The Royal College of Emergency Medicine

FEVERISH CHILD

NATIONAL QUALITY IMPROVEMENT PROJECT

NATIONAL REPORT 2018/19

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Contents

Executive Summary

Overview

This report contains the findings from the 2018-19 RCEM national quality improvement project (QIP) on febrile children.

A total of **17,235** patients presenting to **181** Emergency Departments (EDs) had their documented care reviewed in this national clinical audit and quality improvement project (QIP). This was the third time this audit had been conducted, and the first time the topic had been conducted using QI methodology.

The purpose of the audit and QIP was to monitor documented care against the standards published in July 2018, and to facilitate improved care using QIP methodology and weekly data feedback. QIP methodology was promoted to encourage EDs to improve towards more consistent delivery of these standards, helping clinicians examine the work they do day-to-day, benchmark against their peers, and to recognise excellence.

The performance summary charts in the next section are a summary of the weekly performance against the standards between August 2018 – January 2019.

Key findings

This report represents not just another large scale national clinical audit but the delivery of a shared platform providing QI tools and real time data with, which individual departments can use to progress towards achieving the national standards.

This has enabled individual departments the opportunity to make in year progress towards achieving the national standards.

Patient data

EDs continued to face challenge in achieving timely initial assessment and timely senior decision maker review, with evidence of more challenge during the busy winter months. This report continued to highlight that EDs were struggling to staff teams with the necessary resources to meet their demands; with implications on achieving high quality standards of safe care.

EDs across the country have faced issues achieving initial assessment within 15 minutes, with only a slight improvement seen. The median time for initial assessment was 13-15 minutes. However, the data revealed this could be much longer, with some patients not having this recorded for several hours.

The majority of children presenting with feverish illness were below two years of age. This group is one of the most challenging in the ED; with the majority recovering well from a self-limiting febrile illness, but a small proportion having a more serious bacterial illness or evolving sepsis. The signs of more serious illness could often be subtle, masked by robust physiological reserve until they are in extremis.

It was encouraging to see that there was generally good use of the established NICE guidance for assessment and management of children under five years without a clear diagnosis.

Use of a sepsis risk stratification tool was less consistent, though the lack of a nationally agreed tool has helped highlight the challenge this poses for management of the paediatric patient.

Providing good quality safety net advice was important to help carers identify those children with fever who had an evolving serious bacterial illness or sepsis. It was

promising that EDs were achieving this a high proportion of the time, with written leaflets the commonest form of safety netting. It would be good to share other mediums and whether they improved care.

Organisational data

Almost all (97%) EDs reported to be using an early warning score for feverish children which demonstrated good practice. This was an encouraging improvement as the 2015/16 RCEM audit recommended that all EDs adopt a vital signs scoring system such as a PEWS (or an equivalent early warning score).

Most departments (91%) reported using a tool to identify children at risk of sepsis, however this was not reflected in the patient-level weekly data, suggesting consistent implementation of such a tool was challenging.

Furthermore, the data revealed that 92% of EDs use a clinical management tool having identified children as high risk for sepsis.
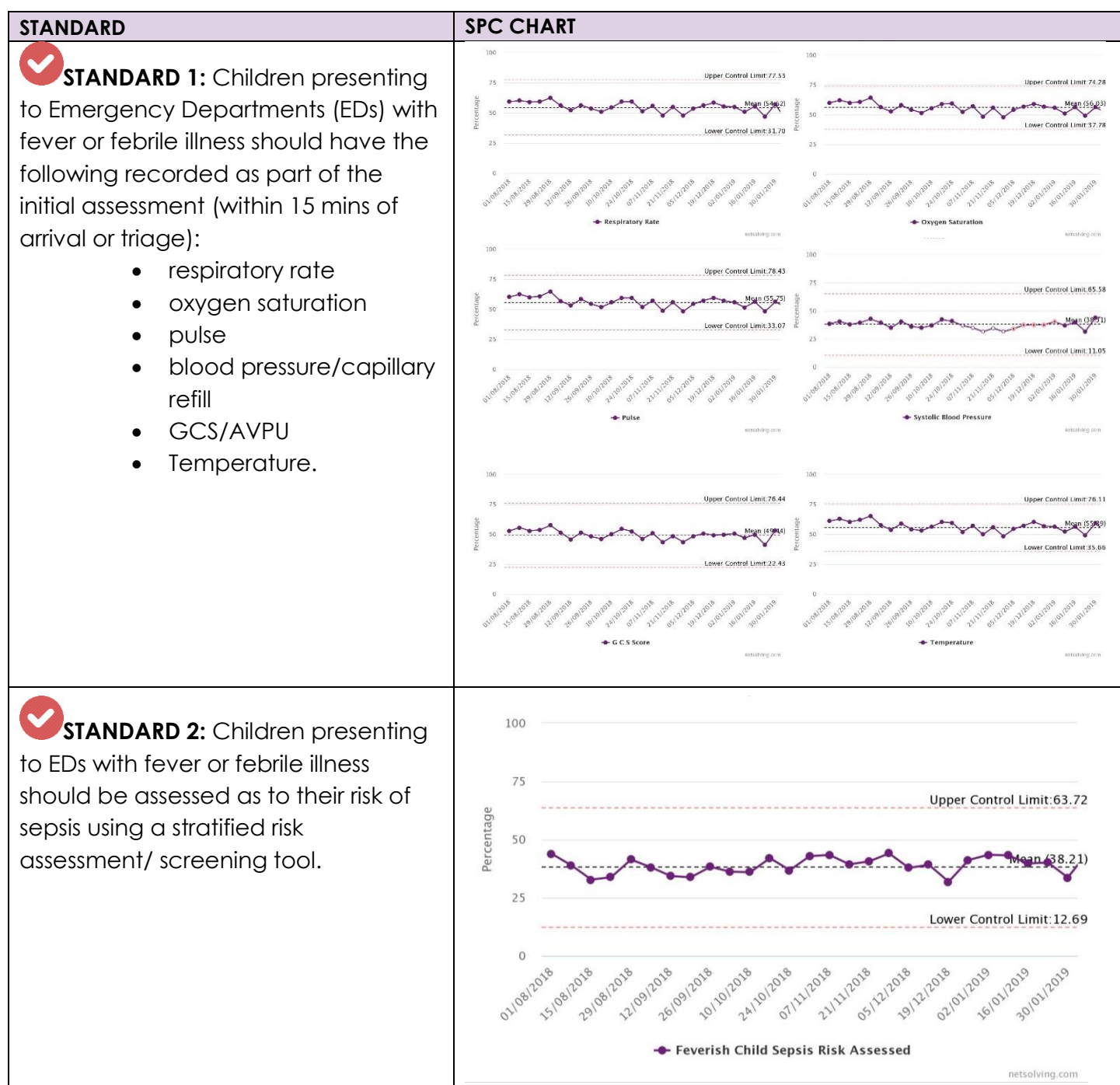
Finally, data revealed that there was good use of safety net advice, with most units having a written leaflet for families to refer to.

Key recommendations

1. EDs should look at ways to improve timely initial assessment consistently at times of pressure and peak activity, ensuring all parameters are checked and recorded to give a comprehensive assessment of febrile children within 15 minutes.

2. EDs should work closely with management teams to ensure adequate senior decision maker cover at peak times of activity to ensure safe assessment and management of the acutely unwell febrile child.

3. EDs should adopt or develop a tool to stratify risk of sepsis for feverish children so that they receive appropriate escalation or de-escalation of treatment and senior review.

4. Adequate training should be in place for all staff managing children less than 5 years presenting with fever. Training should enable complete sets of observations to be performed and responded to, with recognition of risk regarding serious bacterial illness or sepsis, and appropriate treatment instigated.
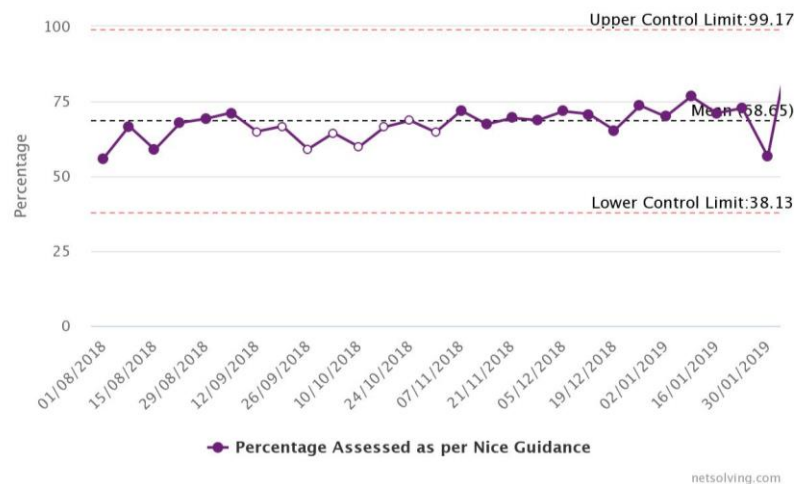
Performance Summary

The below graphs show the weekly performance against standards for this audit. See the appendices for a guide to interpreting these charts.

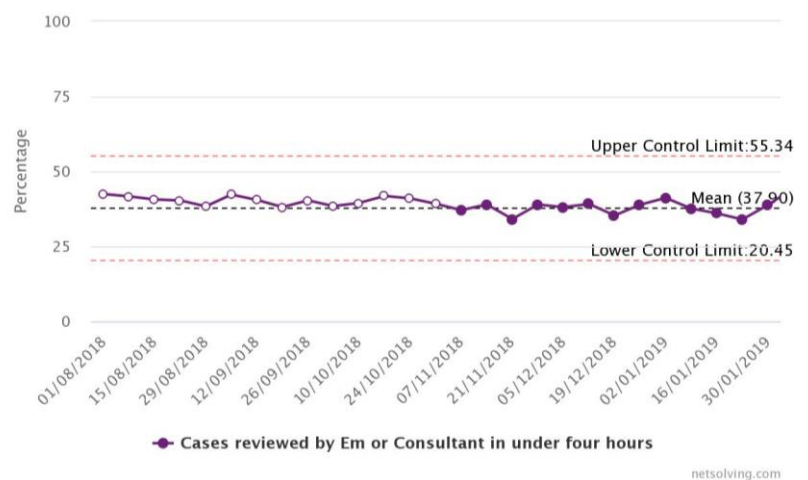| STANDARD	SPC CHART
✅ **STANDARD 1:** Children presenting to Emergency Departments (EDs) with fever or febrile illness should have the following recorded as part of the initial assessment (within 15 mins of arrival or triage): • respiratory rate • oxygen saturation • pulse • blood pressure/capillary refill • GCS/AVPU • Temperature.	
✅ **STANDARD 2:** Children presenting to EDs with fever or febrile illness should be assessed as to their risk of sepsis using a stratified risk assessment/ screening tool.	

STANDARD 3: Children presenting with fever or febrile illness and without an apparent source of infection should be assessed as per NICE guidance traffic light system to guide further investigation and management.


