

Explainer December 2018

# Snowed under: understanding the effects of winter on the NHS

Sarah Scobie

Winter is a challenging time for the health service. As we head into the colder months, this explainer unpacks what winter means for the NHS, in terms of its impact on health, demand for services, and how the NHS responds.

With the 2017/18 winter period having gone into the annals as [one of the most difficult ever](#) for the NHS, we also assess how this year is shaping up and look at whether there is any evidence to suggest that this year will be any better for patients.

## Key points

- Even moderately cold weather (an average temperature of 5–8°C) results in increased illness and higher death rates.
- Flu epidemics have a major impact when they occur, but there is significant variation from year to year in how many people and which groups are affected.
- Primary care deals with most of the increase in winter-related illness. Small changes in the ability of primary care teams to manage peaks in demand become amplified across the wider care system.

- The number of A&E attendances actually decreases in winter, but the proportion of people admitted increases.
- A higher proportion of patients with longer lengths of stay in winter means hospitals have less flexibility to manage demand.
- Given recent trends, we can expect the pressure on the NHS this winter to be similar to last year.
- Although A&E waiting times tend to grab the headlines, health systems should consider a broader range of factors when assessing winter pressures, from deaths related to cold temperatures and provision of services in the community through to the way acute medical patients are managed in hospital.

## Winter, health and the impact on the NHS

There are three key ways in which winter has an impact on health in this country: moderately cold weather, severe winter weather, and flu. Each of these issues has a different effect on the health service in terms of frequency and duration, who is affected, and which services need to respond.

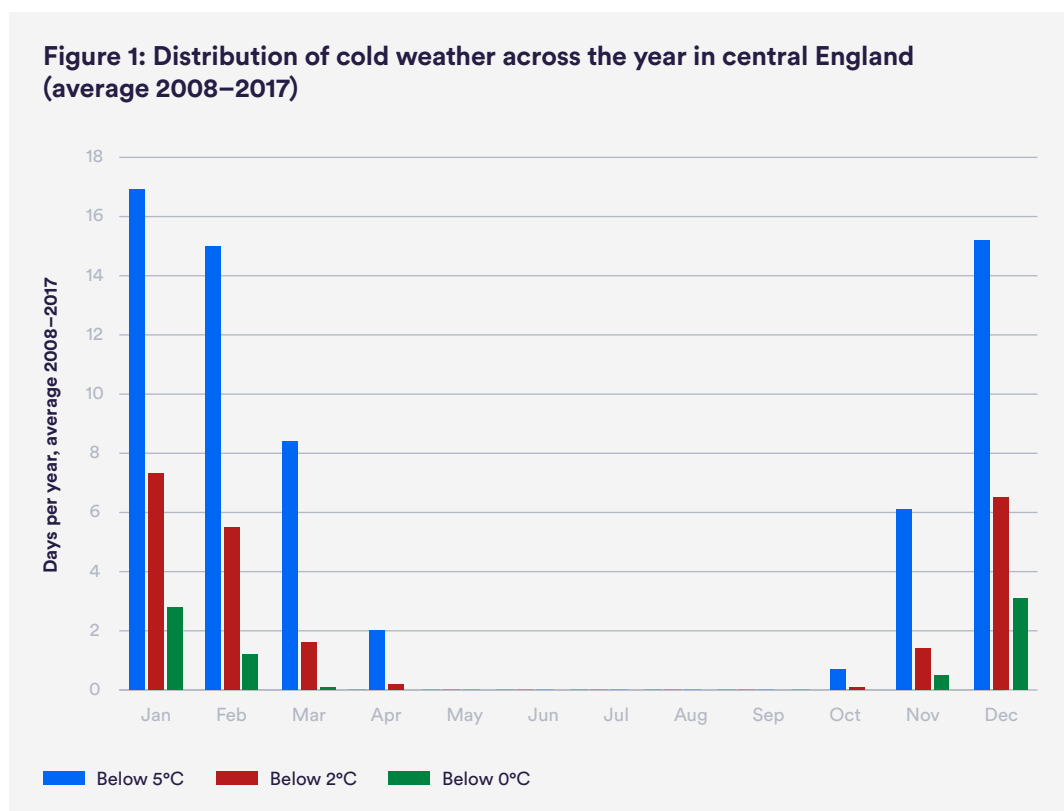
While it is a given that the outside temperature will drop in winter, the impact of cold weather on people's health is not restricted to the months of December to February, and the temperature does not need to get very cold either.

