



## **Briefing: January 2020**

# Can variation help to explain the rise in emergency admissions for children aged under five up to 2018/19?

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This briefing uses evidence from hospital data over the 10-year period from 2009/10 to 2018/19 to look at the increase in emergency admissions for young children, aged under five, and to explore some of the possible underlying reasons for the increase. It also sets out recommendations for policy-makers, researchers, data providers and data users in light of this analysis, and considers the implications in the context of the Covid-19 pandemic and beyond.

### **Key points**

- 1 The growth in short-stay emergency admission rates over the 10-year period was largest for infants and was focused among the very young, with the rate for infants aged one to six days increasing by 109%, from 11 to 23 per 1,000 population. There were associated large increases in short-stay emergency admission rates for conditions such as neonatal jaundice, which can be preventable and which targeted interventions might help.
- 2 We found high rates of short-stay emergency admissions among children from the most deprived areas of England and a persistent gap between children from the most deprived areas and those from the least deprived areas. These need to be addressed.

Some regions do not have a deprivation gap at all, or they have narrowed it over time, and research is needed to understand what is different about these areas.

- 3 We found that the existing national hospital datasets are not effectively capturing short-stay emergency activity for young children. There is no way to identify observation activity that might occur in paediatric assessment units rather than on the ward or in the emergency department. The absence of a time measure for admission and discharge in inpatient data means that separating short-stay emergency activity from other forms of care is challenging.
- 4 Differences in service provision could be influencing emergency admission rates both across England and over time. We found differences in short-stay emergency admission rates between hospitals depending on the type of short-stay assessment unit they had for young children. We also know from research by others that the opening of a paediatric assessment unit can lead to changes in the volume of emergency admissions to the ward.

Reducing the use of emergency hospital care has been a focus of health care policy in England for some time. The desire to reduce unnecessary emergency attendances and where possible to reduce emergency admissions by providing care outside of the hospital was again recently highlighted as a key aim in the *NHS Long Term Plan* (NHS, 2019). This focus and any initiatives proposed, such as the move to same-day emergency care, have largely centred around adults and specific conditions (NHS Improvement, 2019). However, young children also use a lot of emergency hospital care and rates have been rising over time.

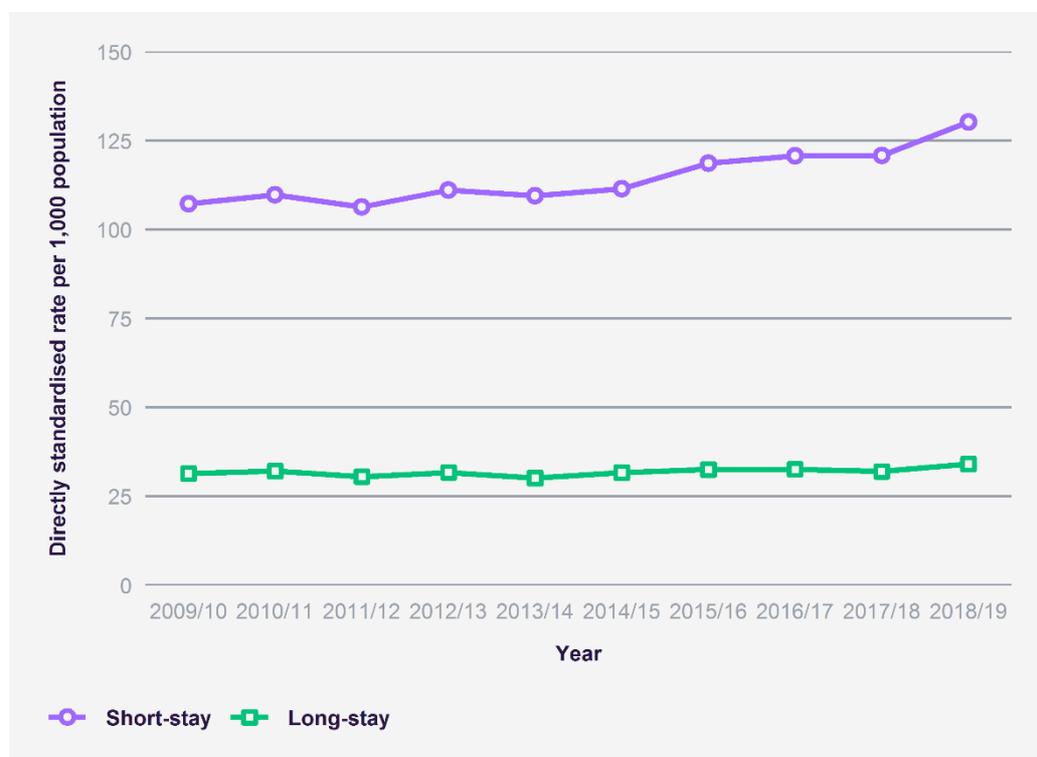
Children under the age of five accounted for 10% of emergency attendances and 9% of emergency admissions in 2018/19, despite representing less than 6% of the population (NHS Digital, 2020a, 2020b; Office for National Statistics, 2019). Further, emergency admissions for this age group increased by 18% over the 10-year period under study in this briefing (NHS Digital, 2020b). Emergency hospital visits can be stressful for young children and their parents or carers and, as with adults, research has highlighted potentially inappropriate emergency department attendances occurring at this age, which better support elsewhere in the system might have prevented (Diaz-Caneja and others, 2005; McHale and others, 2013). However, unlike with adults, moves to address this age group's emergency care use have often relied on local innovation (Kossarova and others, 2016).