STANDARD 4: There should be timely senior review (by an EM or paediatric consultant/ST4+ or equivalent non-training doctor) for children presenting to EDs with fever or febrile illness who:

- are < 1 year of age
- **OR** have no apparent source of infection with red features as per NICE feverish illness guidance
- **OR** are assessed to be at intermediate or high risk of sepsis (2 or more amber features, or one red feature).
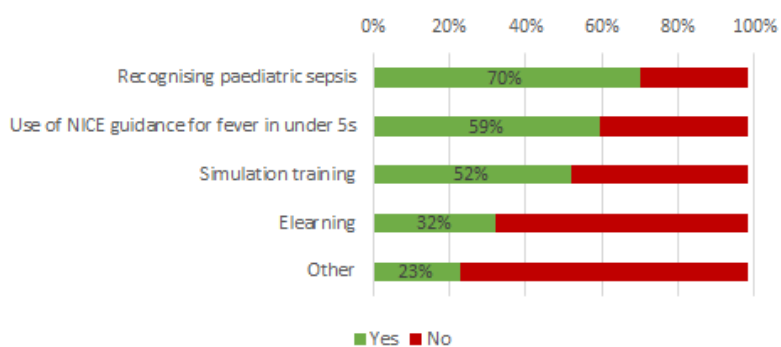

STANDARD 5: Children presenting to EDs with fever or febrile illness who are discharged home should be provided with an appropriate "safety net" including information to take home e.g. written advice, video, app.
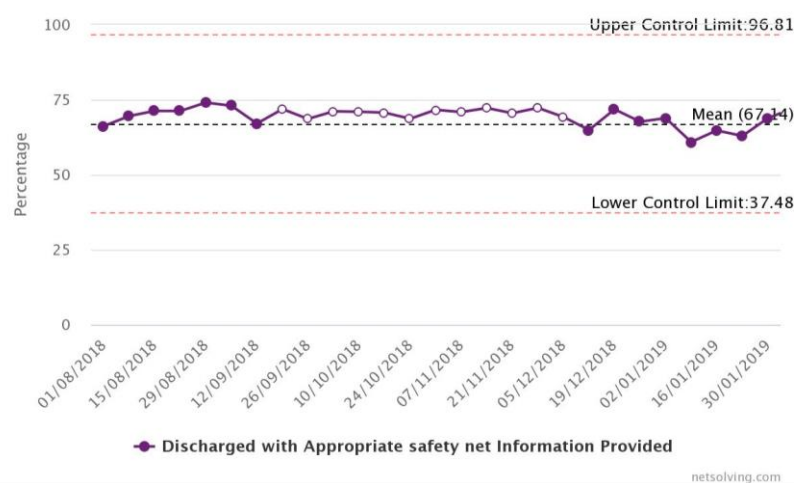
STANDARD 6: EDs should provide training for clinicians in the management of children presenting with febrile illness including recognition of sepsis.

Foreword

Dr Taj Hassan, RCEM President

The commitment of EDs to engage in quality improvement is a source of great pride to us. We applaud the enthusiasm with which departments have embraced our new style of national clinical audit with integrated QIP methodology. RCEM recognises the pressurised environment most departments continue to work in and is keen to support your fantastic efforts by keeping this QIP open online for you to use locally whenever you want.

We encourage you all to consider how your department can make progress on the four recommendations, particularly if your data shows that this is a challenging area.

It is fantastic to see such an increase in the number of EDs using early warning scores (EWS). We strongly encourage all EDs to continue using EWS to identify and manage febrile children, and to introduce this to your ED if you have not already.

We know that senior decision makers are vital to the proper running of an ED, particularly during peak activity times. By working with management teams to ensure good cover we are moving closer to consistent safe management of acutely unwell febrile children. Being mindful of local challenges, I encourage you to investigate how to consistently improve timeliness of initial assessment of feverish children under five, and especially the under two-year-old group.

Dr Taj Hassan, RCEM President

Dr Simon Smith, Chair of Quality in Emergency Care Committee

Dr Elizabeth Saunders, Chair of Quality Assurance & Improvement Subcommittee

Introduction

This report presents the results of a national clinical audit and quality improvement project for patients under 5 years of age who presented to ED with fever or febrile illness as part of their presenting complaint.

RCEM have moved from benchmarking by looking at data as static annual sample audit reports, to using time series data analysis that supports EDs to measure, review and improve their services in achieving standards deemed fundamental, developmental or aspirational to achieving the best emergency care.

Using the PDSA methodology RCEM encouraged ED teams to measure small samples over time and to instigate small tests of change along the way, to deliver quality improvement projects.

RCEM also welcome EDs willingness to share their improvement ideas and initiatives so that others can also learn improvements can be spread.

We recognise that using nationally aggregated data in this report limits its value without a nationally defined quality improvement initiative underpinning the PDSAs over time. However, RCEM hope that individual EDs find the tool helpful in recording their improvement over time for local initiatives. Sharing PDSAs via the online tool SHOULD enable wider system learning and is encouraged.

Background

RCEM last ran an audit looking at management of patients under 5 years of age who presented to EDs with fever or febrile illness as part of their presenting complaint in 2012/13 and 2010/11.

RCEM have since revised the standards to reflect more recent national developments, making some direct comparison more challenging. RCEM have also compared some of this years' results to the 2015/16 vital signs in children in 2015/16. We have compared some of this year's results to this also.

In the UK, the National Institute for Health and Clinical Excellence (NICE)(1) have updated their guideline on Fever in under 5s: assessment and initial management in 2017 to cross-refer to the NICE (2) guideline on Sepsis: recognition, diagnosis and early management.

What stands out is that EDs across the country have continued to face issues with achieving timely initial assessment within 15 minutes, with just a slight improvement since 2015/16. The median time for initial assessment is 13-15 mins, however this could be much longer with some patients not having this recorded for several hours.

Patterns of peak attendance late into the afternoon and evening remain unchanged over time and reflect national data. This report has demonstrated that EDs continue to face challenges in achieving timely initial assessment and timely senior decision maker review, with evidence of more challenge in busy winter months. This continues to highlight that EDs were struggling to staff teams with the necessary resources to meet their own demands and that this had implications on achieving high quality standards of safe care.

The demographic of age distribution has remained comparable over the past six years. Most children presenting with feverish illness remain below two years of age. This group is

one of our most challenging in the ED, with the majority recovering well from a self-limiting febrile illness, but a small proportion having a more serious bacterial illness or evolving sepsis, the signs of which can often be subtle, masked by robust physiological reserve until they are in extremis.

There was generally good use of the well-established NICE guidance for assessment and management of those children under 5 years without a clear diagnosis which was encouraging.

Use of a sepsis risk stratification tool was less consistent, though the lack of a nationally agreed tool highlights the challenge this poses for the paediatric patient.

As described above, many children presented with abnormal physiology in that they were often tachycardic and lethargic with fever, but many recovered quickly. Though relatively uncommon, the consequences of missing sepsis in a child could be devastating for families and professionals and establishing local safeguards to this is an important strategy for all EDs.

Providing good quality safety net advice is important to help carers identify those children with fever who have an evolving serious bacterial illness or sepsis.

It has been apparent from the findings that EDs were achieving this a high proportion of the time, with written leaflets the commonest form of safety netting. It would be good for EDs to share other mediums and whether they have improved care.

Case study

QIP – Introducing a Paediatric Sepsis Tool in the Paediatric Emergency Department at Imperial College Healthcare NHS Trust, London.

QIP Lead, Dr Neil Thompson, PEM Consultant

The National Institute for Clinical Excellence (NICE) published guidance for the recognition and treatment of sepsis (NG51) in 2016, following on from work done by The Sepsis Trust amongst many others.

Many paediatric units have experienced challenges with the implementation of this guidance for a wide variety of reasons, these range from a lack of definition of paediatric sepsis to the relatively low incidence of significant infections compared to the total number of febrile children attending acute and emergency providers.

Imperial College NHS Trust looked at how the implementation of the guideline may affect their workflow. Their research found that 20% of children presenting to an ED with an illness to would trigger the published sepsis tool.

This would have a significant impact on the department if the senior decision maker was required to review all of these children within 15 minutes. Of those who triggered the tool, 66% were discharged home, and only 1 of 338 patients had a diagnosis of sepsis.

The Trust took the basis of the published sepsis tools, and in the Autumn of 2018 redesigned them for their department. Using input from the medical and nursing staff, they created a paper version of the tool for use at triage, with red and amber flag pathways. After a staged implementation using "champions", they then used the tool for all children presenting with an illness and collected data about patient flow and patient outcomes.

To review this data, they then used PDSA cycles to modify the tool, and are currently using Version 8. Changes included empowering senior triage nurses to move children from red flag pathway to amber flag pathway, emphasising the importance of regular reviews and observations, and increasing the physiological limits using published centiles for heart rates and respiratory rates.

According to Dr Neil Thompson, PEM Consultant, "By involving nursing and medical teams of all grades, we have had good engagement of the tool, and valuable and practical feedback about how to improve it. It has also improved our use of the senior decision maker in febrile children."

The Trust are continuing to collect the audit data and are looking to implement an electronic version of the tool in the near future.

Methodology

Participation summary

Nationally, **17,235** cases from **181** EDs were included in the audit. Click the map below to open an interactive map of participating EDs.

Audit methodology and history

All Type 1 EDs in the UK were invited to participate in June 2018. Data were submitted using an online data collection portal. The audit was included in the NHS England Quality Accounts list for 2018/2019.

Participants were asked to collect data from ED patient records on consecutive cases who presented to the ED between 1 August 2018 – 31 January 2019.

See Appendix 1 for the audit questions and the standards section of this report for the standards.

Sample size

To maximise the benefit of the new run charts and features, RCEM recommended entering 5 consecutive cases per week. This enabled contributors to see their EDs performance on key measures, any changes week by week and visualise any shifts in the data following a quality intervention (PDSA cycle).

Country	Number of relevant EDs	Number of cases
National total	181/239 (76%)	17,235
England	159/179 (89%)	15,420
Scotland	5/28 (18%)	422
Wales	9/13 (69%)	710
Northern Ireland	6/10 (60%)	596
Isle of Man /Channel Islands	2/3 (66%)	87

Expected patient numbers	Recommended sample size	Recommended data entry frequency
<5 a week	All patients	Weekly
>5 a week	5 consecutive patients	Weekly

Alternative

In some cases, EDs found weekly data entry too onerous, departments were provided guidance on an alternative methodology of entering monthly data instead. The system recorded each patient's arrival date and automatically split the data into weekly arrivals, thereby preserving the benefit of seeing weekly variation.

Expected patient numbers	Alternative sample size	Alternative data entry frequency
<5 a week	All patients	Monthly
>5 a week	20 consecutive patients	Monthly

Pilot methodology

A pilot of the audit was carried out prospectively from 2 to 13 July. This tested the standards, questions, quality of data collectable, as well as the functioning of the online portal and reporting templates.

Several improvements were made to the final project based on feedback from the pilot sites.

RCEM were grateful to contacts from the following Trusts for helping with the development of the audit and integrated QIP:

- Frimley Health NHSFT
- St Helens & Knowsley Teaching Hospitals NHS Trust
- Luton & Dunstable University Hospital NHSFT
- North Tees Hospital NHSFT
- Western Sussex Hospitals NHS Foundation Trust

Standards

The audit asked questions against standards published by RCEM in July 2018:

STANDARD	GRADE	
1. Children presenting to Emergency Departments (EDs) with fever or febrile illness should have the following recorded as part of the initial assessment (within 15 mins of arrival or triage): • respiratory rate • oxygen saturation • pulse • blood pressure/capillary refill • GCS/AVPU • temperature	✔	**Fundamental**
2. Children presenting to EDs with fever or febrile illness should be assessed as to their risk of sepsis using a stratified risk assessment/screening tool.	✔	**Fundamental**
3. Children presenting with fever or febrile illness and without an apparent source of infection should be assessed as per NICE guidance traffic light system to guide further investigation and management.	✔	**Developmental**
4. There should be timely senior review (by an EM or paediatric consultant/ST4+ or equivalent non-training doctor) for children presenting to EDs with fever or febrile illness who: • are < 1 year of age • **OR** have no apparent source of infection with red features as per NICE feverish illness guidance • **OR** are assessed to be at intermediate or high risk of sepsis (2 or more amber features, or one red feature)	✔	**Developmental**
5. Children presenting to EDs with fever or febrile illness who are discharged home should be provided with an appropriate "safety net" including information to take home e.g. written advice, video, app.	✔	**Aspirational**
6. EDs should provide training for clinicians in the management of children presenting with febrile illness including recognition of sepsis.	✔	**Developmental**

Understanding the different types of standards

✔ **Fundamental**: need to be applied by all those who work and serve in the healthcare system. Behaviour at all levels and service provision need to be in accordance with at least these fundamental standards. No provider should provide any service that does not comply with these fundamental standards, in relation to which there should be zero tolerance of breaches.