Moderately cold weather (when the average daily temperature falls below between 5–8°C) has a significant impact on people's [health](#). Each 1°C drop in average daily temperature below this level results in around 4% increase in death rates in England. On average, there are 64 days of moderately cold weather – where the mean daily temperature falls below 5°C – each year [in England](#). These days occur between October and April (see Figure 1).

Despite the significant effect of moderately cold weather on mortality rates, Public Health England only issues cold weather alerts when the average temperature [falls to 2°C](#), and [cold weather payments](#)<sup>1</sup> are only issued when

1 Cold weather payments are payments made from the Social Fund to some recipients of income support or credit during periods of very cold weather.

there are seven consecutive days below zero. On average, there are only 23 days a year when the mean temperature falls below 2°C and only 8 below zero.



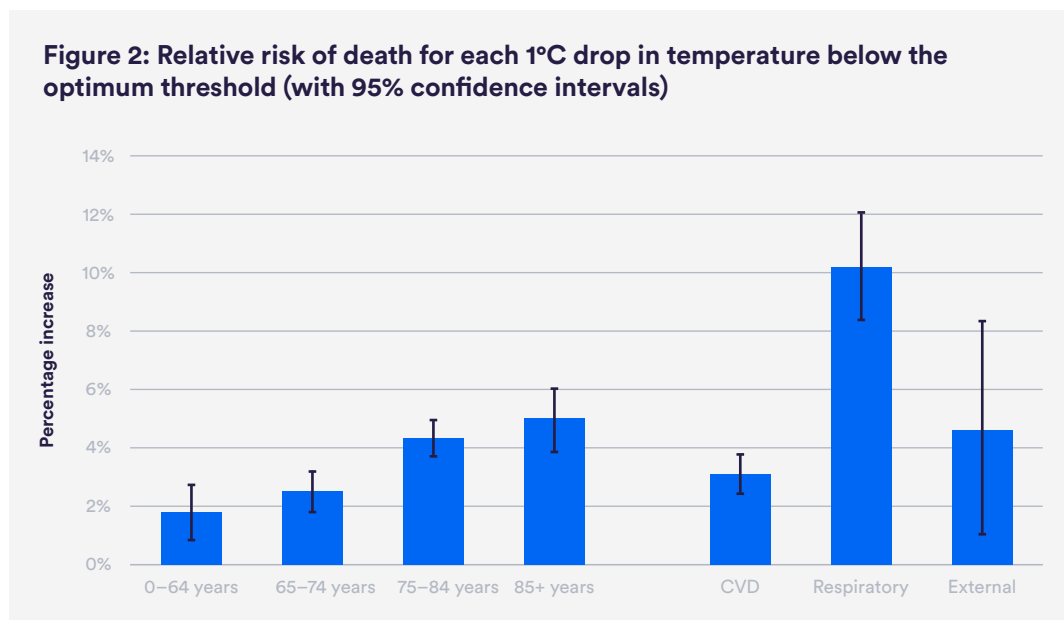
Source: Nuffield Trust analysis of [Met Office data](#) for central England

The main groups at increased risk of death during periods of moderately cold weather are older people and those with chronic respiratory conditions. People with heart disease and related illnesses are also affected, and we also include people suffering from injury, hypothermia and other external causes in this list.

Figure 2 shows the percentage increase in mortality for each 1°C drop in temperature below the optimum threshold for different age groups and by cause of death. For every 1°C drop in temperature, the risk of death from respiratory conditions increases by about 10%. The [most recent analysis](#) of cold-related mortality indicates that the effect has increased over time among people over 75, and those with a respiratory disease.

