



Public Health
England

Protecting and improving the nation's health

PHE heatwave mortality monitoring

Summer 2019

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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 heatwave periods in the summer 2019. This report summarises the excess deaths observed throughout the heatwaves of summer 2019.

The summer of 2019 saw 3 heatwaves (2 Level-3 heatwave alerts issued by the Met Office and one heatwave defined from the mean Central England Temperature (CET), when 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 28 June to 30 June 2019 where there was no significant excess mortality observed. The second heatwave occurred from 21 July to 28 July 2019 when an estimated 572 excess deaths were observed above baseline in 65+ year olds. The third and final heatwave of the summer 2019 occurred between 23 August to 29 August 2019, where there were an estimated 320 excess deaths observed above baseline in the 65+ year olds. This resulted in a total estimate of 892 excess deaths over the summer 2019 period. Heatwaves continue to result in significant health impact, The UK has had a [heatwave plan](#) since 2004, the importance of which remains.

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

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

- days on which there was a Met Office defined Level-3 heatwave alert
- days with a mean CET greater than 20°C and
- one day before and after the time period identified through the 2 points above

Three heatwave periods were observed during summer 2019

Deaths occurring from 3 May 2019 to 12 September 2019 were assessed using baseline registrations as supplied by ONS from 3 May 2019 to 17 September 2019 (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).

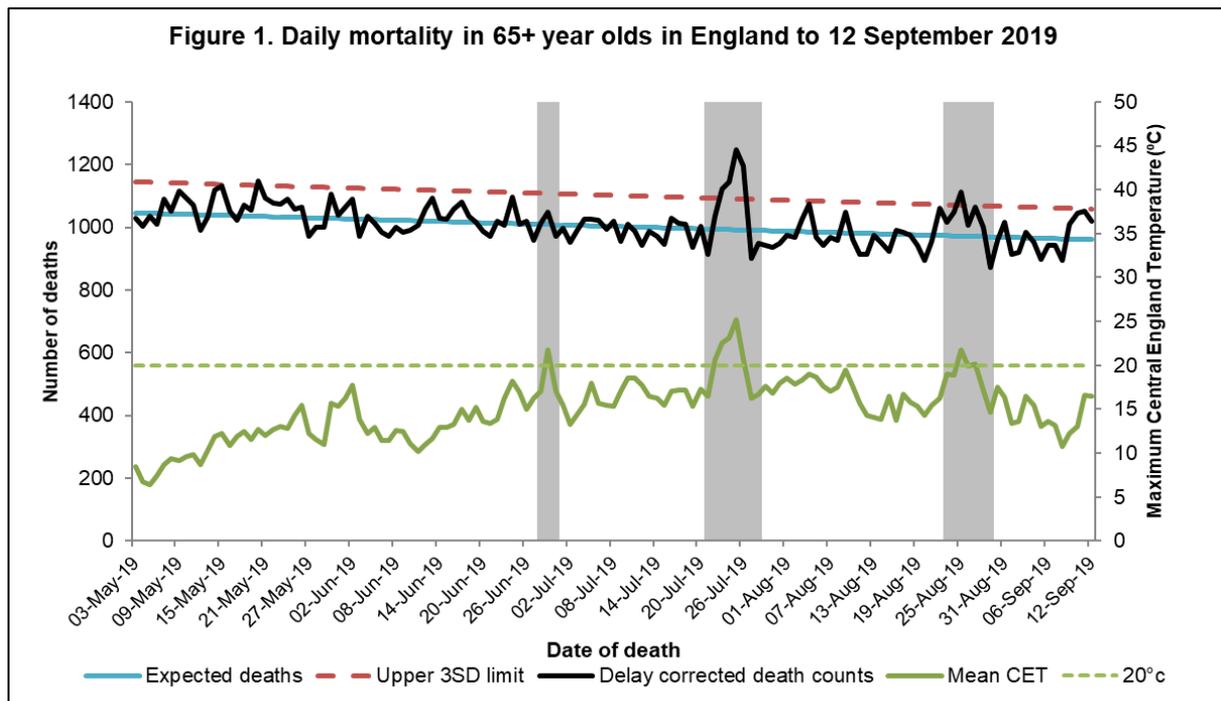
Overall and by age group

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 (28 June to 30 June 2019), no cumulative excess deaths were observed in the 0 to 64 years or the 65+ year old's in England. Peak temperatures were seen 29 June 2019.