✔ **Developmental**: set requirements over and above the fundamental standards.

✔ **Aspirational**: setting longer term goals.
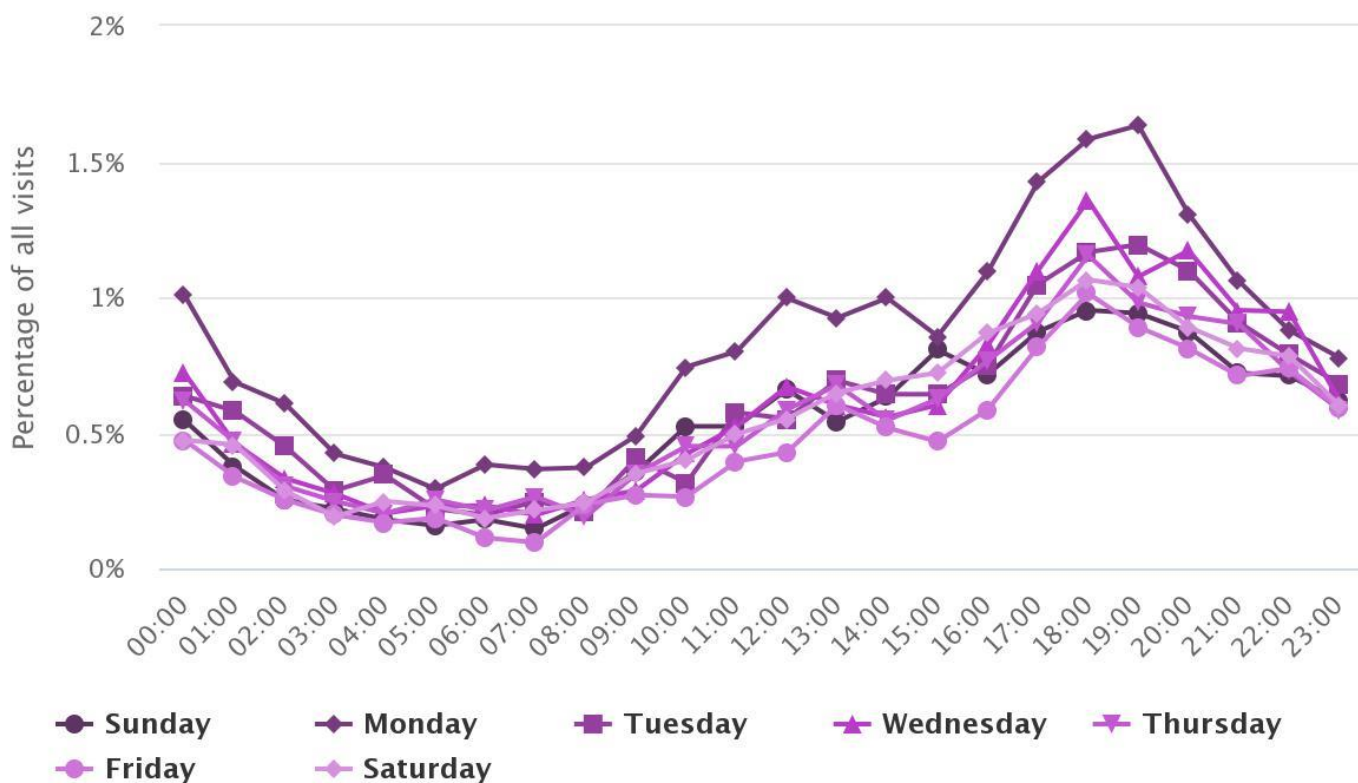
For definitions on the standards, refer to appendix.

Section 1: Casemix
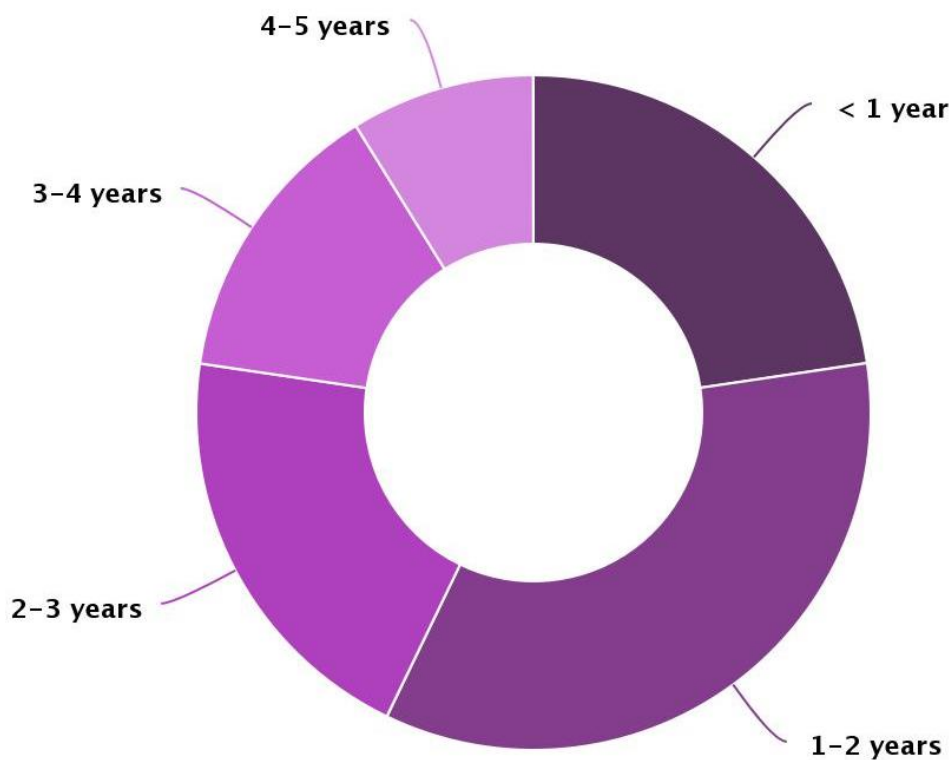
National casemix of the patients

Q1.2: Day and time of arrival

netsolving.com

Sample: all patients

The data showed a pattern of attendance reflective of national data. The peaks in attendance of children admitted to EDs, including those with fever, occurred in the late afternoon and evenings.

Q1.3: Patient age

netsolving.com

Sample: all patients

Evident from other national data resources most children presenting with fever were under 2 years of age.

This study revealed that 57% were under 2 years of age. This group remain the diagnostically hardest and riskiest group with implications on the importance of ensuring EDs achieve comprehensive senior decision maker presence with expertise in managing children at peak times of activity.

Q3.2: Sepsis risk
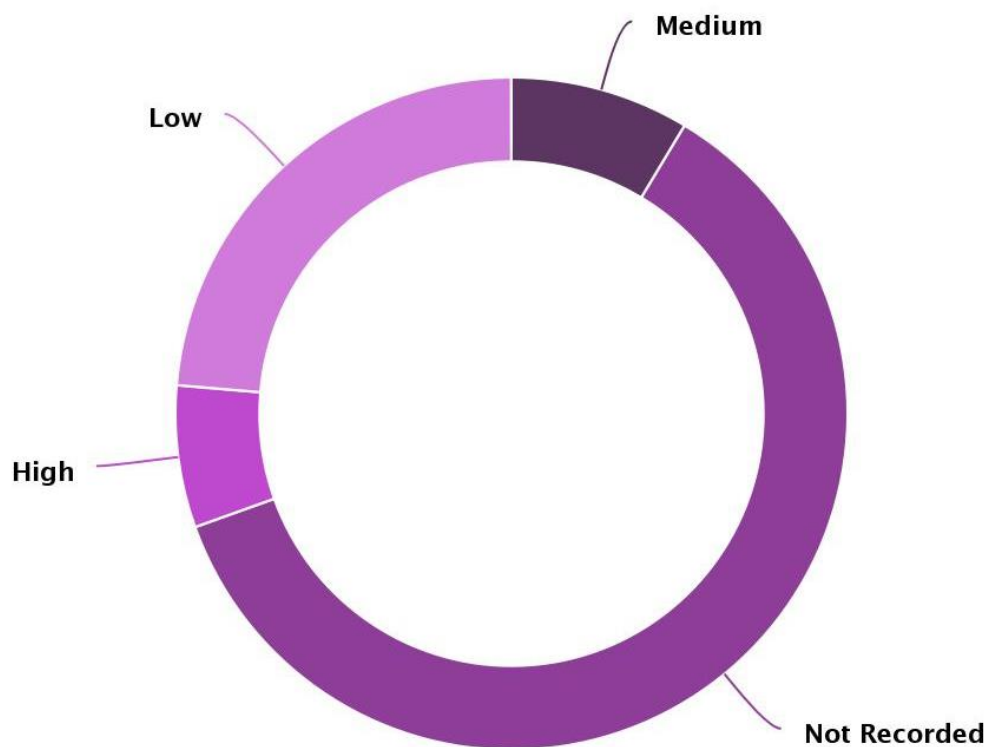
Sample: all patients

The data showed that only a small national proportion of feverish children (7%) were identified as high risk for sepsis.

This was reflective of national data, however, the lack of clear definitions for sepsis in children made it challenging to obtain a clear picture.

Therefore, EDs should ensure safeguards are in place to identify those at high risk and ensure they are investigated and managed appropriately.