There is also wide geographical variation in the increase in deaths due to cold weather. The south and west of the country tend to have higher rates of

cold-related mortality than the north and east of England, despite the fact that average temperatures are higher in the south than the north. This could reflect differences in insulation of housing, or variability in temperature between summer and winter: there is strong [international evidence](#) that countries with colder winters tend to have lower winter related mortality than countries with warmer winters.



Source data: Chalabi and others (2015) Evaluation of the implementation and health-related impacts of the Cold Weather Plan for England 2012. [Final report](#), PIRU.

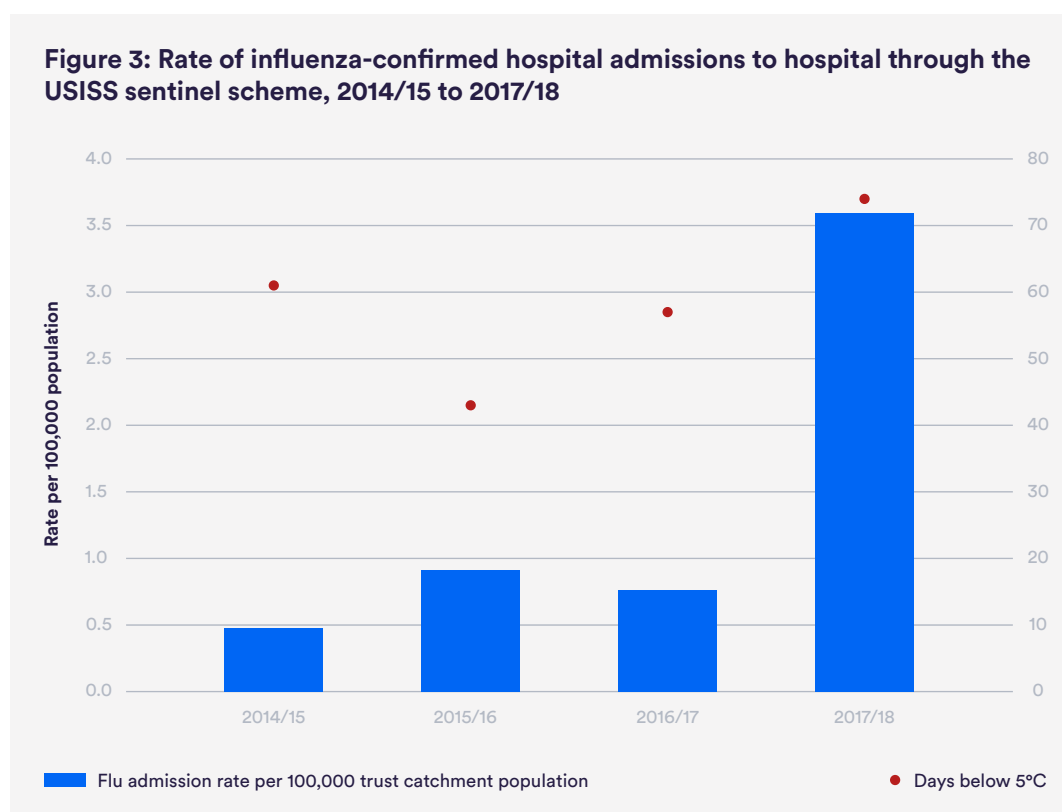
Moderately cold weather also causes [an increase in emergency hospital admissions](#) – although the effect is smaller than for mortality, with an increase of approximately 1% in admissions for each 1°C drop in temperature below the threshold. As with mortality, the impact is greatest for older people and for admissions for cardiovascular and respiratory illnesses.

Notably, though, admissions for injuries do not increase. A&E attendance rates are [lower in winter](#) than in summer, but in winter people are more likely to be [admitted](#). Respiratory illnesses account for a higher proportion of A&E attendances in winter than summer, accounting for up to [15% of all](#) attendances.

