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NHS Underwater

Analysis of increasing flooding events in the NHS and its impact on patients.

By Jack Jeffrey

About Round Our Way



Keeping the people and places we love safe.

Round Our Way is a new group for working and lower-middle class people who are increasingly worried about climate change but feel our voices are missing from the debate.

We use research and personal stories to get more attention paid to the impact climate change is having on our lives, from rising food prices to more of our homes being flooded. We make sure our worries can't be ignored and work to get our voices put at the heart of decision-making.

Round Our Way was founded by Roger Harding. After being raised by a single mum in a council house, Roger has gone on to have a career fighting for people not to have to struggle as his family did. For several years he was a director at the homeless and housing charity Shelter, successfully pushing for more affordable homes to be built and creating stronger protections for families facing eviction and repossession. Before leaving to create Round Our Way, Roger was Chief Executive of RECLAIM, the Greater Manchester-based working class youth charity. He serves as Vice Chair of Victim Support.

About this report

This report was written for Round Our Way by Jack Jeffrey, with input from Roger Harding. We are grateful to all the health professionals who have fed into this work and commented on its findings.



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Executive summary

This report brings together and analyses various studies examining the impact of flooding on the National Health Service (NHS) in England. Climate change is generating more extreme weather, which makes instances of flooding increasingly numerous and severe in the UK. This research looks at this growing risk to the NHS, the people who work in it and the people who rely on its services.

Our analysis highlights:

- The NHS is already under considerable pressure and this is being made worse by increases in extreme weather which both cause ill health and impact NHS sites.
- In particular, flooding is already impacting a significant number of NHS sites and this is very likely to increase as climate change produces more extreme weather.
- Between April 2021 and March 2022 there were 176 instances of flooding at NHS sites, which predominantly impacted General Acute Hospitals.
- Trusts in the East of England and London were the worst affected, with Mid and South Essex NHS Foundation Trust, The Princess Alexandra Hospital NHS Trust, and Barnet, Enfield and Haringey Mental Health NHS Trust, incurring the most instances of flooding.
- More NHS sites are at significant risk of flooding. According to the most recent UK Climate Risk Assessment, 10% of hospitals in the UK are at risk from flooding, with the risk increasing in the future if climate change worsens.
- This issue requires greater government attention to both manage this increasing risk to the NHS and tackle the climate change that is making flooding more likely.



Context: the increasing likelihood and cost of flooding

Flooding is increasing due to climate change

While the UK has always been prone to floods, the hazard is increasing in both frequency and intensity due to the impact of climate change, with serious consequences both now and in the future.

The latest State of the UK Climate report indicates that the UK has become wetter over the last two decades. The period 2012-2021 was on average 10% wetter than 1961-1990. UK winters have especially been affected, with total rainfall increasing by 26% in the same period.¹ This is set to continue, with days of intense and prolonged heavy rainfall predicted to increase in the future.²

According to research by Oxford University and the Royal Meteorological Institute, climate change will mean that flooding events, such as Storm Desmond in 2015, are roughly 40% more likely in the future.³ Many other attribution studies have found that the probability of flooding or the corresponding precipitation event was enhanced by climate change.⁴

Flooding is devastating for people's health and finances

Flooding causes considerable hardship for individuals and communities. Even with improvements and technological advances in flood defences and warning systems, flood damage currently costs the UK around £740 million each year.⁵

Damage caused by flooding is set to increase in the future. According to a recent paper, even if COP 26 and net-zero pledges are met, the annual average UK flood damage is predicted to increase, with some parts of the South East and North West of England set to experience a 25% rise in damages.⁶ If current net-zero promises aren't met, however, flood damages are estimated to be even more severe.

Flooding has, and will continue to have, substantial financial implications for England. But as the researchers of the paper put it "It's unfortunate that the quantifying impact often needs to be in pounds and dollars...Flooding can mean severe mental health implications, but it is harder to estimate these effects".⁷

While this report focuses on the impact flooding has directly had on the NHS, the impact on people's health is considerable, which in turn places further demands on the health service. The immediate dangers of flooding on physical health are obvious, however, in the UK the majority of impacts on health in England are associated with mental health. After the winter 2013-2014 UK floods, Public Health England established the English National Study of Flooding and Health to investigate the long-term impacts of flooding on mental health. It found that people who experience flooding were more likely to have symptoms of depression, anxiety and post-traumatic stress disorder (PTSD), even 2 years after the flood event.⁸ The study also found elevated symptoms of mental health disorders in those who lived in the vicinity of a flood event, and observed that loss of health and social care services was a significant stressor associated with this flood-related mental health burden.⁹



Flooding occurrences at NHS sites

According to the most recent UK Climate Risk Assessment, risk of flooding to infrastructure is one of the most severe climate hazards for the population.¹⁰ Essential services like health and social care, as well as other critical infrastructure, are exposed to this increasing risk.