Q4.1: Was the patient admitted within 4 hours
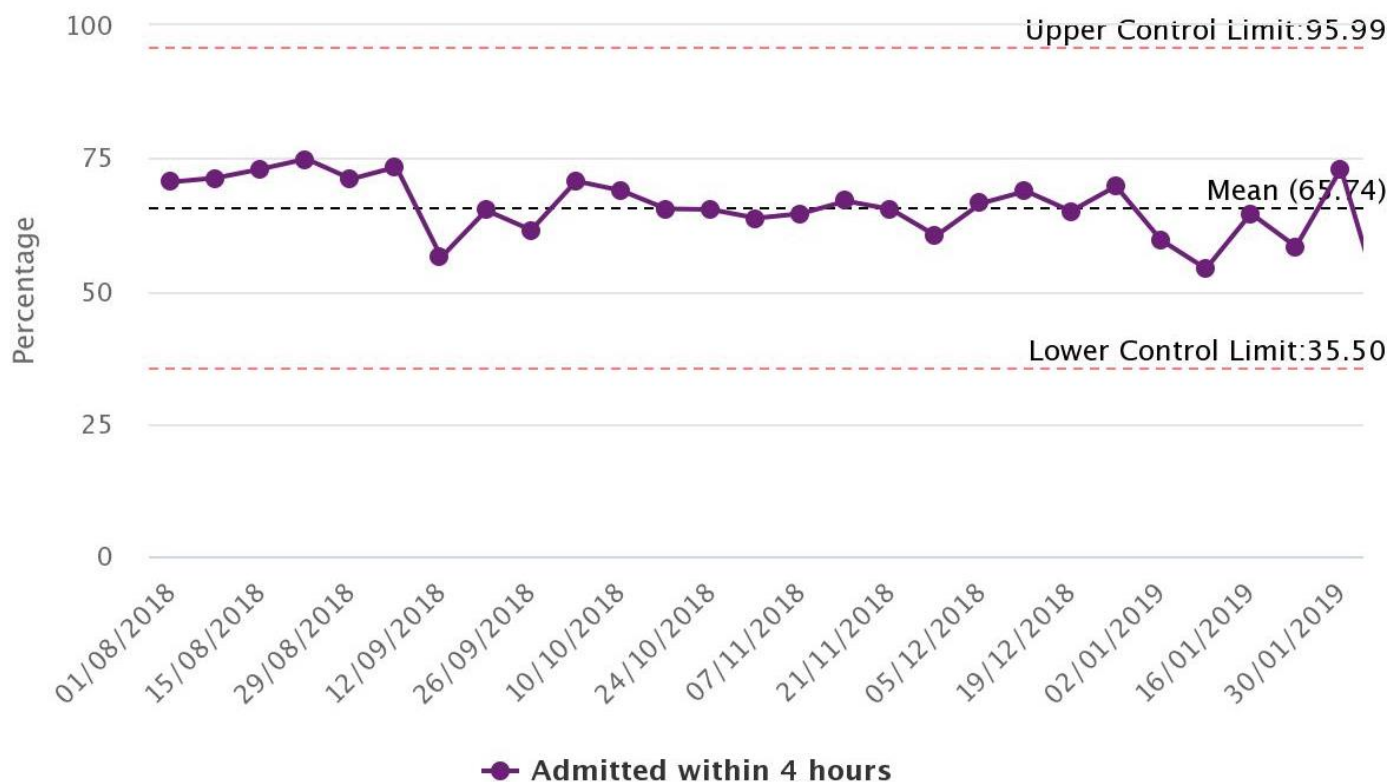
Sample: all patients

Data showed that 31% of children presenting with fever were admitted.

The results also revealed that a mean of 65% of patients were admitted within 4 hours. It was clear that this is more of a challenge for units to achieve in the winter months.

This data highlights how winter pressure on departments affects their ability to manage children in a timely way.

STANDARD 1: Initial assessment of vital signs

✅ **Fundamental Standard 1:** Children presenting to Emergency Departments (EDs) with fever or febrile illness should have the following recorded as part of the initial assessment (within 15 mins of arrival or triage):

- respiratory rate
- oxygen saturation
- pulse
- blood pressure/capillary refill
- GCS/AVPU
- temperature

Q2.1: Was respiratory rate measured and recorded within 15 minutes
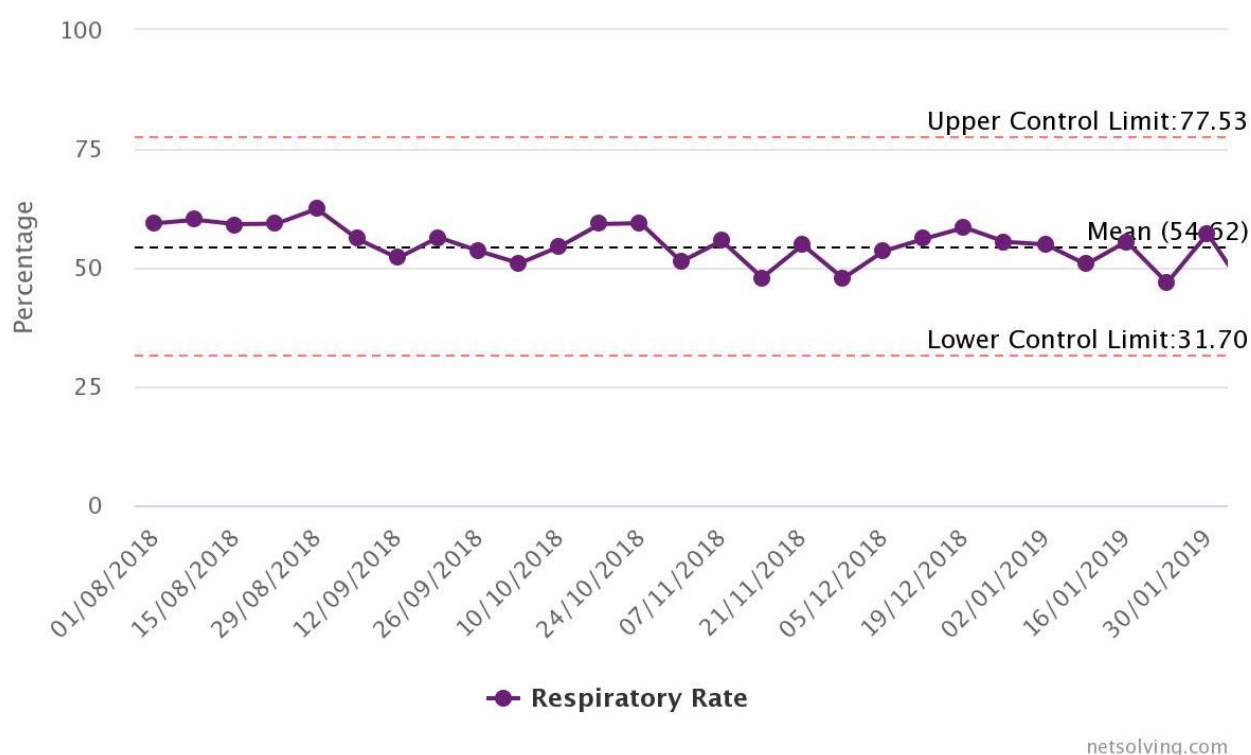
Sample: all patients

A mean of 54% of feverish children have respiratory rate measured and documented within 15 minutes of arrival in the ED. This remains similar to previous audits. In 2016, 53% of children presenting to EDs had vital signs checked within 15 minutes. Though not a statistical change there is variation over winter months that suggests EDs under pressure take longer to make initial assessments which may add risk to patient safety.

Although not entirely comparable, the respiratory rate recorded for the Feverish Child 2012/13 audit was 89% of audited patients nationally, compared to 78% achieved in 2010/11. It is worth noting that the standard for 2012/13 and 2010/11 audit were assessed within 20 minutes.

Therefore, it was clear to see that not all children were getting their observations done. This is slightly concerning and clearly demonstrates that some EDs have not been successful in improving quality and achieving the recommended standards of care.

QIP

QIP suggestion: Organisations should consider why their ED may face issues achieving initial assessment within 15 minutes. RCEM recommend using QI tools such as process mapping and driver diagrams to identify ways to improve the triage/streaming process, and identify any waste that could be eliminated. Where necessary, map the requirements to build a business case for additional resource.

Q2.2: Was oxygen saturation measured and recorded within 15 minutes
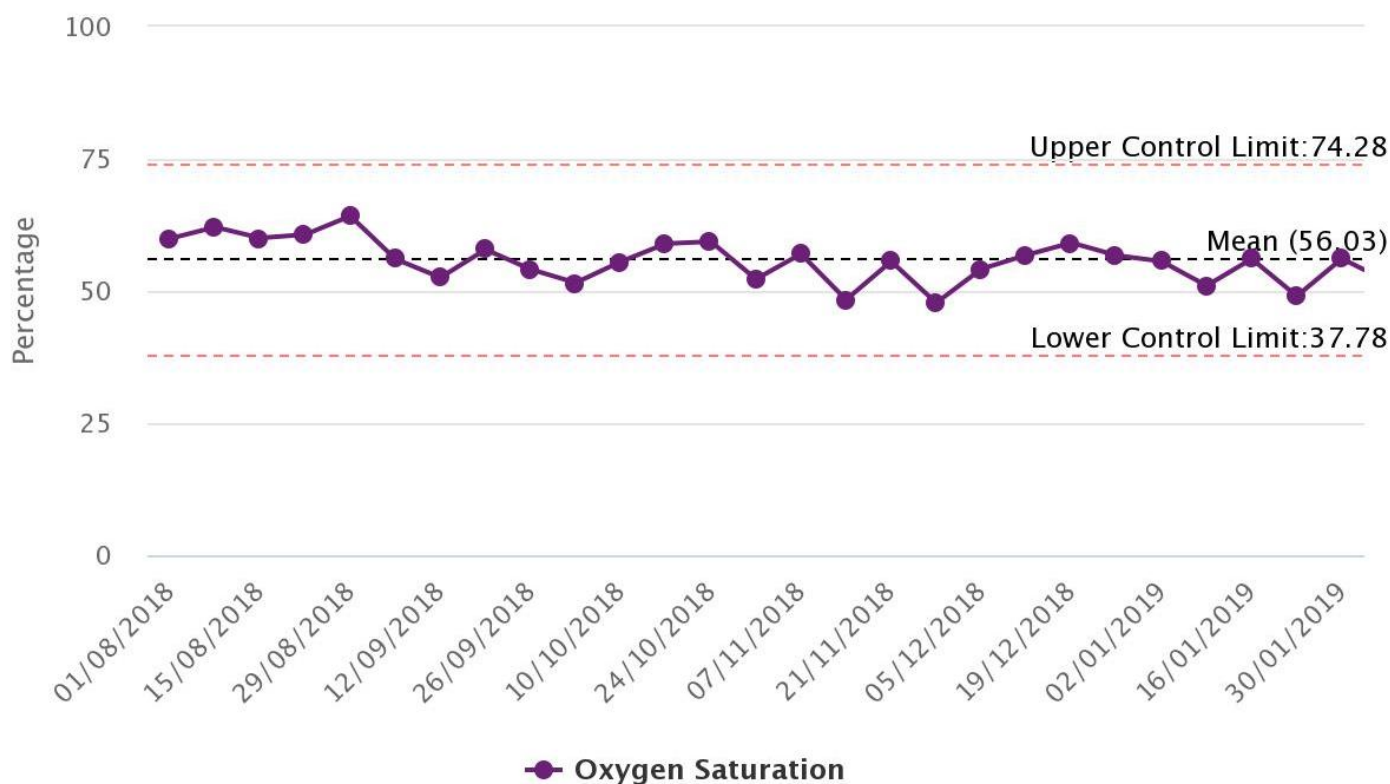
netsolving.com

Sample: all patients

Modality is often used to assess oxygen saturations and HR measurements; therefore, it was unsurprising that these measurements mirrored each other in this report.

The data revealed that 56% of feverish children had oxygen saturations measured as part of an initial assessment within 15 minutes. This was a slight improvement from the 2016 vital signs audit where this was 52%.

It is clear, that pressure in the winter months made it harder for units to achieve this fundamental target.

It is worth noting that the figures obtained for this standard in 2012/13 was 94% for oxygen saturation measured and assessed within 20 minutes.

