Public Health England

Protecting and improving the nation's health

PHE heatwave mortality monitoring

Summer 2018

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Published January 2019
PHE publications
gateway number: GW-85

PHE supports the UN
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 heatwave periods in the summer 2018. This report summarises the excess deaths observed throughout the heatwaves of summer 2018.

The summer of 2018 saw 4 heatwaves (3 Level-3 heatwave alerts 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 25 June to 27June 2018 when there were an estimated 188 excess deaths observed above baseline in the 65+ year olds. The second heatwave occurred from 30 June to 10 July 2018 when an estimated 266 excess deaths observed above baseline in 65+ year olds. The third heatwave occurred from 21 July to 29 July 2018, where there were an estimated 409 excess deaths observed above baseline in the 65+ year olds. The fourth and final heatwave of the summer 2018 occurred between 01 August to 09 August 2018, where there were no significant excess deaths observed.This resulted in a total estimate of 863 excess deaths over the summer 2018 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 CET greater than 20°C and
1 day before and after the time period identified through a) and b)

Four heatwave periods were observed during summer 2018

Deaths occurring from 01 May 2018 to 30 September 2018 were assessed using baseline registrations as supplied by ONS from 01 May 2018 to 04 October 2018 (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

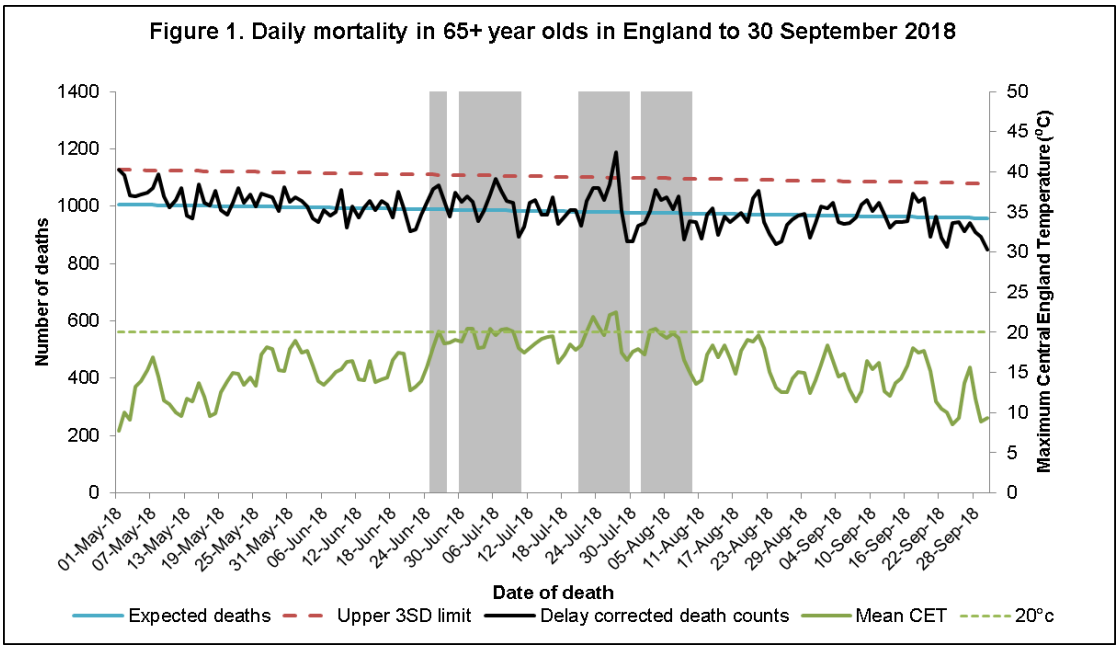
Figure 1 shows the data for all 65+ year olds in England along with the daily mean CET (data provided by the Met Office).

During the first heatwave (25 June to 27 June 2018), a cumulative total of 188 (51 to 325 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 26 June 2018 and excess deaths were observed on all days.