The desire to move care out of the hospital for all ages has perhaps become even more pertinent in recent months with the arrival of the Covid-19 pandemic and the cessation of some health care activity, in particular hospital care. Early evidence shows that children aged under five saw some of the biggest reductions in the use of emergency hospital care during the first months of the Covid-19 pandemic (Public Health England, 2020; The Strategy Unit, 2020a, 2020b). While activity has subsequently started to return to pre-pandemic levels, there is still learning to be taken from what happened to care for this age group during those early months, which, in combination with the historical data covered in this briefing, might indicate areas where care could be improved.

## **How did emergency admission rates change over the 10-year period for children aged under five?**

We found that, between 2009/10 and 2018/19, the emergency admission rate for children aged under five increased by 18%, from 138 to 164 emergency admissions per 1,000 population. This change occurred despite accounting for any changes in the population size or structure over that period. Emergency admissions followed by a short stay in hospital (admitted in an emergency and then discharged that day or the next) were very common at this age, with 79% of emergency admissions in 2018/19 classed as short. The increase in the emergency admission rate over the 10-year period was mainly concentrated in this group (see Figure 1): emergency admissions with a short stay increased by 21% over the period, from 107 to 130 per 1,000 population, while those with a longer stay increased by 10%, from 31 to 34 per 1,000 population. As a result of this difference, we chose to look at changes in emergency admissions across a range of characteristics, split by subsequent length of stay.

**Figure 1: Emergency admission rates for children aged under five, by length of stay, 2009/10 to 2018/19**



Source: NHS Digital, Office for National Statistics

### Age-specific differences

We looked at differences in emergency admissions split by age on admission and found that there were increases in short-stay emergency admission rates for all young children over the 10-year period, but the increase was largest for infants. Short-stay emergency admission rates for infants increased by 29%, from 215 to 277 per 1,000 population. This increase was mainly driven by very young children under six months of age, in particular those aged between one and six days. The short-stay emergency admission rate for infants aged one to six days increased by 109% over the period, from 11 to 23 per 1,000 population.