Q2.3: Was pulse measured and recorded within 15 minutes
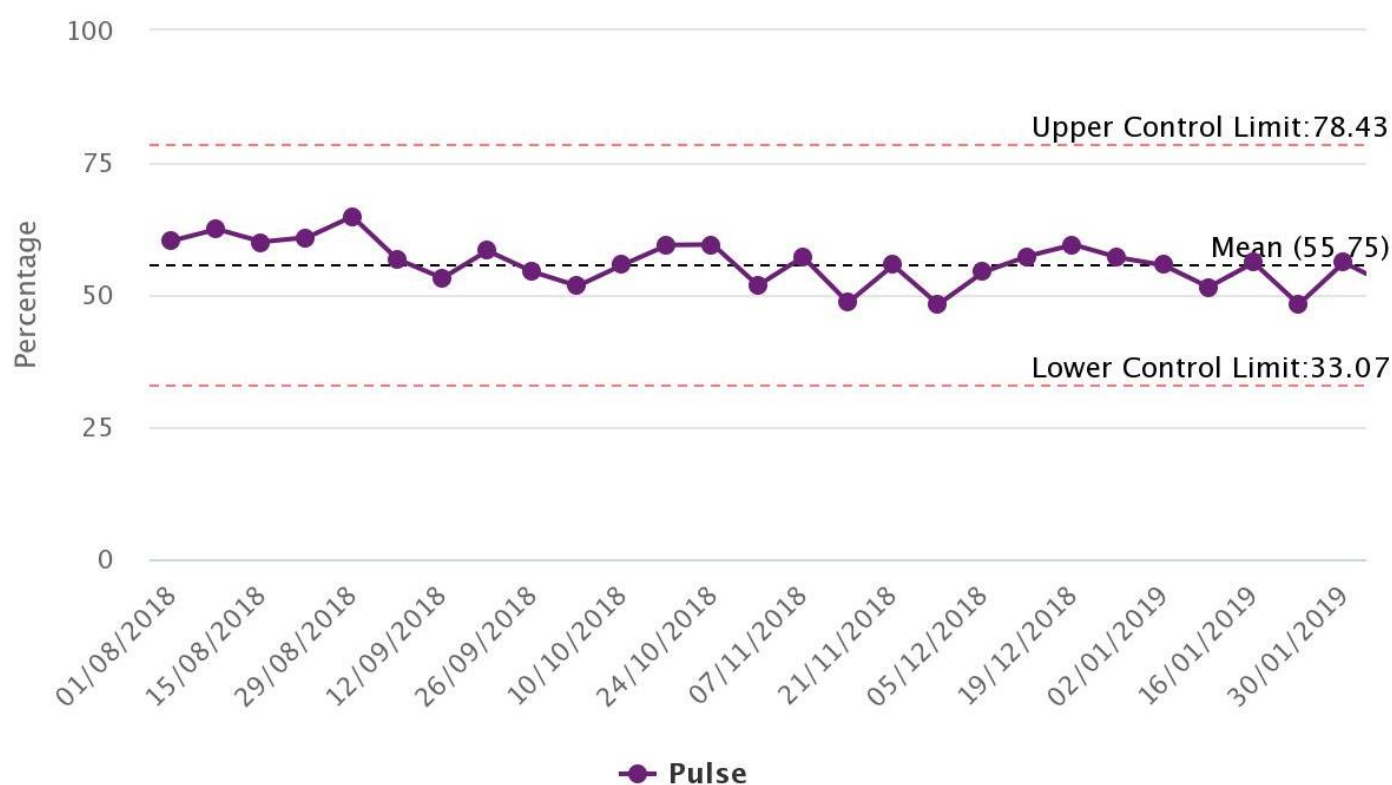
Sample: all patients

A mean of 55% was achieved for pulse measured and recorded within 15 minutes of arrival in the ED. This figure remained similar to that obtained in the 2016 vital signs audit where 53% of children presenting to EDs had their vital signs checked within 15 minutes.

The results have also showed that Trusts have consistently achieved this standard half of the time. Therefore, much improvement is required in order to meet the standard.

Although not directly comparable, in 2013/12 audits, 96% of patients had their pulse measured and recorded within 20 minutes.

Q2.4: Was Systolic blood pressure / capillary refill measured and recorded within 15 minutes
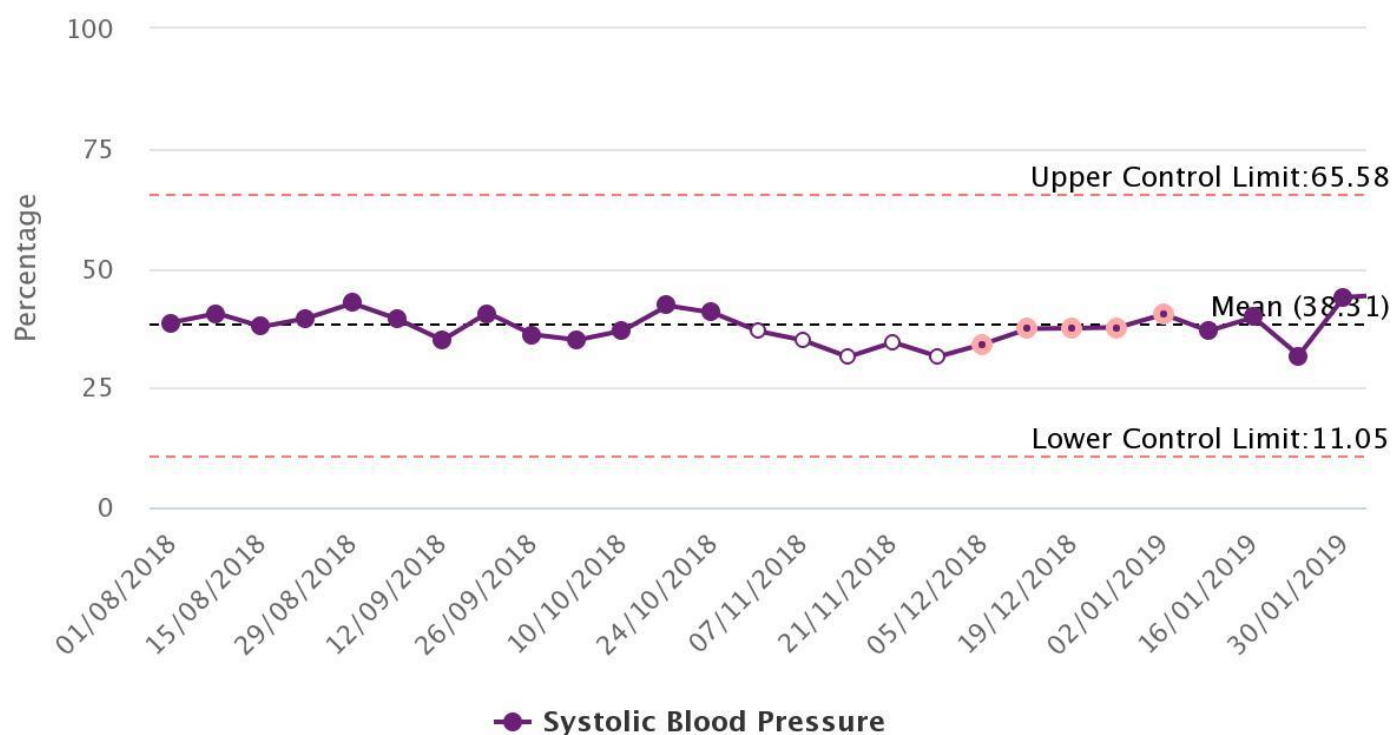
Sample: all patients

The data revealed that systolic blood pressure and/or capillary refill measured and recorded within 15 minutes remained low with a mean of 38% achieved.

The highest performing EDs were only managing to measure this within 15 minutes 52% of the time. Winter pressures in November made this significantly more challenging for departments to achieve nationally, as indicated by the run of five white dots below the mean.

However, a small improvement occurred between December and January, evident from the five red dots, which was encouraging. EDs are encouraged to explore the reasons for this improvement and should maintain improvements locally.

In 2012/13 the figures obtained for systolic blood pressure and/or capillary refill measured and recorded within 20 mins were 47% in 2010/11 and 63% in 2012/13 demonstrating that this vital sign was the least well recorded of the six recommended vital signs.

NICE guidance stipulates that we should "measure the blood pressure of children with fever if the heart rate or capillary refill time is abnormal and the facilities to measure blood pressure are available. [2007]".

It is pertinent for EDs to explore the challenges they have faced in measuring these important parameters of perfusion and potential sign of deterioration and shock.

QIP

QIP suggestion: It is recommended that organisations follow a recognised process to identify barriers for staff completing this important measure such as emotional mapping (1) of the assessment process. Co-designing solutions is also highly recommended to maximise uptake.

Q2.5: Was GCS score (or AVPU) measured and recorded within 15 minutes
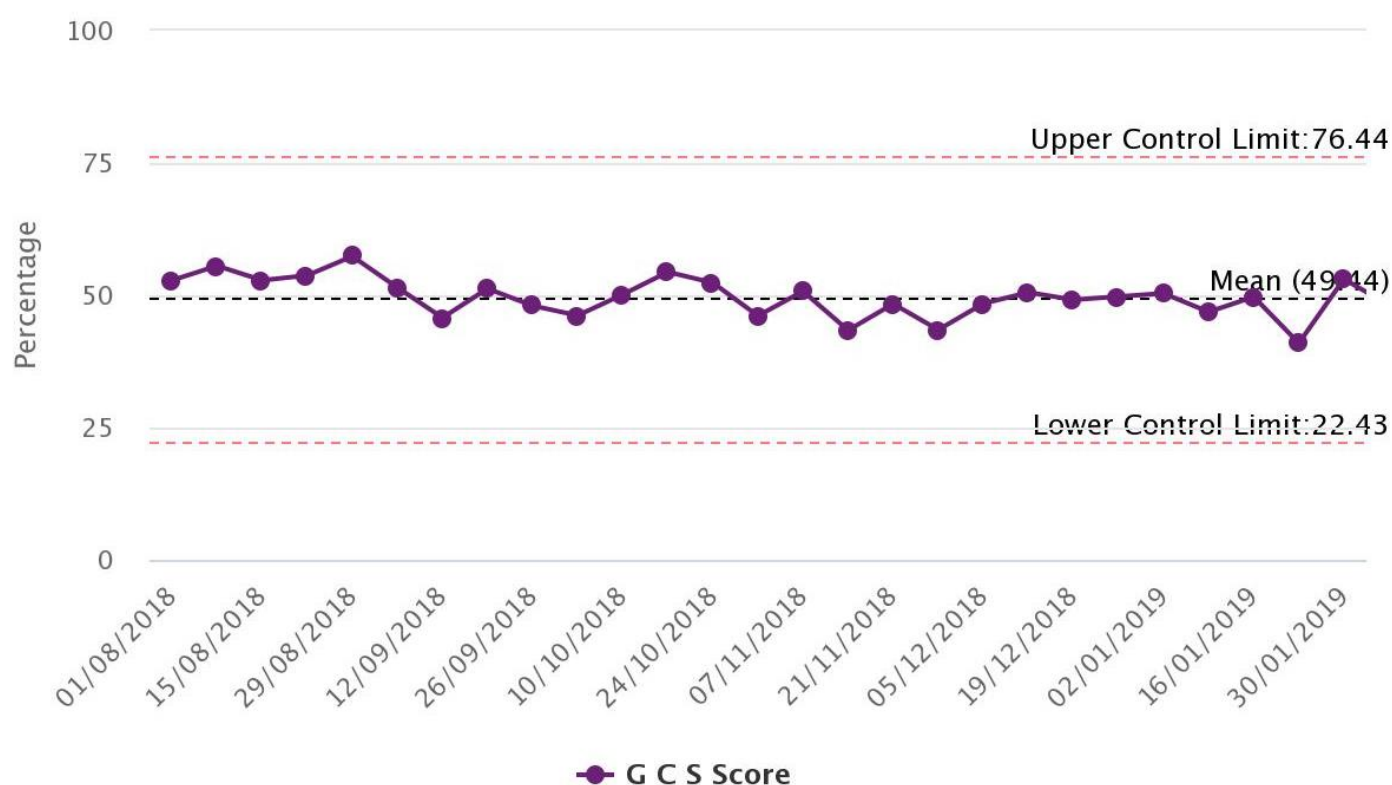
Sample: all patients

The data revealed a mean of 49% for GCS score (or AVPU) measured and recorded within 15 minutes with the top performing ED only achieving this 62% of the time. This was an improvement since the 2016 vital signs audit when 40% children with an illness had GCS/AVPU measured within 15 minutes.

