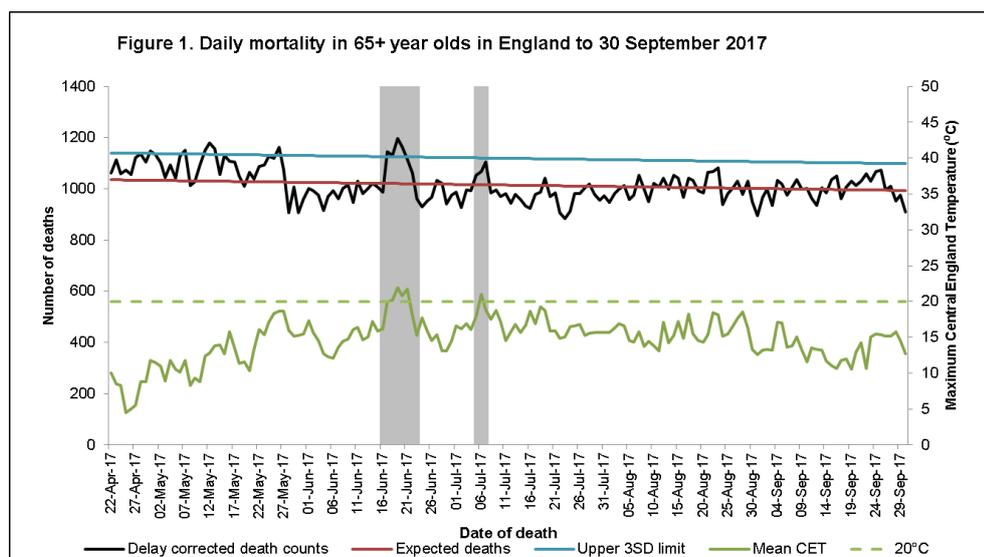
Deaths occurring from 22 April 2017 to 30 September 2017 were assessed using baseline death registrations as supplied by ONS from 22 April 2017 to 04 October 2017 (providing the daily expected deaths) and correcting observed deaths for delays to registration (delay corrected death counts). Daily age-group and region-specific all-cause excess mortality was determined using a linear regression model and calculated as the cumulative excess above baseline (expected deaths).

Overall and by age group

Figure 1 shows the data for all 65+ year olds in England along with the daily mean CET (data provided by the Met Office).

During the first heatwave (17 June to 23 June 2017), a cumulative total of 598 (405 to 791, 95% confidence interval (CI)) excess deaths were observed above the baseline for all-cause mortality in the 65+ year olds in England. Peak temperatures were seen on 19 and 21 June 2017 and excess deaths were observed 18-22 June 2017.

During the second heatwave (05 July to 07 July 2017), a cumulative total of 180 (62 to 298, 95% CI) excess deaths were observed above the baseline for all-cause mortality in the 65+ year olds in England. Peak temperatures were seen on 06 July 2017 and excess deaths were observed on all days.



*Heatwave days are highlighted in grey

By region

Table 1 summarises the number of excess deaths more than expected in the 0-64 and 65+ year olds, observed at regional level during both heatwaves.

Note: Table 1 contains cumulative corrected deaths

Table 1. Excess deaths detected by region in England during the summer 2018 heatwaves in the 0-64 and 65+ year olds

| Region | Excess number of deaths by age group (95% confidence interval) | | | |
|--------------------------|--|-------------------------|-------------------------------|------------------------|
| | Heatwave 1 (16 to 23 June) | | Heatwave 2 (05 to 07 July) | |
| | 0-64 year olds | 65+ year olds | 0-64 year olds | 65+ year olds |
| North East | -6 (-27 to 15) | -29 (-74 to 16) | -6 (-19 to 7) | -7 (-35 to 21) |
| North West | 18 (-15 to 51) | 28 (-45 to 101) | -2 (-22 to 18) | 34 (-11 to 79) |
| Yorkshire and the Humber | 12 (-16 to 40) | -17 (-77 to 43) | 13 (-4 to 30) | 7 (-29 to 43) |
| East Midlands | 5 (-19 to 29) | 70 (13 to 127) | 5 (-10 to 20) | 23 (-12 to 58) |
| West Midlands | -1 (-29 to 27) | 99 (34 to 164) | 8 (-9 to 25) | 35 (-5 to 75) |
| East of England | 19 (-8 to 46) | 77 (-3 to 157) | 9 (-7 to 25) | 11 (-38 to 60) |
| London | 10 (-25 to 45) | 80 (23 to 137) | -1 (-22 to 20) | 15 (-20 to 50) |
| South East | 2 (-31 to 35) | 184 (104 to 264) | 0 (-20 to 20) | 46 (-3 to 95) |
| South West | 10 (-15 to 35) | 108 (37 to 179) | 16 (1 to 31) | 16 (-27 to 59) |
| England | 68 (-18 to 154) | 598 (405 to 791) | 42 (-11 to 95) | 180 (62 to 298) |

*Statistically significant values are marked in bold

Conclusions

England observed 2 heatwave periods in 2017, with significant excess mortality impact in the 65+ year olds observed at a national level during both heatwaves and at a regional level in the East Midlands, West Midlands, London, South East and South West during the first heatwave only. Significant excess mortality was seen in the 0-64 year olds at a regional level only in the South West during heatwave 2 but not at a national level. The impact on mortality of 778 deaths in 2017 was less than seen in 2016 (908 deaths), 2006 (2,323 deaths) and 2003 (2,234 deaths). The UK has had a heatwave plan since 2004, the importance of which continues to be highlighted year on year.