During the second heatwave (21 July to 28 July 2019), a cumulative total of 572 (390 to 754 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 25 July 2019 and significant excess deaths were observed on 22 to 26 July 2019.

During the third heatwave (23 August to 29 August 2019), a cumulative total of 320 (150 to 490 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 25 August 2019 and significant excess deaths were seen on 23 to 28 August 2019.



*heatwave days are highlighted in grey

By region

Table 1 summarises the number of excess deaths more than expected in the 0 to 64 and 65+ year olds, observed at regional level during all 3 heatwaves.

Note: Table 1 contains cumulative corrected deaths

Table 1. Excess deaths detected by region in England during the summer 2019 heatwaves in the 0 to 64 and 65+ years old

Region	Excess number of deaths by age group (95% confidence interval)					
	Heatwave 1 (28 to 30 June)		Heatwave 2 (21 to 28 July)		Heatwave 3 (23 to 29 August)	
	0 to 64-year olds	65+ year olds	0 to 64-year olds	65+ year olds	0 to 64-year olds	65+ year olds
North East	-2 (-14 to 10)	-14 (-41 to 13)	17 (-3 to 37)	49 (5 to 93)	7 (-18 to 32)	35 (-28 to 98)
North West	-18 (-36 to 0)	-4 (-45 to 37)	-38 (-68 to -8)	3 (-63 to 69)	17 (-5 to 39)	105 (38 to 172)
Yorkshire and the Humber	-7 (-22 to 8)	-19 (-55 to 17)	-1 (-26 to 24)	90 (31 to 149)	18 (-5 to 41)	80 (24 to 136)
West Midlands	17 (1 to 33)	-20 (-56 to 16)	0 (-27 to 27)	26 (-34 to 86)	-4 (-29 to 21)	-15 (-71 to 41)
East Midlands	-3 (-19 to 13)	31 (-17 to 79)	3 (-24 to 30)	92 (13 to 171)	7 (-18 to 32)	-12 (-86 to 62)
East of England	1 (-14 to 16)	-11 (-46 to 24)	-28 (-52 to -4)	116 (60 to 172)	17 (-5 to 39)	88 (35 to 141)
London	5 (-13 to 23)	10 (-24 to 44)	-3 (-33 to 27)	74 (18 to 130)	41 (13 to 69)	108 (56 to 160)
South East	11 (-8 to 30)	22 (-22 to 66)	-24 (-55 to 7)	137 (65 to 209)	-10 (-39 to 19)	105 (38 to 172)
South West	9 (-7 to 25)	9 (-30 to 48)	-2 (-28 to 24)	-15 (-79 to 49)	0 (-24 to 24)	-94 (-154 to -34)
England	12 (-37 to 61)	4 (-107 to 115)	-76 (-156 to 4)	572 (390 to 754)	41 (-34 to 116)	320 (150 to 490)

* Statistically significant values are marked in bold

Conclusions

England observed 3 heatwave periods in 2019, with significant excess mortality impact in the 65+ year olds observed at both a national level and at a regional level during the second and third heatwaves. Significant excess was observed in the North East and East Midlands regions during heatwave 2, in the North West region during heatwave 3 and in Yorkshire and the Humber, East of England, London and South East regions during heatwaves 2 and 3. Significant excess mortality was seen in the 0 to 64-year olds at a regional level only, in the West Midlands during heatwave 1 and in London during heatwave 3.

The impact on mortality of 892 excess deaths was more than seen in recent years 2018 (863 deaths) and 2017 (778 deaths), but less than what was 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.