It is interesting to note that a GCS score (or AVPU) measured and recorded within 20 minutes was recorded for 79% of audited patients in 2012/13 nationally compared to 63% in 2010.

Much improvement is still required for this vital sign for the fundamental standard to be achieved.

Q2.6: Was temperature measured and recorded within 15 minutes
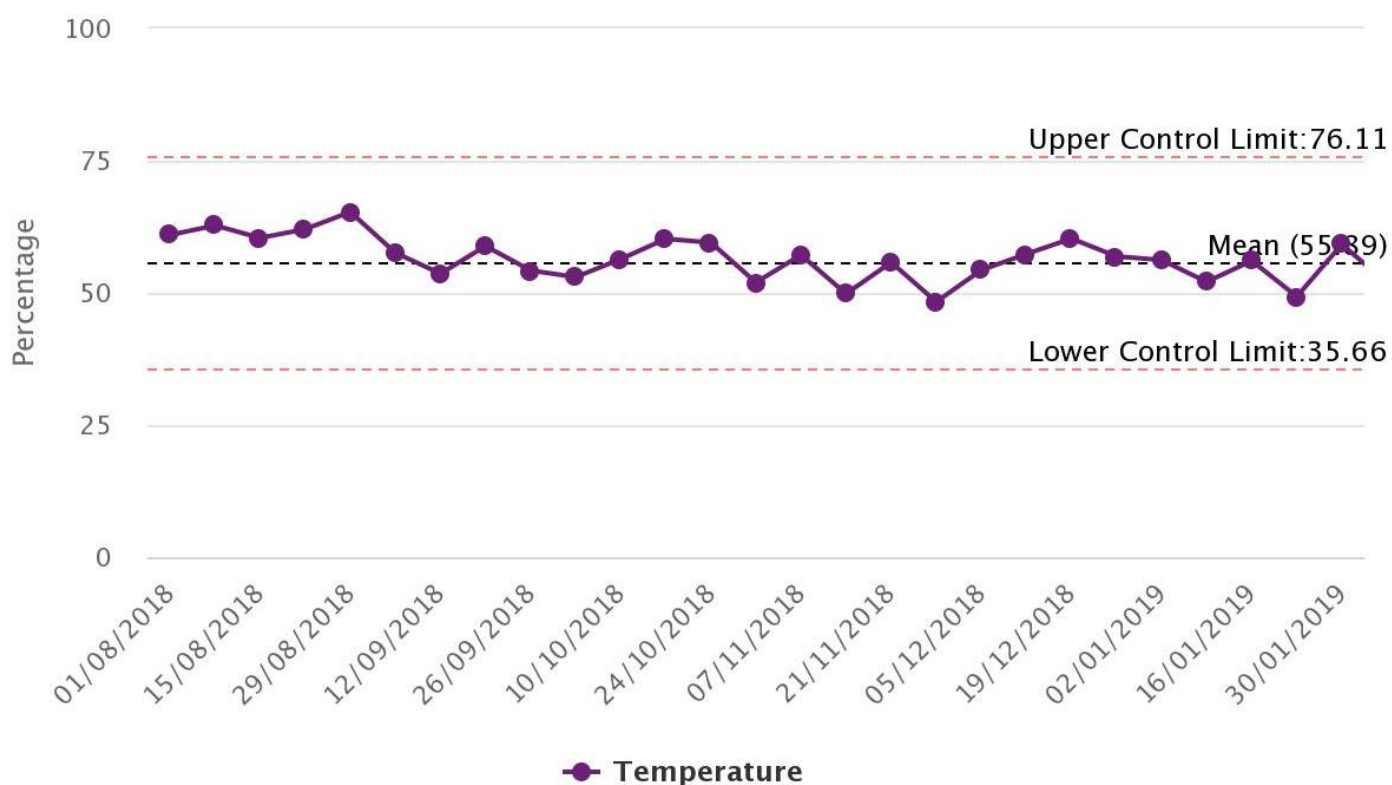
Sample: all patients

The data from the analysis showed a mean of 55% for temperature measured and recorded within 15 minutes, with the highest performing EDs managing to achieve this standard 85% of the time.

In 2012/13 temperature was measured and recorded within 20 minutes in the notes for almost all audited patients nationally.

Therefore, much improvement is required to ensure that Trusts achieve the recommended standard of care.

STANDARD 2: Sepsis risk assessment

Fundamental Standard 2: Children presenting to EDs with fever or febrile illness should be assessed as to their risk of sepsis using a stratified risk assessment/screening tool.

Q3.2: Was a sepsis risk stratification tool used?
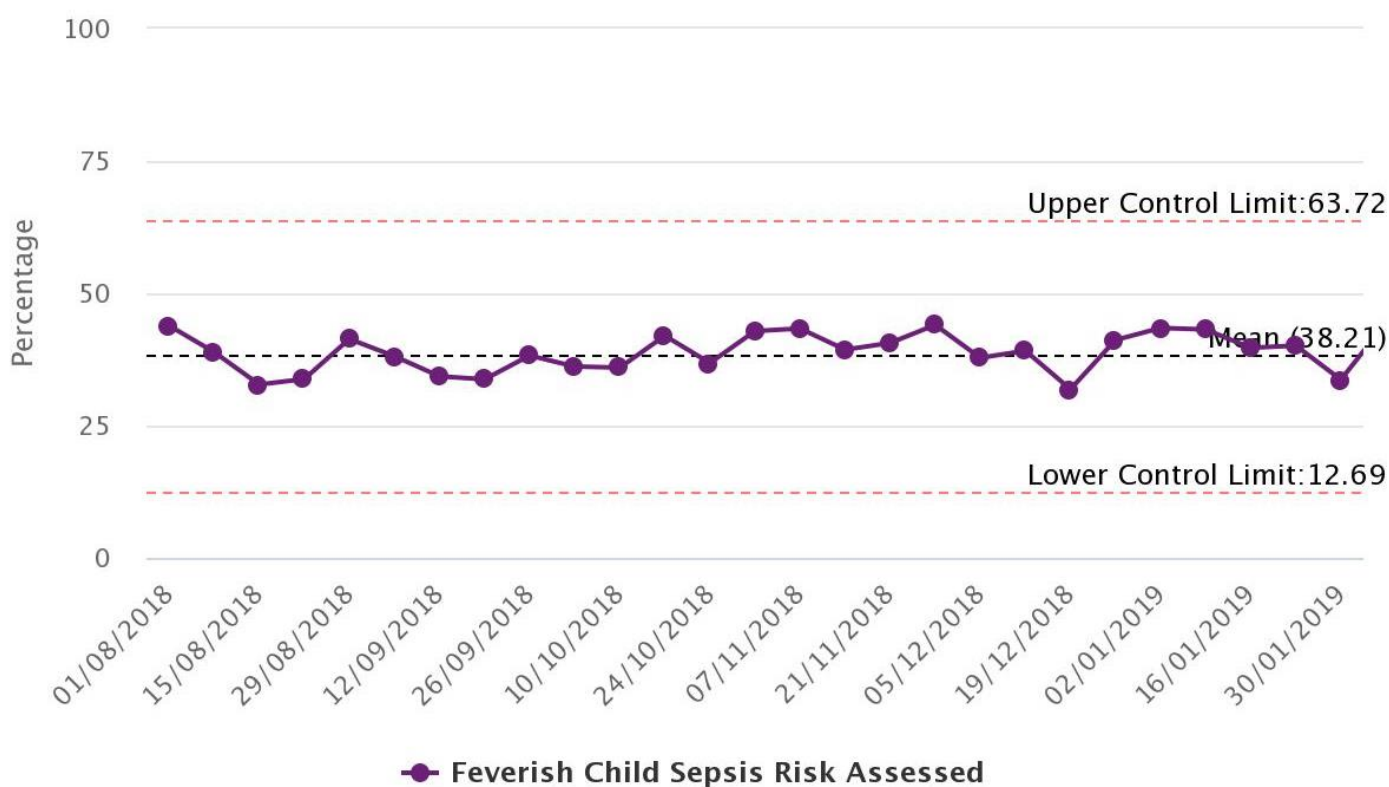
Sample: All patients

The data showed that 92% of EDs reported to using a tool to assess risk of sepsis in children. However, the mean showed that a sepsis risk stratification tool was being used only 38% of the time.

This suggested the tools were challenging for departments to use.

QIP

QIP suggestion: to use PDSA to refine a tool using small patient samples.

Case Study – A PED in London had been piloting and carrying out a PDSA on a locally developed sepsis risk assessment tool. Their study revealed that in the initial phase many children with fever and tachycardia triggered red alert for sepsis though clinically did not warrant following the sepsis 6 as another differential was apparent.

Enabling senior nurses to step a child onto the amber pathway improved flow while maintaining safe management of febrile children and improved local usability of the form.

The following charts will give you further information about investigations done for patients at high risk of sepsis.

Q3.2a: Is there evidence of blood gas investigations?

Sample: Q3.2 = Yes – high risk

The data showed a mean of 34% high risk patients had a blood gas taken. A large downward spike in data occurred in November.

Q3.2b: Is there evidence of blood culture investigations?
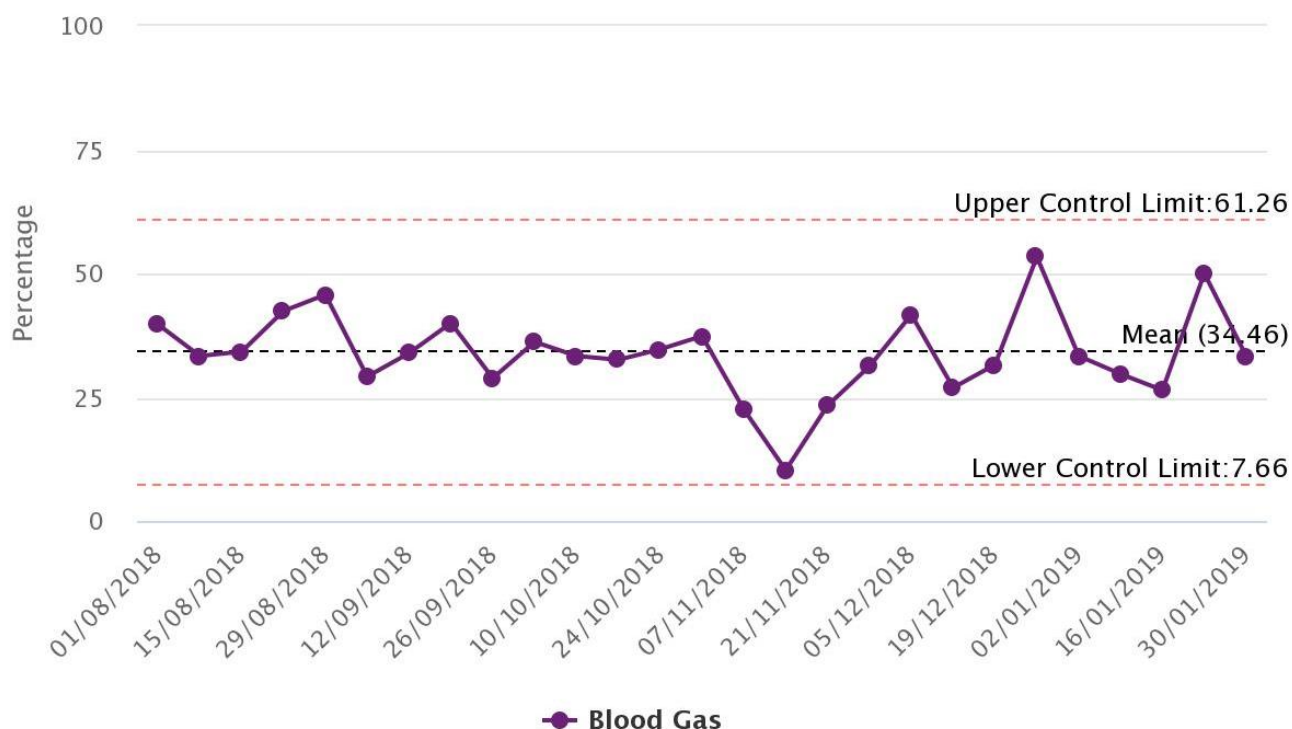
netsolving.com

Sample: Q3.2 = Yes – high risk

Data revealed a mean of 30% high risk patients had a blood culture taken.