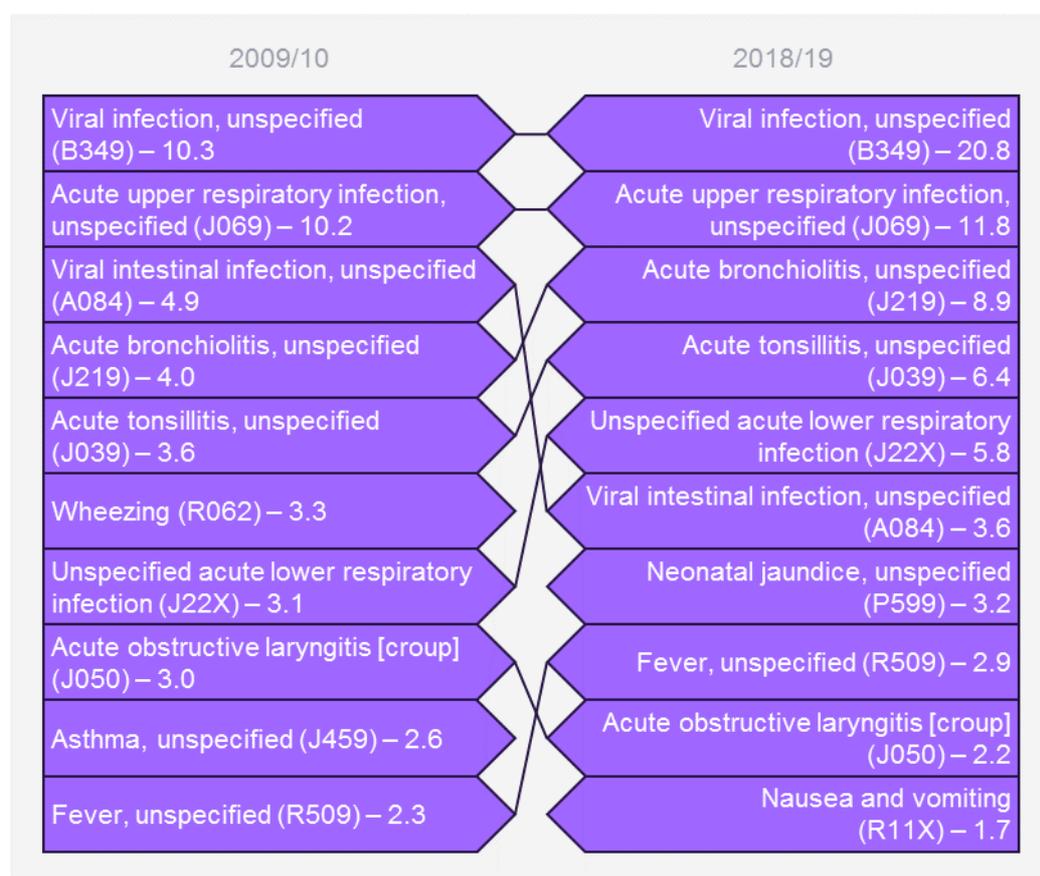
For long-stay emergency admissions, rates were again highest for infants across all time points, but in general the change over the 10-year period was much slower than for short stays. Long-stay emergency admission rates for infants increased by 12%, from 83 to 93 per 1,000 population, while rates for young children aged one to three increased by between 5% and 7%. There was a small but significant decline in the long-stay emergency

admission rate for four-year-olds, of 5%, representing around one less emergency admission per 1,000 in 2018/19 compared with 2009/10.

### Differences by reason for emergency admission

We found that changes in emergency admission rates also varied by reason for admission (primary diagnosis for the admitting episode) – see Figure 2. Short-stay emergency admissions for neonatal jaundice unspecified, acute bronchiolitis unspecified and viral infection unspecified all more than doubled over the 10-year period.

**Figure 2: Short-stay emergency admission rates per 1,000 population for children aged under five, by most common reasons for admission, 2009/10 and 2018/19**



Note: International Classification of Diseases 10<sup>th</sup> Revision codes contained in parentheses  
 Source: NHS Digital, Office for National Statistics

Six of the 10 most common reasons for short-stay emergency admissions in 2018/19 were the same as for long-stay emergency admissions. However, overall there was more variety in the reasons for long-stay admissions and the changes over time were much smaller. For viral infection unspecified, the long-stay emergency admission rate increased by 56% over the period, from 1.8 to 2.8 per 1,000 population. For the other common conditions, any increase equated to less than one emergency admission per 1,000 population, although it was still significant.

