



Public Health
England

Protecting and improving the nation's health

PHE Heatwave Mortality Monitoring

Summer 2016

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.

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Published June 2018
PHE publications
gateway number: 2018160

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Sustainable Development Goals



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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 several heatwaves in the summer 2016. This report summarises the excess deaths observed throughout the heatwaves of summer 2016.

The summer of 2016 saw 3 Level 3 heatwave alerts issued by the Met Office. Excess daily mortality was estimated using baseline death registration data from the Office for National Statistics (ONS). The first heatwave occurred from 18 July to 22 July 2016, where there were an estimated 612 excess deaths observed above baseline in the 65+ year olds. The second heatwave occurred between 22 August to 26 August 2016, where there were an estimated 296 excess deaths observed above baseline amongst 65+ year olds. The third and final heatwave of the summer 2016 occurred between 12 September and 17 September 2016, where there were no significant excess deaths observed. This resulted in a total estimate of 908 excess deaths over the summer 2016 period.

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

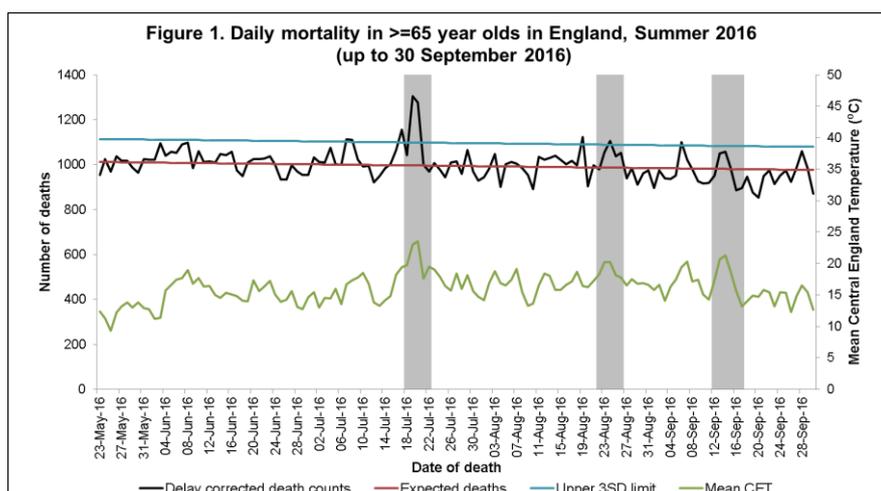
Deaths occurring from 24 May 2016 to 30 September 2016 were assessed using baseline registrations as supplied by ONS from 24 May 2016 to 1 July 2017 (providing the daily expected deaths) and correcting observed deaths for delays to registration (delay corrected death counts). A significant daily excess occurs when the number of corrected death counts exceeds the upper 3SD limit. Daily age-group and region-specific all-cause excess mortality was determined using a linear regression model and calculated as the excess above baseline in the days where the 3SD limit was breached.

A heatwave period for the purpose of excess death estimation was defined as previously described (*Green HK et al, 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
 - o one day before or after the time period identified through a) and b)

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 Level 3 heatwave (18 July to 22 July 2016), a cumulative total of 612 (463 to 761, 95% confidence interval (CI)) excess deaths were observed above the baseline for all-cause mortality in the 65+ year olds in England. Peak temperatures and excess deaths were seen on 19 July 2016.
- During the second Level 3 heatwave (22 August to 26 August 2016), a cumulative total of 296 (147 to 455, 95% CI) excess deaths were observed above the baseline for all-cause mortality in the 65+ year olds in England. Peak temperatures and excess deaths were seen on 24 August 2016.
- During the third Level 3 heatwave (12 to 17 September 2016), no cumulative excess deaths were observed in the 0 to 64 years or the 65+ year olds. Peak temperatures were seen on 15 September 2016.



*Heatwave days are highlighted in grey

By region

- Table 1 summarises the number of significant excess deaths in the 0 to 64 and 65+ year olds, observed at regional level during all 3 heatwaves.
- *Note:* Table 1 contains only statistically significant excess deaths therefore the numbers will not add up to the totals mentioned above.

Table 1. Excess deaths detected by region in England during the summer 2016 heatwaves in the 0 to 64 and 65+ year olds

Region	Excess number of deaths by age group (95% confidence interval)					
	Heatwave 1 (19 to 21 July)		Heatwave 2 (23 to 25 August)		Heatwave 3 (14 to 16 September)	
	0-64 year olds	65+ year olds	0-64 year olds	65+ year olds	0-64 year olds	65+ year olds
North East	x	37 (1 to 73)	x	x	x	x
North West	x	112 (56 to 168)	x	x	x	x
Yorkshire and the Humber	x	68 (20 to 116)	x	x	x	x
West Midlands	x	x	x	x	x	x
East Midlands	x	x	x	60 (18 to 102)	x	x
East of England	x	x	x	x	x	x
London	x	76 (33 to 119)	x	62 (19 to 105)	x	x
South East	x	115 (53 to 177)	x	106 (44 to 168)	x	x
South West	x	83 (29 to 137)	x	x	x	x

Conclusions

England observed 3 heatwave periods in 2016, with significant excess mortality impact in the >65 year olds decreasing in size and geographical extent with each heatwave across the summer. No significant impact was seen in the <65 year olds and the impact on mortality of 908 excess deaths was less than seen in 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.