Blood culture investigations were recorded in 27% of relevant cases for 2012/13 and 24% in 2010/11.

Q3.2c: Is there evidence of FBC investigations?

Q3.2 = Yes – high risk

The data revealed a mean of 34% high risk patients had full blood count (FBC) sent. A national drop in the proportion of patients with evidence of FBC investigations occurred in November and then end January, however this was not sustained long enough to be considered a trend. Increases occurred during the third week of August, first and last week of January but they were not sustained long enough to be considered a trend.

FBC investigations were recorded in 32% of relevant cases for 2012/13 and 37% in 2010/11.

Q3.2d: Is there evidence of CRP investigations?
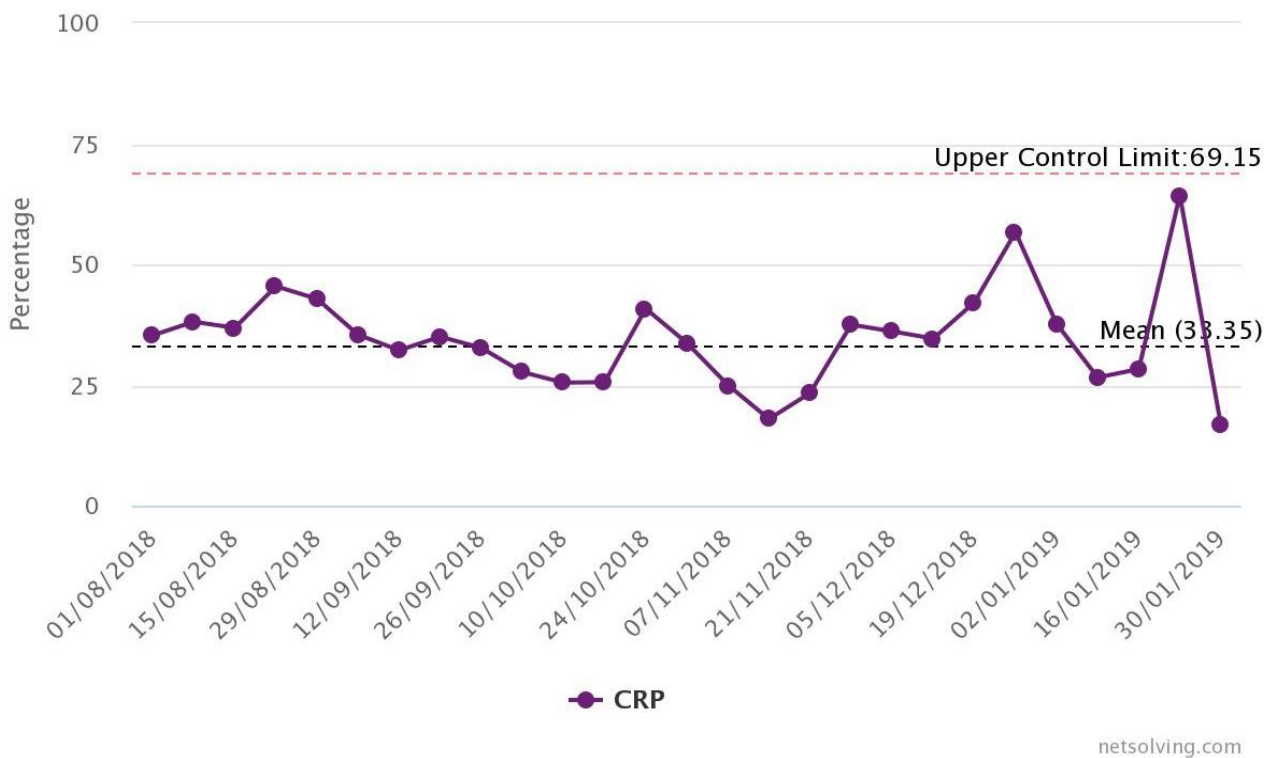
Sample: Q3.2 = Yes – high risk

The data revealed a mean of 33% high risk patients had CRP investigations.

CRP investigations were recorded in 32% of relevant cases for 2012/13 and 37% in 2010/11.

Q3.2e: Is there evidence of U&E investigations?
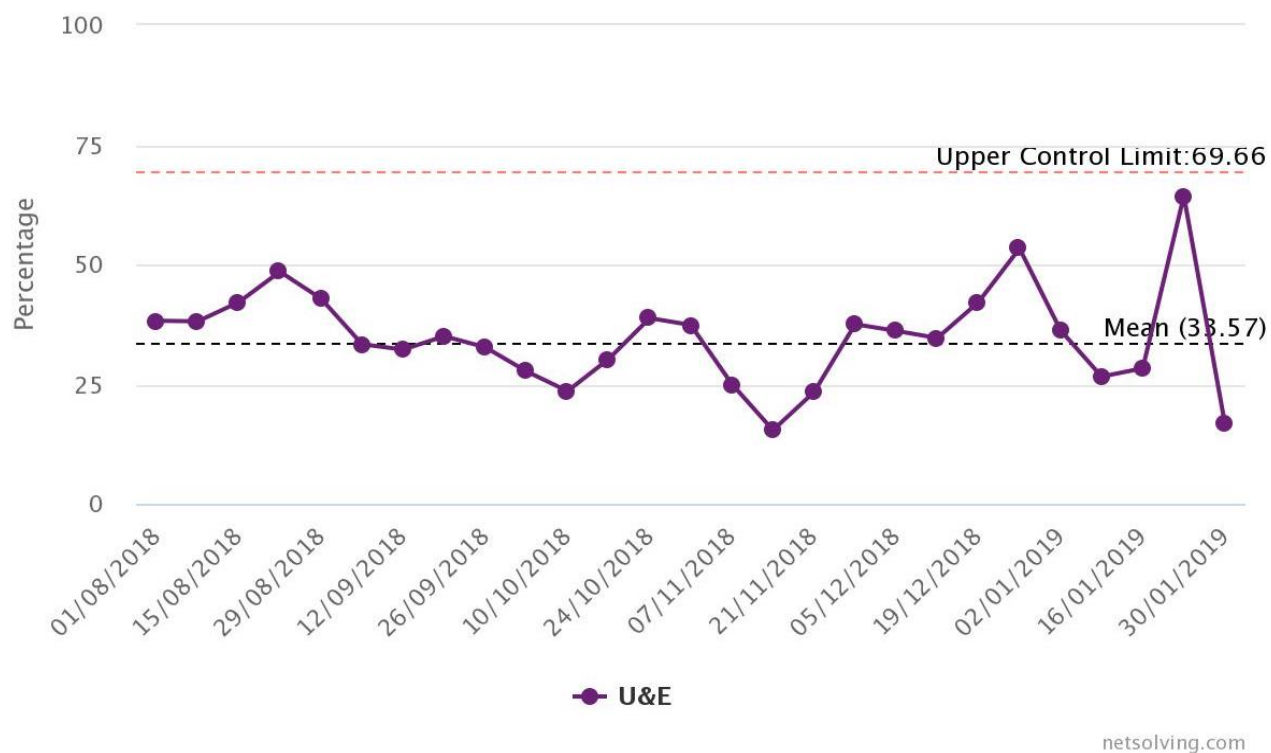
Sample: Q3.2 = Yes – high risk

The data revealed a mean of 34% high risk patients having U&E investigations.

U&E investigations were recorded in 39% of relevant cases for 2012/13 and 23% in 2010/11.

Q3.2f: Is there evidence of creatinine investigations?
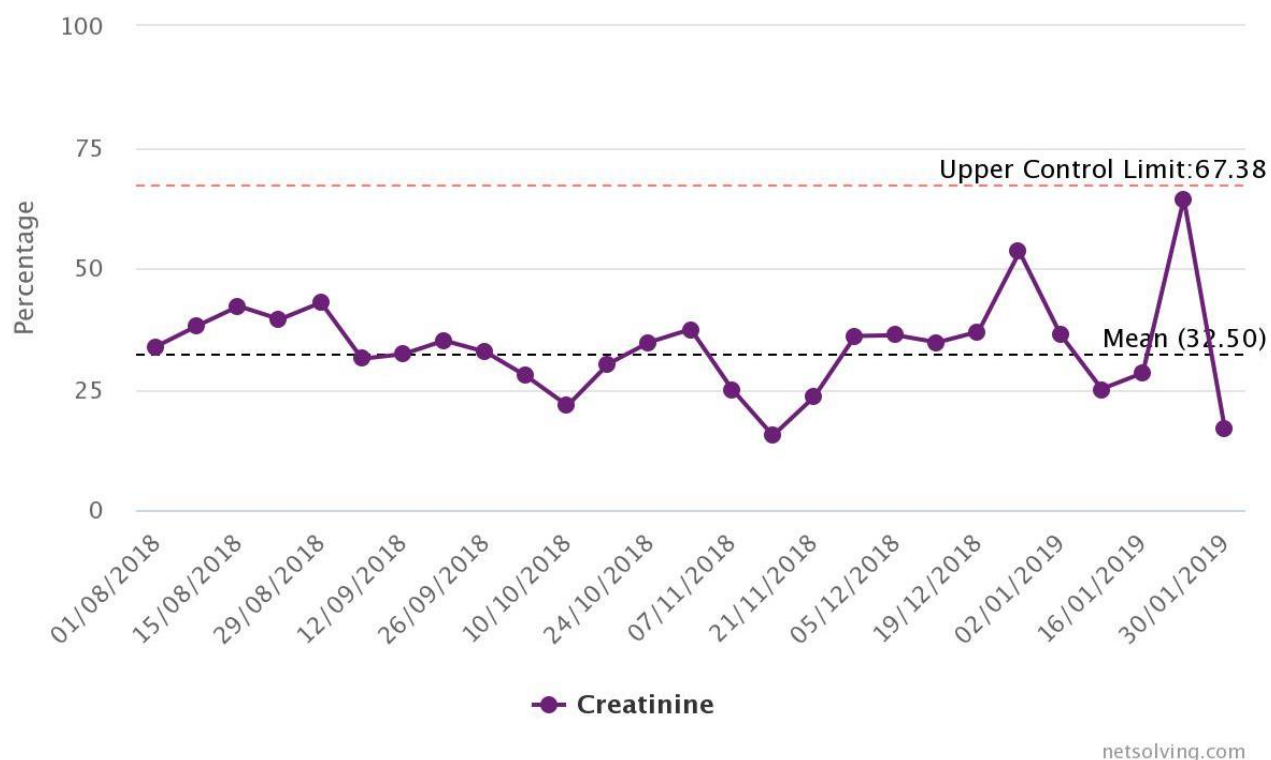
Sample: Q3.2 = Yes – high risk

The data revealed a mean of 35% of high risk patients had evidence of creatinine investigations.