Perhaps predictably, severe winter weather – that is, freezing temperatures, ice and snow – also has an impact upon people’s health. However, in this case, the people [most affected](#) in very cold weather are those of working age:

attendances at A&E increase in these groups, with higher rates of fractures and accidental injuries. Conversely, A&E attendances and injuries fall among the older age group, as they tend to stay indoors during very bad weather. As shown in Figure 1, there are very few sub-zero-temperature days in England (an average of only eight per year), so the impact of these days is small relative to the effect of moderately cold days.

Finally, outbreaks of flu are much more common in winter, but occur independently of cooler outdoor temperatures. Flu outbreaks vary from year to year with regard to the strain of flu, how severe they are, and which patient groups are affected. Figure 3 shows the rate of hospital admissions for confirmed influenza between 2014/15 and 2017/18, showing the variation from year to year. The winter of 2017/18 was a particularly bad one for flu, causing a higher-than-usual [increase in deaths](#), particularly among older people.

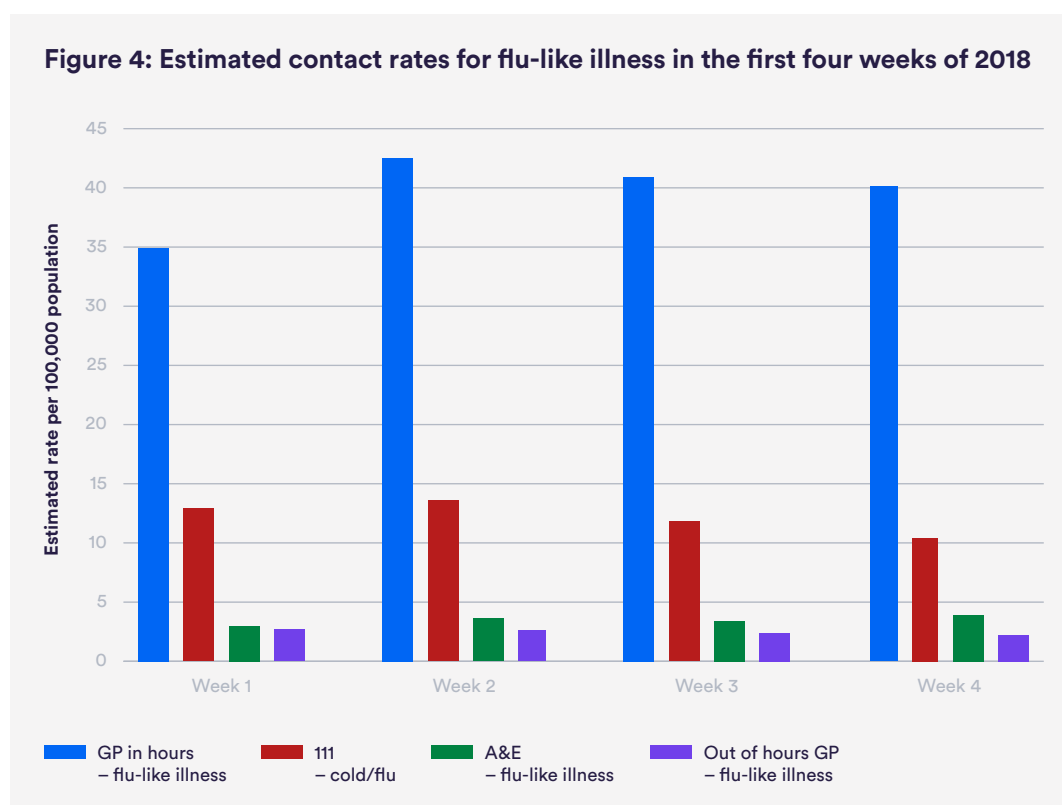


Source data: Public Health England, Surveillance of influenza and other respiratory viruses in the UK: [Winter 2017 to 2018](#), and [Winter 2016 to 2017](#).

Note: USISS stands for UK Severe Influenza Surveillance Schemes.