This risk encompasses flooding from all sources, namely from rivers (fluvial), the sea (coastal), surface water (pluvial) and groundwater. However, surface water flooding has been shown to pose the greatest risk to health and social care assets.¹¹ This is where surface water accumulating from the result of intense rainfall overwhelms drainage systems and as a result excess water cannot be absorbed.

Data on flooding of NHS sites

The Estates Return Information Collection (ERIC) collects information from all NHS trusts relating to the costs of providing and maintaining the NHS Estate.

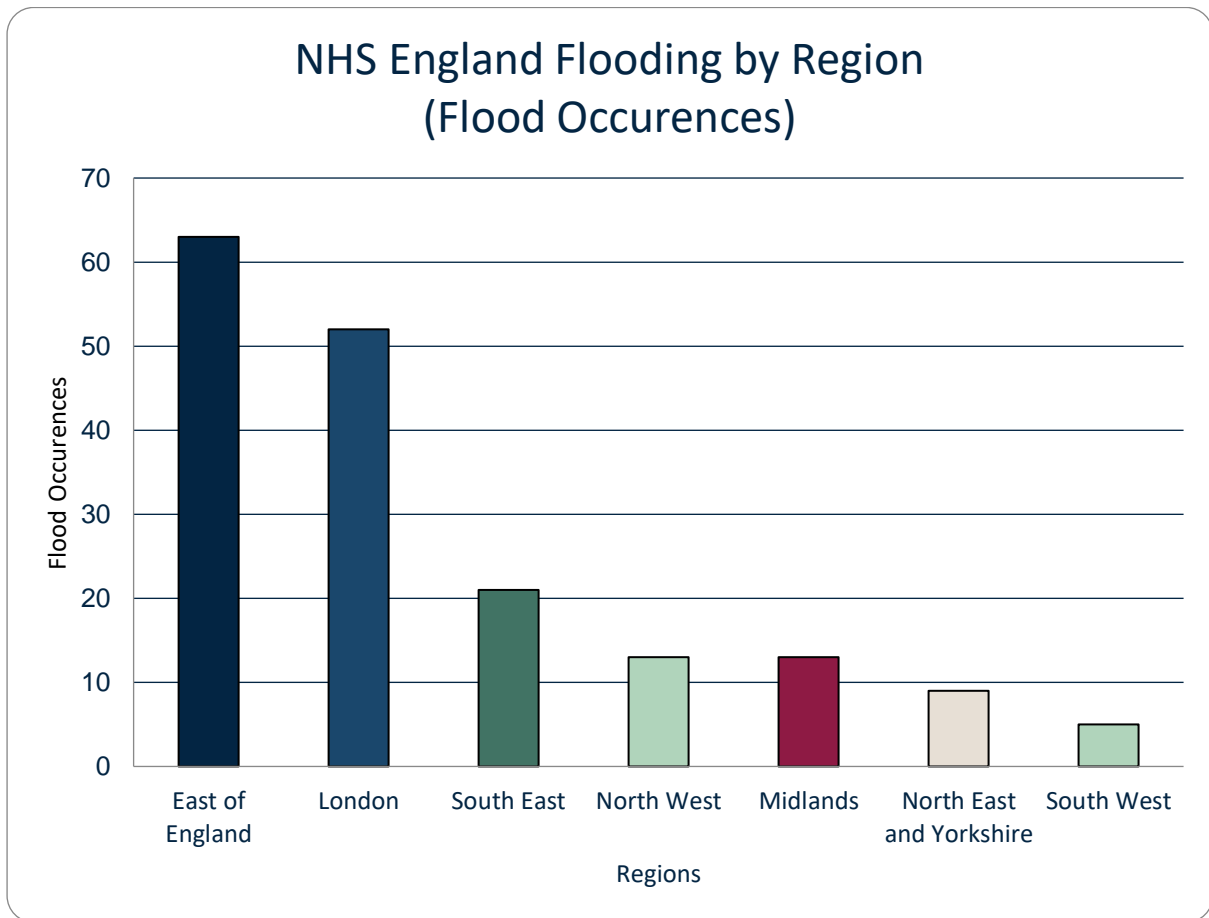
Before last year, NHS trusts were not required to collect data on flooding. However, following on from a commitment from NHS England to monitor and respond to extreme weather events, all NHS trusts now have to report on flooding occurrences - these are defined as instances where water has breached the boundary of a site and caused disruption - annually as part of ERIC.¹²