### **Location-specific differences**

We investigated differences by location by looking at area-level deprivation and the region in which a child lived. Young children from the most deprived areas were most likely to have both short- and long-stay emergency admissions in each of the 10 years we studied. However, the short-stay emergency admission rate among children from the least deprived areas increased at a much faster rate (29%) than the rate among children from the most deprived areas (11%). This differential change narrowed the relative gap between the most and least deprived areas from 60% to 37% (see Figure 3). This picture was repeated for long-stay emergency admissions, with the gap narrowing from 67% to 44%, but with emergency admissions increasing across all deprivation deciles.

**Figure 3: Short-stay emergency admission rates per 1,000 population for children aged under five from the most and least deprived areas of England, 2009/10 to 2018/19**

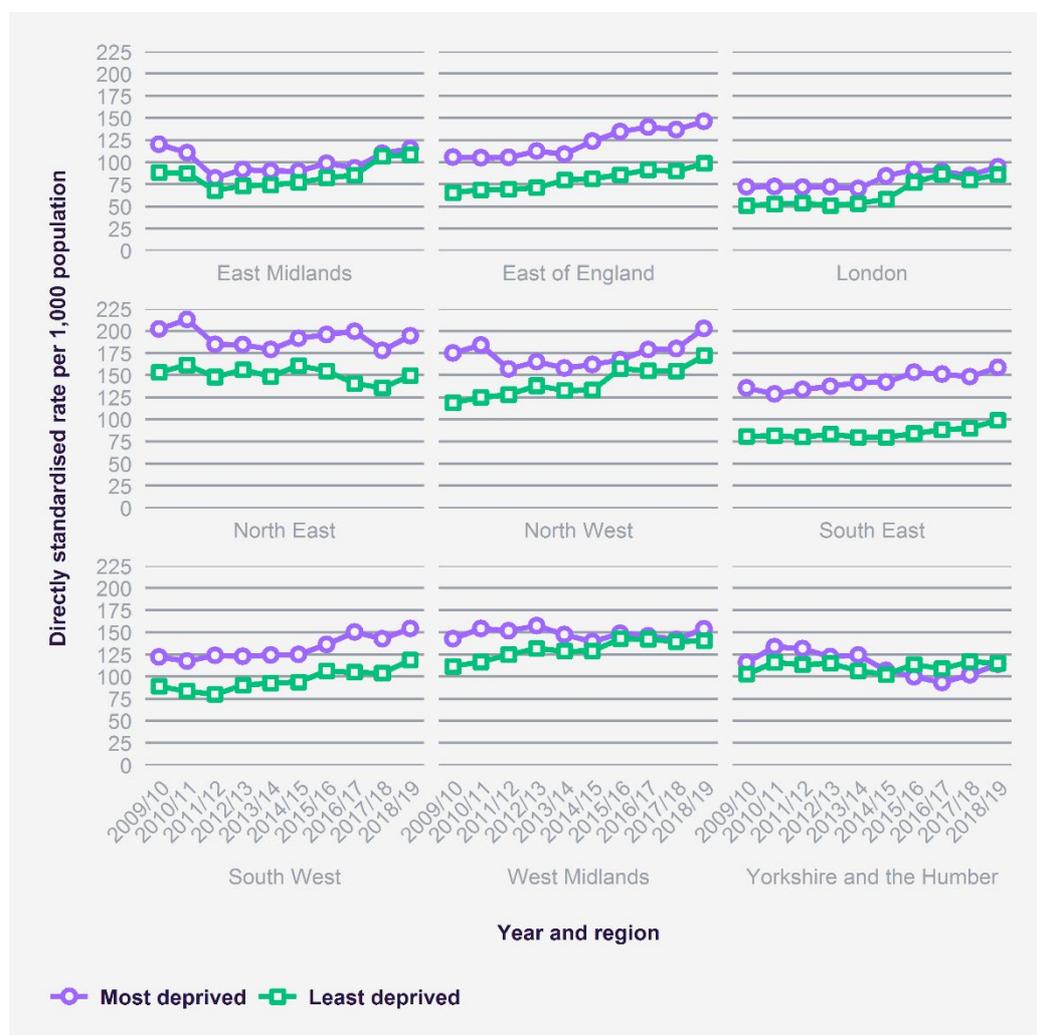


Source: Ministry of Housing, Communities and Local Government, NHS Digital, Office for National Statistics

Across the nine regions of England, there was wide variation in the change in emergency admission rates over the 10-year period. The East of England saw an increase of 48% in the short-stay emergency admission rate, while there was effectively no change in the North East and Yorkshire and the Humber.

Within regions there was also a variety of changes when we looked at the data in terms of deprivation. For short-stay emergency admission rates, there was no change in the deprivation gap for the East of England, North East, South East and South West (see Figure 4). In contrast, the other regions saw their deprivation gap narrow. The East Midlands and Yorkshire and the Humber saw their deprivation gap narrow to the extent that in 2018/19 there was no difference in short-stay emergency admission rates between young children from the most deprived areas and those from the least deprived areas.

**Figure 4: Short-stay emergency admission rates for children aged under five from the most and least deprived areas of England, by region, 2009/10 to 2018/19**



Source: Ministry of Housing, Communities and Local Government, NHS Digital, Office for National Statistics

For long-stay emergency admissions, the only region that saw a change in its deprivation gap was the East Midlands, where the gap between young children from the most and least deprived areas narrowed over the 10-year period, such that in 2018/19 there was no difference in the rates. For all other regions, the admission rates were highest for young children from the most deprived areas.