Outbreaks of flu result in increases in demand on primary care services, ambulance services, and the 111 service, as well as increases in emergency admissions, particularly for older people. Primary care services are the first point of contact for most people’s health needs, and as such deal with the majority of winter-related increases in illness, including flu.

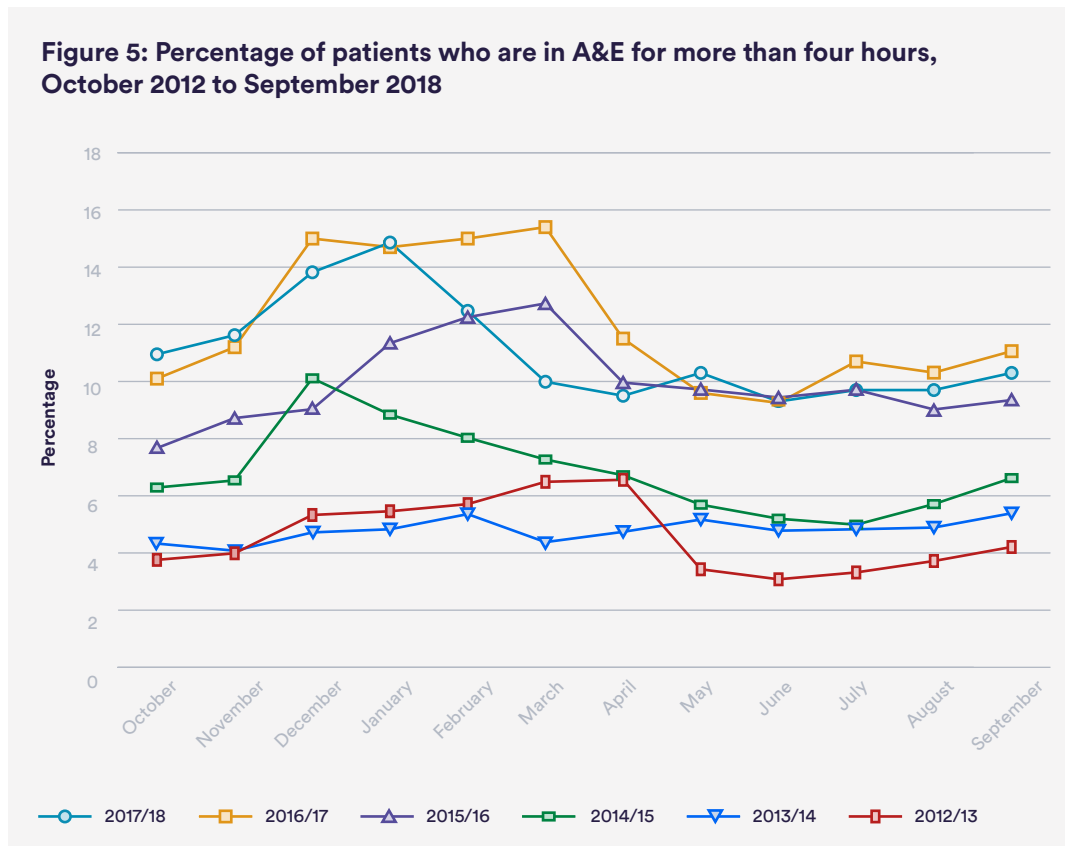
Figure 4 shows the estimated rate of attendances for flu-like illness in different care settings for the first four weeks of 2018. The majority of patients attend their GP for flu-like illness, with attendance rates being approximately 10 times as high in daytime primary care than A&E or out of hours services. Peaks in demand as a result of flu can have a knock-on effect throughout the system: given that around 10 times more people consult GPs about flu than use other services, small changes in how well practices are coping with demand are amplified in other care settings.



Source data: Public Health England syndromic [surveillance reports](#). Analysis by Nuffield Trust to estimate contact rates at 111, out of hours services and A&E.