This new data reveals that in the year April 2021-March 2022 there were 176 incidents of flooding across NHS England sites.

Flooding of NHS sites by region

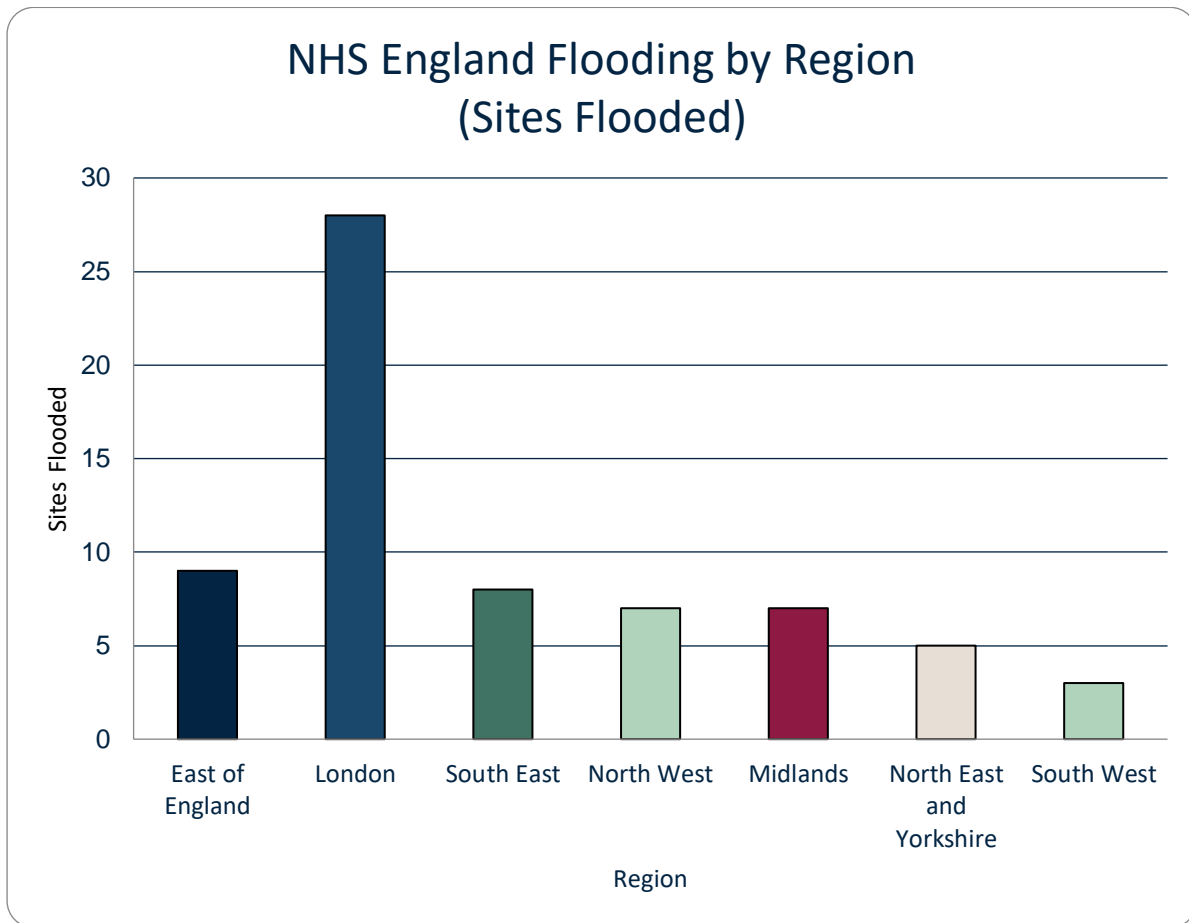
Analysis of this data by region shows that the worst affected regions were the East of England and London, with 63 and 52 instances of flooding, respectively.