## Differences by service provision

We thought that differences by area could reflect changes in service provision over time and across England. In the absence of detailed information on service provision by hospital, we trialled the theory with knowledge about paediatric assessment units (PAUs) from the Royal College of Paediatrics and Child Health’s 2015 Workforce Census (Royal College of Paediatrics and Child Health, 2017a). We looked at differences in emergency admission rates in 2016/17 (the year following census data collection) by paediatric assessment unit co-location. Our hypothesis was that hospitals with a paediatric assessment unit on the ward might have a higher number of short-stay emergency admissions than hospitals with a unit co-located in the emergency department due to differences in where the short-stay activity was recorded.

We found that hospitals with a paediatric assessment unit on the ward had short-stay emergency admissions rates that were 33% higher on average (140 per 1,000 population) than those with a unit in the emergency department (105 per 1,000 population) (see Table 1). This effect was not seen for long-stay emergency admission rates, which we would expect, as the presence of a paediatric assessment unit should have little impact on the care of conditions that require long hospital stays.

**Table 1: Estimated average hospital emergency admission rates, accounting for paediatric assessment unit co-location, age and sex, in 2016/17**

Paediatric assessment unit co-location (number of hospitals)	Short-stay emergency admission rate per 1,000 population (95% confidence limits)	Long-stay emergency admission rate per 1,000 population (95% confidence limits)
Emergency department (42)	105 (91, 121)	33 (29, 38)
Ward (98)	140 (127, 153)	33 (31, 35)

Source: NHS Digital, Office for National Statistics, Royal College of Paediatrics and Child Health

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**Box 1: What is a paediatric assessment unit?**

A paediatric assessment unit is an emergency assessment area for children and young people where investigations, observations and treatment can occur, with the expectation that discharge occurs within 24 hours (Royal College of Paediatrics and Child Health, 2017b). Not all hospitals have them and in those that do they can be co-located in different places: on the ward, in the emergency department or stand-alone. The pathway to access a paediatric assessment unit also varies by hospital, with some requiring referral from the Accident & Emergency (A&E) department or a general practitioner (GP), and others allowing direct access. Due to the differences in where units are located, activity can be recorded in different national datasets (A&E, inpatient and outpatient datasets), or not at all, depending on the hospital.