## Winter pressures

The combined impact on the NHS of increases in illness over winter varies from year to year. In recent years a typical pattern has been for performance to deteriorate during later autumn or early winter, and then go into freefall after Christmas (Figure 5). The length of time taken for services to recover also varies from year to year, and since 2014/5 A&E performance has not returned to the pre-winter level.



Source: QualityWatch analysis of NHS England monthly A&E performance statistics

But the decline in NHS performance is not only attributable to the weather or seasonal illness. It is also a reflection of how patients flow through the health and care system.

Over Christmas and New Year, patients' use of health services changes. General practices are closed for the three bank holidays over the holiday period, resulting in **fewer GP appointments** in December than November or January. Calls to the 111 service **increase** in December, but the data on advice

given to patients suggests that the patients have less urgent needs overall: as a proportion of calls, fewer patients are advised to attend A&E, and a higher proportion are referred back to their GP.

The profile of patients in hospital also changes over the same period. Hospitals discharge as many patients as possible before Christmas, so people can spend Christmas at home. There are also very few planned operations. Although A&E attendances are not usually high in December or January, the number of admissions from A&E increases.

Hospital beds fill up with patients admitted as an emergency. These are more likely to be older patients who stay in hospital for longer. Higher bed occupancy has an impact on the ability of hospitals to manage peaks in demand, and to admit patients who are waiting in A&E: once occupancy reaches 92%, hospitals are **increasingly likely** to be unable to admit patients within the current four-hour target.<sup>2</sup>

A higher proportion of long-stay patients also makes a difference, as this has an impact on how flexibly patients can use beds. The **average bed occupancy** in England for January to March 2018 was 92.6%, reflecting the high level of pressure experienced across the NHS.

The cumulative effect of increases in demand, changes in how patients seek help, and how services manage the flow of patients results in a significant deterioration in performance in January, which is most clearly visible in the **increasing time** patients wait to be admitted as an emergency. This pattern of winter pressure can often continue for the rest of the winter. This was particularly the case recently in 2017/18, 2015/16, and in 2012/13 when performance did not start to recover until April or May (see Figure 5). These were also all long winters in terms of temperature, with a higher than usual number of cold days in February (and for 2013, in March as well).

2 This is an average figure and varies depending on the case mix of the hospital and the type of care needed.



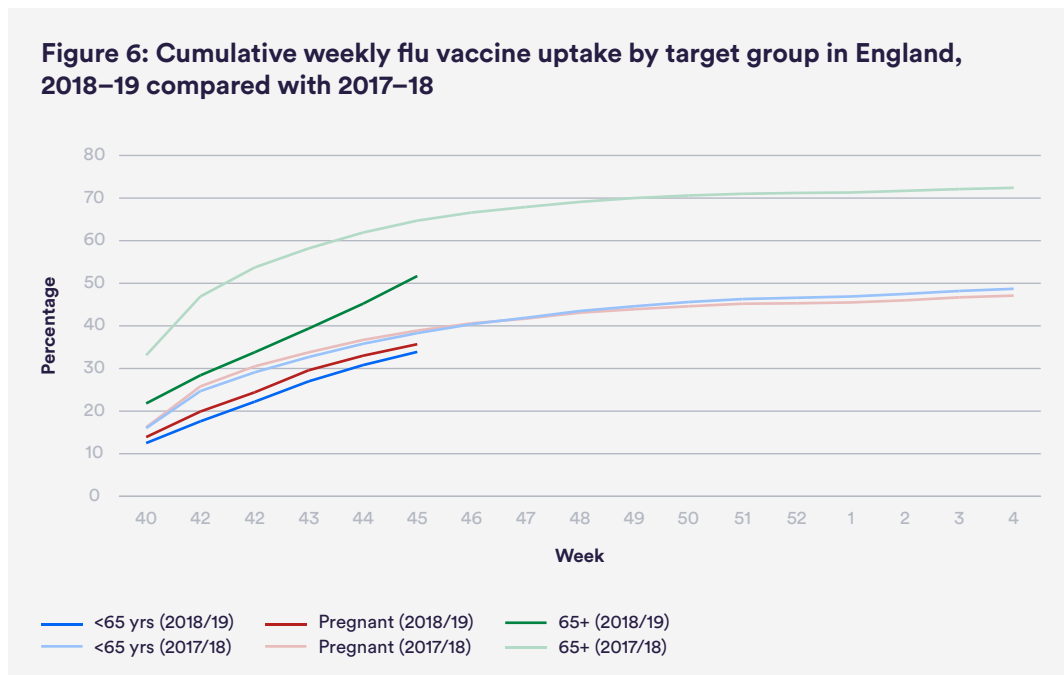
## Ready for the 2018/19 winter?