During the second heatwave (30 June to 10 July 2018), a cumulative total of 266 (4 to 528 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 01 to 02, 05 and 08 July 2018 and excess deaths were observed on 30 June-02 July and 05-09 July 2018.

During the third heatwave (21 July to 29 July 2018), a cumulative total of 409 (172 to 646 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 27July 2018 and excess deaths were seen on 22 to 28 July 2018.

During the fourth heatwave (02 August to 09 August 2018), no cumulative excess deaths were observed in the 0-64 years or the 65+ year olds overall in England. Peak temperatures were seen on 03 August 2018.



*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 all 4 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 (25 June to 27 June)		Heatwave 2 (30 June to 10 July)		Heatwave 3 (21 to 29 July)		Heatwave 4 (01 to 09 August)	
	0-64 year olds	65+ year olds	0-64 year olds	65+ year olds	0-64 year olds	65+ year olds	0-64 year olds	65+ year olds
North East	-3 (-15 to 9)	25 (-4 to 54)	6 (-18 to 30)	2 (-54 to 58)	**21 (0 to 42)**	13 (-37 to 63)	19 (-2 to 40)	-33 (-83 to 17)
North West	-2 (-22 to 18)	36 (-11 to 83)	32 (-6 to 70)	30 (-60 to 120)	-5 (-40 to 30)	-33 (-115 to 49)	-6 (-41 to 29)	-51 (-133 to 31)
Yorkshire and the Humber	3 (-14 to 20)	18 (-22 to 58)	9 (-23 to 41)	-21 (-97 to 55)	1 (-28 to 30)	18 (-4 to 40)	3 (-26 to 32)	10 (-59 to 79)
East Midlands	4 (-11 to 19)	27 (-13 to 67)	17 (-12 to 46)	-30 (-106 to 46)	11 (-15 to 37)	52 (-17 to 121)	12 (-14 to 38)	6 (-63 to 75)
West Midlands	2 (-15 to 19)	**51 (5 to 97)**	1 (-32 to 34)	47 (-41 to 135)	-12 (-42 to 18)	14 (-65 to 93)	-5 (-35 to 25)	-3 (-82 to 76)
East of England	14 (-3 to 31)	-19 (-68 to 30)	-21 (-53 to 11)	-29 (-122 to 64)	11 (-18 to 40)	67 (-16 to 150)	9 (-20 to 38)	60 (-22 to 142)
London	-10 (-28 to 8)	8 (-32 to 48)	9 (-26 to 44)	**128 (51 to 205)**	30 (-2 to 62)	**165 (95 to 235)**	10 (-22 to 42)	**128 (58 to 198)**
South East	-1 (-34 to 32)	25 (-31 to 81)	11 (-51 to 73)	107 (-1 to 215)	-15 (-71 to 41)	86 (-11 to 183)	2 (-54 to 58)	9 (-88 to 106)
South West	14 (-2 to 30)	17 (-28 to 62)	7 (-23 to 37)	32 (-54 to 118)	2 (-25 to 29)	26 (-51 to 103)	19 (-8 to 46)	-22 (-99 to 55)
England	22 (-35 to 79)	**188 (51 to 325)**	71 (-39 to 181)	**266 (4 to 528)**	46 (-53 to 145)	**409 (172 to 646)**	61 (-38 to 160)	104 (-133 to 341)

* Statistically significant values are marked in bold

Conclusions

England observed 4 heatwave periods in 2018, with significant excess mortality impact in the 65+ year olds observed at a national level during the first 3 heatwaves only and at a regional level during all 4 heatwaves with significant excess observed in the West Midlands during heatwave 1 and in London during heatwaves 2, 3 and 4. Significant excess mortality was seen in the 0-64 year olds at a regional level in the North East during heatwave 3 but not at a national level. The impact on mortality of 863 excess deaths was more than seen in 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.