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## What does this tell us?

The increase in emergency admissions seen in the 10-year period we studied for this briefing did not occur uniformly for all young children under the age of five. When we look at the data by key characteristics, we see that some of the changes might be more of a cause for concern than others, in particular those involving infants and children from more deprived areas. In addition, we found limitations in the current recording of hospital activity, which, if addressed, could give a clearer picture of young children's use of emergency hospital care.

The increase in emergency admissions for infants we identified cannot be explained solely by changes in the birth rate or an increase in the number of premature babies with long-term conditions requiring more hospital care. A large proportion of emergency admissions are for neonatal jaundice, which others have suggested could be potentially preventable admissions (Jones and others, 2018). Meanwhile, access to and a lack of paediatric expertise in primary care have been highlighted as possible drivers of children's use of emergency hospital care (O'Cathain and others, 2020). Concerns have also been raised about reductions in health visiting and the quality of postnatal care, which could be linked to the high number of emergency admissions seen for very young infants with neonatal conditions (Care Quality Commission, 2019; Institute of Health Visiting, 2019). Other concerns concerning health outcomes for this vulnerable age group – such as a higher infant mortality rate relative to other Western countries – reinforce the need for more to be done to address their health needs (QualityWatch, 2020).

Over the period, children from the most deprived areas were more likely than children from the least deprived areas to have an emergency admission. Barriers to accessing primary care and the perception of the hospital as a place that solves problems have both been highlighted as drivers of emergency hospital care use among people from more deprived areas (O'Cathain and others, 2020). The gap between young children living in the most and the least deprived areas has narrowed, but not in the way one would hope: there has been increased emergency activity for children from the least deprived areas, while there has been sustained high activity for children from the most deprived areas. The latter bucks the general trends we have seen in this analysis and could indicate this group's reduced access to the short-term emergency hospital care provided in paediatric assessment units, which requires further investigation.

Many interventions have been trialled to reduce emergency admissions among children and young people, with varying success, such as education, triage and placing paediatric expertise in the emergency department (Thompson Coon and others, 2012). These interventions tend to be targeted at an age group as a whole, but in this briefing we have highlighted subgroups, such as infants with neonatal jaundice and children from the most deprived areas, where interventions could perhaps be targeted to have the greatest impact and benefit.

This briefing has also drawn attention to the limitations of existing national hospital datasets to consistently report short-stay emergency activity for young children, despite their increasing use of short-stay emergency care. The high prevalence of short-stay emergency admissions among young children is not a new thing, but the national datasets do not record the nuance in this activity (Saxena and others, 2009). In 2015, 140 hospitals in England stated they had a paediatric assessment unit and these units are increasingly considered a safe way to provide short-term care (Royal College of Paediatrics and Child Health, 2017a). However, it is not possible to isolate this activity in the data, which means that care quality in terms of short- and long-stay activity cannot be consistently examined. Children are admitted to paediatric assessment units with the intention that they will be discharged within 24 hours; however, there are no time markers in the inpatient dataset and around half of all paediatric assessment units are known to operate 24 hours a day (Royal College of Paediatrics and Child Health, 2017a, 2017b). This means that to capture all short-stay activity, we needed to look beyond same-day discharges, which may have blurred the boundaries between truly short (<24 hours) and longer activity.

We found that hospitals with a paediatric assessment unit co-located on the ward had higher average short-stay emergency admissions in 2016/17 than those where the paediatric assessment unit was co-located with the emergency department. While this does not tell us about change over time, we know from research elsewhere that opening a paediatric assessment unit can have an impact on the volume of emergency admissions to the ward (Husk and others, 2018; Margolis and others, 2016; Ogilvie, 2005). The units have been introduced gradually and it is plausible that they might have had an impact on changes in emergency admission rates over time and contributed to variation across England.