The NHS is going into the 2018/19 winter with A&E and waiting times for routine treatments being **worse than in previous years**, following several years of deteriorating performance, and higher than usual levels of demand over summer.

So, how is the NHS preparing for the winter and will it be enough? The **planning** for this winter has three main themes.

### Vaccination

The flu vaccination programme this year is focusing on pregnant women, parents of children aged 2 to 3 years, people over 65 and adults with underlying health conditions. There is also a strong emphasis on ensuring that NHS staff are also **vaccinated**. The vaccination programme got off to a bad start due to **shortages of the vaccine**. Rates of vaccination are substantially lower than at the same time last year, particularly for people over 65 (see Figure 6). Vaccination rates among staff are similar to previous years, although they **vary regionally**, with only 36% of frontline health care workers in London being vaccinated, compared to 46% across England as a whole.



Source: PHE Weekly National Influenza Report data, 01 November 2018 - [Week 46 report](#) (up to week 45 data)

## Stranded patients

A second area of focus this winter is on so-called ‘stranded patients’ – people staying in hospital for more than 7 days – and ‘super stranded patients’, which is those staying in hospital for 21 days or more. This is motivated by [evidence](#) that patients spend time in hospital unnecessarily, and that longer lengths of stay are linked to [worse outcomes](#), particularly for frail older patients. Furthermore, reducing long lengths of stay could free up capacity in hospitals, and enable hospitals to manage their bed capacity more flexibly.

It is unclear whether progress has been made in meeting the aim of a 25% reduction in very long stay patients, as this data is not published routinely. However, data is available on those patients classified as having a [delayed transfer of care](#) from an acute hospital bed to a more appropriate setting. This year, the number of these patients is lower than at its peak in 2016, but is [at a similar level](#) to the same point in 2017. Bed occupancy is also at a similar level in 2018 to the same time in 2017, at an average of 89.1% for July to September.

## Area-specific plans

The third area of preparation is [local planning and resilience](#), including ‘high intensity support for the most challenged systems’. This builds on analysis from 2017/18 by NHS Improvement which identified significant variations between organisations in how quickly they could recover from very [high levels of demand](#).

As we have seen, performance across the NHS in England has deteriorated in the last five years. But this overall pattern disguises significant variation in the experience of patients at individual hospitals. For example, just 12 hospitals accounted for 80% of people waiting over 12 hours to be admitted at the peak of winter in January 2018.

Progress with integration is showing promise in some sustainability and transformation partnerships (STPs), who are reporting better collaborative working to enable local solutions. But this is [far from universal](#) and the national policy drive for greater integration seems unlikely likely to produce noticeably improved performance.

In previous winters, [funding has been allocated](#) to acute trusts for winter pressures. So far this winter, no additional funding has been allocated to hospitals, but some funding has been allocated to [support social care services](#), which are facing severe resource constraints.

Less high profile than the NHS Improvement guidance is the cross-sector [Cold Weather Plan](#) created by Public Health England. The most recent Cold Weather Plan places a greater emphasis on addressing the impact of moderately cold weather, following an [evaluation](#) of the 2012 plan which found that targeting people at higher risk is difficult to achieve in practice, since it is hard to identify the most vulnerable, such as people with cold homes, using [routine data](#). However, the extent to which the plan is acted on locally is likely to vary. Analysis at STP level has identified 14 STPs (see Box 1) which had more marked increases in deaths in cold weather, and that also have higher than average levels of [fuel poverty](#) (where fuel costs are above the average and spending on fuel would leave households below the poverty line).