By flood occurrences:



Source: Round Our Way analysis of ERIC data

By number of sites flooded:



Source: Round Our Way analysis of ERIC data

Top 10 NHS trusts impacted by flooding

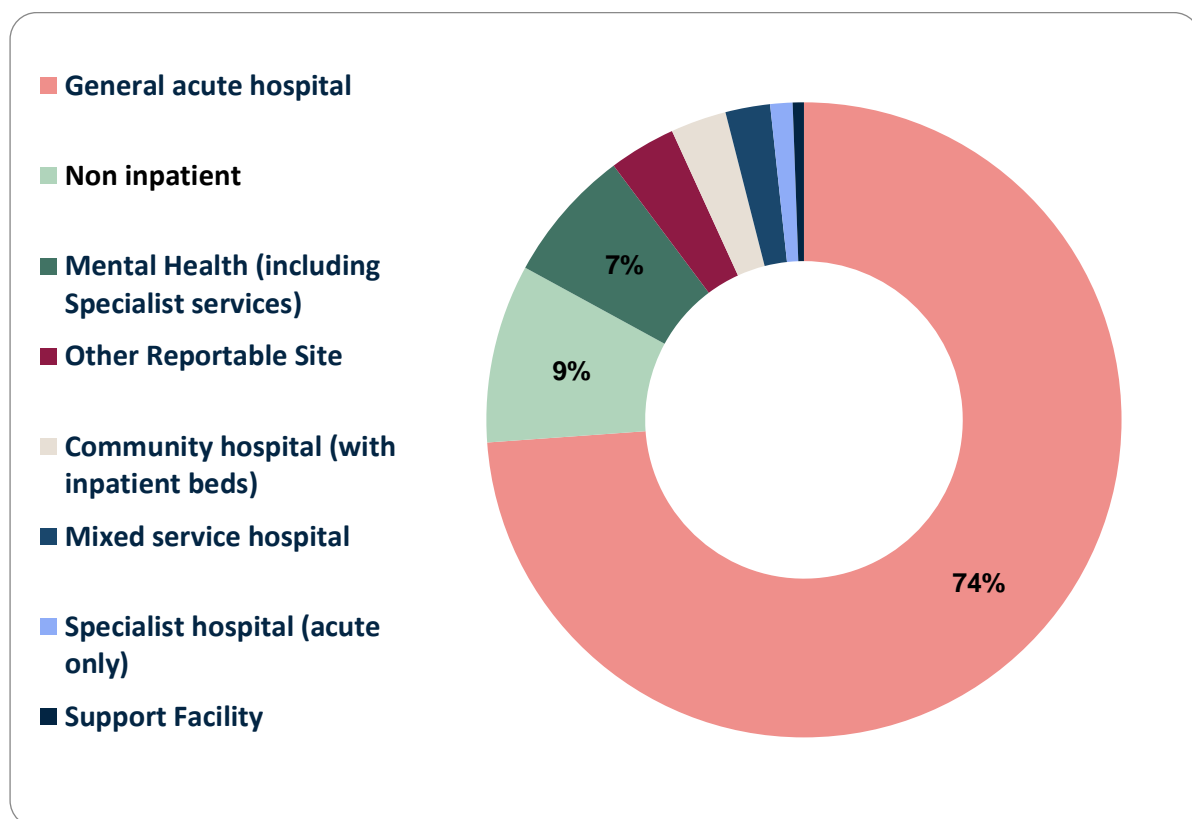
Our analysis of this data reveals the top 10 trusts with the most incidences of flooding in 2021-22. It highlights that Princess Alexandra Hospital in Harlow and Mid and South Essex (which operates across Essex), and Barnet, Enfield and Haringey Mental Health Trust and The Lewisham and Greenwich Trust in London are among the worst hit NHS trusts.