It is important to remember that emergency admissions are just one part of the picture when considering the care of young children – and a relatively small part at that. Some hospital short-stay activity may be recorded within the Accident and Emergency Data Set

(or new Emergency Care Data Set – ECDS), but our understanding of changes in care in this setting is limited because data quality has been continually improving over time, which means that long time series are not viable. Hospital data are also often overly depended on because they are available and relatively accurate nationally. We need to know more about care outside of the hospital, particularly in a world where integration is the focus. Better or more accessible data from the community would help with this.

We do not know what happened to short-stay and long-stay care for young children during the first wave of the Covid-19 pandemic, beyond seeing a massive reduction in overall hospital activity (Public Health England, 2020; The Strategy Unit, 2020a). It will be important to know whether parents/carers sought help elsewhere, whether any particular groups were adversely affected and what the implications of this are for the long term. These questions cannot be answered with the existing national datasets. However, local areas with good linked data could explore them. We also need to ensure that the changes that were made to health care, many of which may remain for the long term (for example, alternatives to face-to-face GP appointments), do not adversely affect the groups that were already at risk of emergency attendances and admissions.

## **Recommendations**

We now set out our recommendations for policy-makers, researchers, data providers and data users in light of our analysis in this briefing paper.

### **Policy-makers and researchers**

- 1 Sustaining the focus on the first 1,000 days of life is vital as unacceptable inequalities in emergency admission rates persist. Targeting interventions at specific groups in addition to universal policies might help to address the drivers behind the use of emergency hospital care by young children such as infants and by level of area deprivation.
- 2 There are inherent differences between regions of England but research needs to be undertaken to better understand why some areas have had large increases in short-stay emergency admissions relative to others, or have seen changes in their deprivation gap where others have not.
- 3 The first wave of the Covid-19 pandemic interrupted many of the trends reported in this briefing, but there is an opportunity to understand where care was sought, if at all, for

young children in the absence of emergency hospital care use and what implications that has for young children's outcomes now and in the future.

#### Data providers

- 4 National hospital datasets need to be improved to better capture short-stay emergency activity. Information on time of admission and discharge would be beneficial, along with the type of hospital setting that care is conducted in, for example the emergency department, ward or paediatric assessment unit. These changes are being made for specific conditions in adults, with the move to record same-day emergency care in the Emergency Care Data Set, and it is something that should be considered for children as well (NHS Improvement, 2019).
- 5 The work on national datasets for aspects of care that occur outside the hospital, including community and primary care, needs to be continued as, in combination with the other recommendations set out here, it will provide valuable insights into pathways of care for young children as well as other age groups.

#### Data users

- 6 Both analysts but also service designers and evaluators need to have a better understanding of the limitations of national datasets. Changes to services introduced gradually have the potential to have an impact on long-term trends and could lead to data being misinterpreted. There are warnings in the *Hospital Episode Statistics (HES) Analysis Guide* that should be considered when conducting research but also when deciding on how to show impact from a new care model (NHS Digital, 2019).

## Glossary

**Emergency admission:** an inpatient admission to hospital that is classified as an emergency by the ‘admission method’ field in the Hospital Episode Statistics.

**Long-stay emergency admission:** an emergency admission where the patient is discharged at least two calendar days after the admission date.

**Paediatric assessment unit (PAU):** an area that is typically located alongside the ward or emergency department, with beds where children can be observed and treated for a short period of time.

**Short-stay emergency admission:** an emergency admission where the patient is discharged either on the same day as the admission or the day after.

## Supplementary information

Additional detail on the methods used in our research for this briefing, and supporting charts and tables for the findings, are available in the Research Appendix.

## Acknowledgements

Thanks to the Workforce team at the Royal College of Paediatrics and Child Health for providing data on paediatric assessment units from their Workforce Census.

Thanks also to Marie Rogers, Damian Roland and Ronny Cheung for reading an early draft of this briefing and providing invaluable feedback.

This work uses data provided by patients and collected by the NHS as part of their care and support. Read more at <https://www.nuffieldtrust.org.uk/about/corporate-policies#information-security-and-data>.

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