---

**Box 1: STPs with high cold-related deaths risks and high fuel poverty**

Durham, Darlington, Tees, Hambleton, Richmondshire and Whitby STP  
Coast, Humber and Vale STP  
South Yorkshire and Bassetlaw STP  
Staffordshire STP  
Shropshire and Telford and Wrekin STP  
Derbyshire STP  
Nottinghamshire STP  
The Black Country STP  
Coventry and Warwickshire STP  
Northamptonshire STP  
Cornwall and the Isles of Scilly STP  
Somerset STP  
Bath, Swindon and Wiltshire STP  
Gloucestershire STP

---

Source: [Murage and others \(2018\)](#) 'Variation in cold-related mortality in England since the introduction of the Cold Weather Plan: Which areas have the greatest unmet needs?' *Int. J. Environ. Res. Public Health* 2018, 15(11), 2588.

## What can we expect this winter?

Given current levels of bed occupancy and pressure on staffing, both in hospitals and primary care, it is unlikely that this winter is going to be significantly better for patients and the NHS than last year.

The decline in performance over winter is a long-term trend, and the same pressures exist in the system this year as in previous years. There has been no real let-up in underlying [workforce](#) challenges, and demographic trends have continued. Services are supporting a higher proportion of older, frailer patients with long-term conditions, and [improved survival](#) of patients from earlier emergency admissions is estimated to account for around a third of the increases in emergency admissions. Furthermore, cuts in social care and other public services have a major knock-on effect on the NHS. This is particularly the case for emergency services, which become the point of last resort, with patients attending A&E or calling an ambulance when other services are closed or have no capacity.

The emphasis in this year's national guidance on local planning is welcome, as local leaders are best placed to identify the issues that need to be addressed most urgently, and to identify local solutions. Each year the NHS opens 3,500-4,000 [escalation beds](#) over winter to accommodate additional demand. We are also likely to see hospitals and local NHS leaders using a range of other strategies to manage peaks of demand. Some of these are part of longer-term changes, for example schemes to support [earlier discharge](#) of patients, and paramedics increasingly treating patients without admission to hospital. Other strategies are [short term and reactive](#), including rescheduling or cancelling planned operations, and accommodating patients in mixed-sex wards.

Yet even with these actions, patients are likely to wait longer in A&E again this winter, particularly patients who need to be admitted. Given that the NHS has already [missed the goal](#) of 90% of patients being seen within four hours in September 2018, it is not credible to say that the majority of providers will achieve the 95% standard for the month of March 2019, as was set out in the 2018/19 planning guidance.

Limited information about workload and activity in primary care and across the community is a major blind spot when it comes to understanding how well health services are coping, and means that the spotlight in winter remains on the hospital front door. However, the recently published data on [GP appointments](#) may start to address this issue.

Local health systems should consider a broader set of measures – including winter-related mortality, which is available at STP level. Longer-term strategies also need to focus on what is happening to [acute medical patients](#) within the hospital in order to address the current challenges facing trusts managing increasingly complex patients with a struggling workforce.

**Nuffield Trust is an independent health charity. We aim to improve the quality of health care in the UK by providing evidence-based research and policy analysis and informing and generating debate.**

**59 New Cavendish Street  
London W1G 7LP  
Telephone: 020 7631 8450  
[www.nuffieldtrust.org.uk](http://www.nuffieldtrust.org.uk)  
Email: [info@nuffieldtrust.org.uk](mailto:info@nuffieldtrust.org.uk)**

Published by the Nuffield Trust.  
© Nuffield Trust 2018. Not to be reproduced without permission.  
ISBN: 978-1-910953-60-0

Design by Soapbox: [soapbox.co.uk](http://soapbox.co.uk)

**nuffield**trust