Rank	NHS England Trusts	Flooding Occurrences
1	Mid and South Essex NHS Foundation Trust (East of England)	30
2	The Princess Alexandra Hospital NHS Trust (East of England)	27
3	Barnet, Enfield and Haringey Mental Health NHS Trust (London)	14
4	The Lewisham and Greenwich NHS Trust (London)	9
5	King's College Hospital NHS Foundation Trust (London)	7
6	Lancashire Teaching Hospitals NHS Foundation Trust (North West)	7
7	Worcestershire Acute Hospitals NHS Trust (Midlands)	7
8	Hull University Teaching Hospitals NHS Trust (North East)	6
9	East Kent Hospitals University NHS Foundation Trust (South East)	5
10	Royal Berkshire NHS Foundation Trust (South East)	5

Source: Round Our Way analysis of ERIC data

Hospitals are most affected by this flooding

The NHS Digital data shows an overwhelming majority of flooding instances in 2021-2022 occurred at General Acute Hospitals – sites that provide inpatient medical care and other related services for surgery, acute medical conditions or injuries. Only 1% of flooding instances occurred at non-hospital sites ('Support Facilities') where patients are not treated or accommodated.



Source: Round Our Way analysis of ERIC data

The impact of flooding on the NHS

Whilst there is no overall assessment of the total impact of flooding on NHS services or financial costs, flood events have undoubtedly caused damage to healthcare infrastructure. Multiple examples show just how disruptive flooding instances can be both for staff and patients unable to access vital services.

A qualitative study assessing the impact on healthcare systems in Lincolnshire after the December 2013 weather events found that flooding caused considerable disruption to services.¹³ At a time of seasonal pressure, staff shortages were widely reported on top of difficulty accessing sites for both patients and staff. Elective surgeries and outpatient clinics were cancelled, family doctor appointments were rescheduled, home visits were delayed, a mental health unit was evacuated and a general hospital initiated plans for vertical evacuation (moving patients to a higher floor away from the area of danger) with clinicians triaging patients for evacuation. Additionally, there was an increased demand for mental health services after the flooding event.

Another comprehensive study of rainfall and ambulance response times showed that even low-magnitude floods can disrupt services, with more dramatic reductions in mandatory response timeframes in urban areas.¹⁴ Researchers also found that coverage to vulnerable facilities, like care homes, was also reduced under multiple flooding scenarios, noting that vulnerable groups such as the elderly, young people and people with poor health are disproportionately affected by natural disasters such as flooding.¹⁵

Knock-on effects of flooding to other critical infrastructure may also undermine the delivery of health and care services. For instance, power or IT outages can cause significant issues. In 2015, a flood caused a power cut to the Royal Berkshire hospital. The hospital had to close its accident and emergency department to all but life-threatening conditions.

Future flood risk at NHS sites

A significant portion of health and social care assets in England are at risk of flooding, and this risk is predicted to increase in the 2050s and 2080s. The dominant factor in driving up this future risk is climate change.¹⁶ The table below estimates the number of health and social care assets at ‘significant’ risk now and in the future under different combinations of climate change pathways and population scenarios:

		2050s				2080s			
Population Projection	Present	Low		High		Low		High	
Climate pathway (global warming reached in 2100)		2°	4°	2°	4°	2°	4°	2°	4°
England									
Emergency services	495	729	835	735	842	841	985	854	1001
GPs surgeries	2474	3662	4205	3690	4235	4243	5056	4299	5127
Hospitals	1055	1336	1451	1350	1466	1463	1617	1491	1649
Care homes	2187	3286	3864	3315	3879	3901	4745	3962	4823

Source: Sayers et al (2020), see references for details

At present, roughly 10% of UK hospitals are located in areas of significant flood risk. With a further 495 emergency services, 2,474 GP surgeries and 2,187 care homes at risk in England. Under both mild and more intense warming scenarios, the number of hospitals at risk is predicted to increase.



Furthermore, UK related climate projections predict wetter winters and drier summers, with an increase in the frequency and intensity of flooding.¹⁷ Flooding events will therefore be more likely to coincide with seasonal pressure on NHS services (the increase in demand for health and social care services seen in winter).

Overall, even under low warming scenarios the UK will be subject to a range of significant and costly impacts. The considerable scale of health care disruption caused by flooding should not be underestimated. This is in addition to the increased direct health impacts on people impacted by flooding, as well as increases in other weather extremes such as heatwaves.

This issue requires greater government attention to both manage this increasing risk to the NHS and tackle the climate change that is making flooding more likely.



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