Q3.2a: Is there evidence of clotting investigations?

Sample: Q3.2 = Yes – high risk

The data revealed that a mean of only16% high risk patients for sepsis had clotting checked

It is concerning that such low numbers of feverish children deemed to be high risk of sepsis received appropriate investigations. This may reflect that they were subsequently reviewed and no longer deemed high risk, or indeed moved on from ED to a paediatric area for ongoing care. However EDs should take steps to ensure safeguards are in place for teams to identify those at risk and perform appropriate investigations, period of observation and arrange appropriate timely senior review for these high risk children before being discharged.

STANDARD 3: Children without apparent source of infection

Developmental Standard 3: Children presenting with fever or febrile illness and without an apparent source of infection should be assessed as per NICE guidance traffic light system to guide further investigation and management.

Q3.4: Did the patient have an apparent source infection and Q3.4a: Is it clear from the records whether the patient was at low risk, intermediate risk or high risk of serious bacterial illness as per NICE feverish child traffic light guidance?
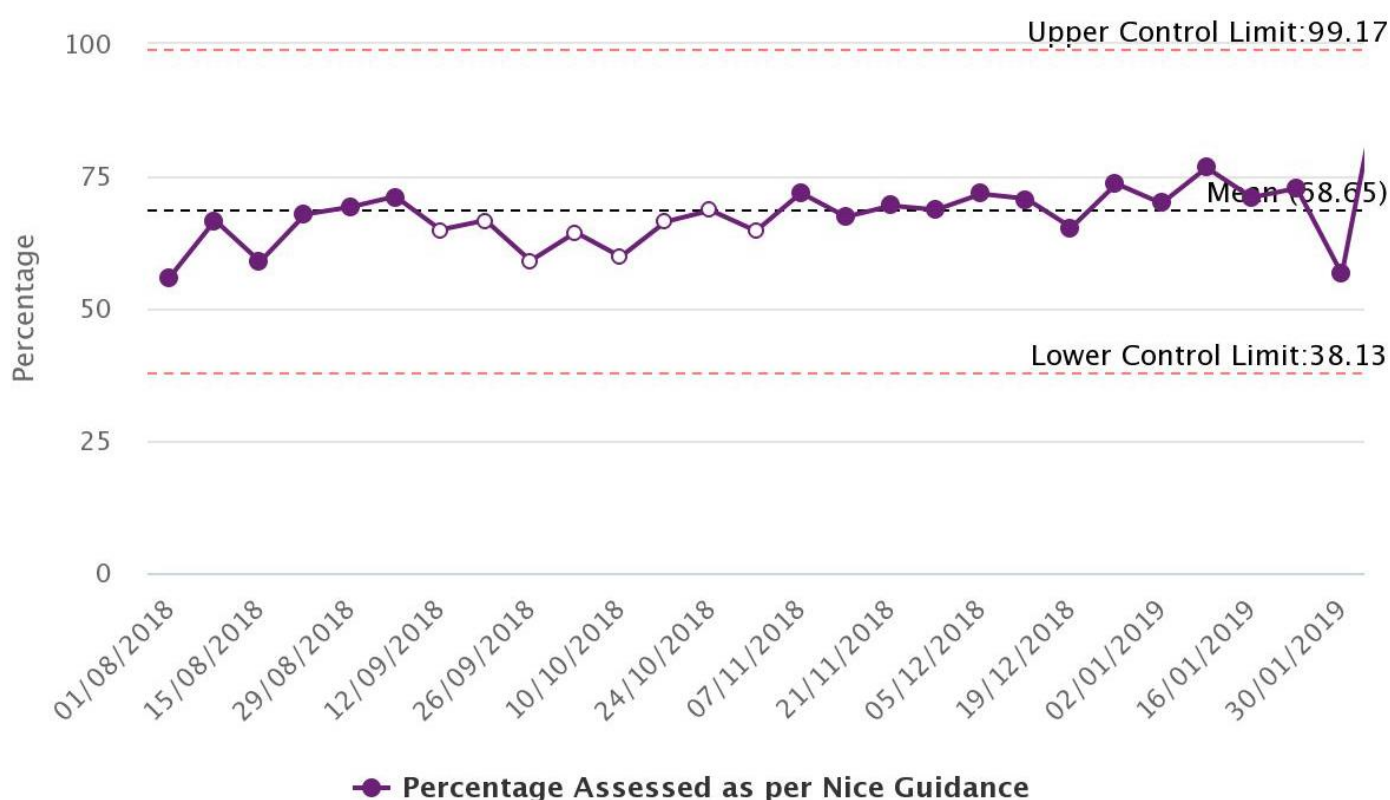
Sample: Q3.4 = no

The results indicated that nearly 70% of EDs are using NICE guidance to assess and manage children presenting with fever or febrile illness, who did not have an apparent source of infection. As NICE is the national institute of clinical excellence the aim should be to approach 100% nationally. The chart demonstrates that this was consistent over time, however the run of white dots show where national performance was consistently below the mean for 8 weeks.

This standard also investigated whether the patient was at low risk, intermediate risk or high risk of serious bacterial illness as per NICE feverish child traffic light guidance. Nationally 10% were high risk (with red features), 22% were intermediate risk (with amber features) and 35% were low risk (with green features). For 34% of children nationally their risk level of serious bacterial illness was not clear in their records.

QIP

QIP suggestion: Units struggling to assess febrile children without an apparent source of infection as per the NICE guidance traffic light system should consider creating a multidisciplinary team to identify barriers. As this is an evidence based guideline developed to optimise safe quality care for this risky group of children, EDs are encouraged to engage in PDSA initiatives to improve uptake and share their examples of good practice wherever possible.

STANDARD 4: Timely senior review

✅ **Developmental Standard 4:** There should be timely senior review (by an EM or paediatric consultant, ST4+ or equivalent non-training doctor) for children presenting to EDs with fever or febrile illness who:

- are < 1 year of age
- **OR** have no apparent source of infection with red features as per NICE feverish illness guidance
- **OR** are assessed to be at intermediate or high risk of sepsis (2 or more amber features, or one red feature)

Q3.5: When did the patient have a clinical review by a senior (ST4+) EM or paediatric clinician?

— Cases reviewed by Em or Consultant in under four hours
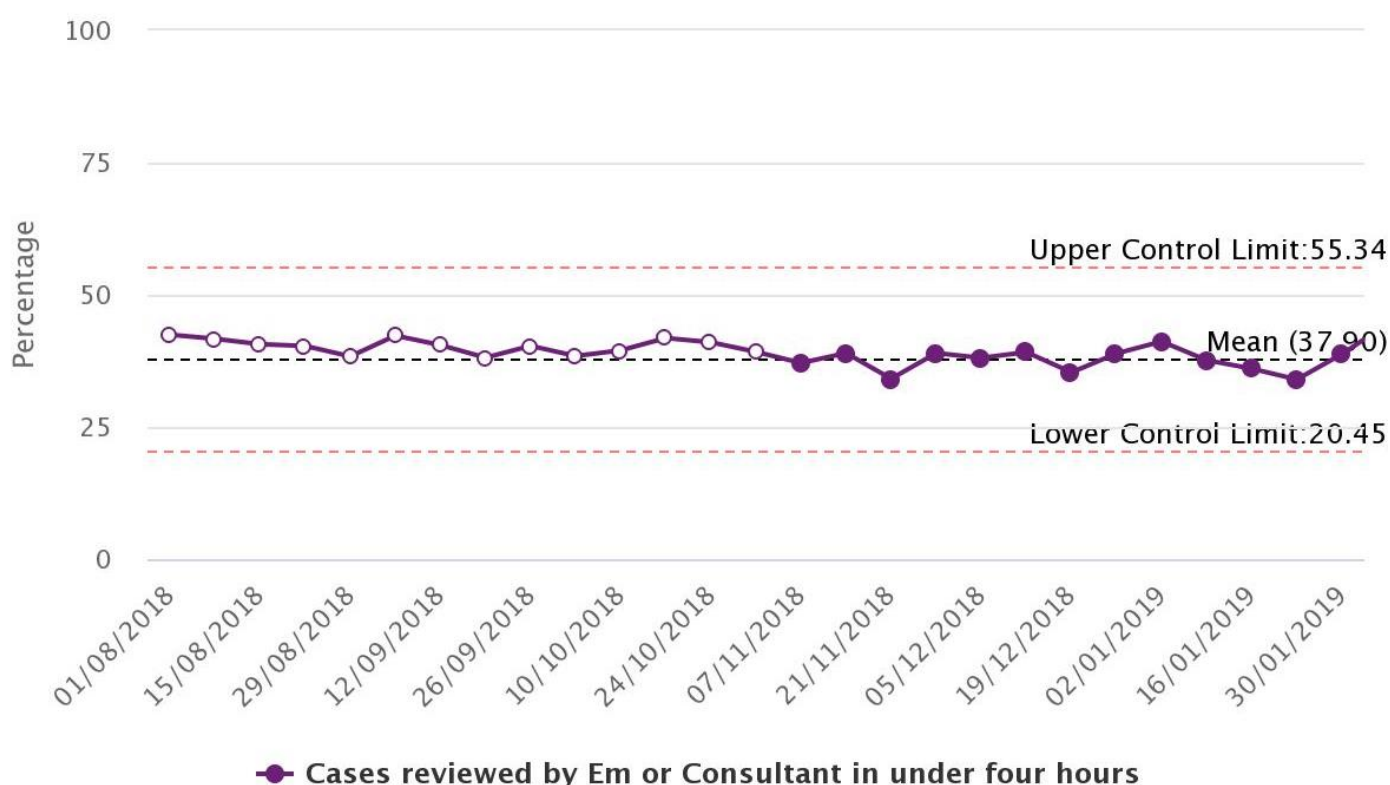
netsolving.com

Nationally an average of 38% of high-risk children with fever received a timely review by a senior decision maker (an EM or paediatric consultant, ST4+ or equivalent non-training doctor).

The SPC chart demonstrates that it is significantly more challenging to meet this standard in the winter months. The run of white dots from August shows that national performance was consistently above the mean until late autumn. It also suggests that EDs have challenges sufficiently resourcing their senior teams to achieve the level of care deemed fundamental to safe patient care, and that this was more challenging to achieve in winter months.

The highest performing unit achieves this 75% of the time, and it is recognised that the set up and resourcing of teams varies across the nation. However, it was worrying that the lowest reported unit only achieved this less than 7% of the time. Such wide control limits have demonstrated huge inequalities in standards of care.

RCEM would welcome those achieving this standard to share their learning with others, so that those not achieving timely senior review might be able to address their own areas of concern, thus helping to provide better levels of safe patient care.

STANDARD 5: Discharge information

✅ **Aspirational Standard 5:** Children presenting to EDs with fever or febrile illness who are discharged home should be provided with an appropriate "safety net" including information to take home e.g. written advice, video, app.

Q4.1: Was the patient discharged and Q4.2: Was appropriate "safety net" provided, including information to take home?

Discharged with Appropriate safety net Information Provided
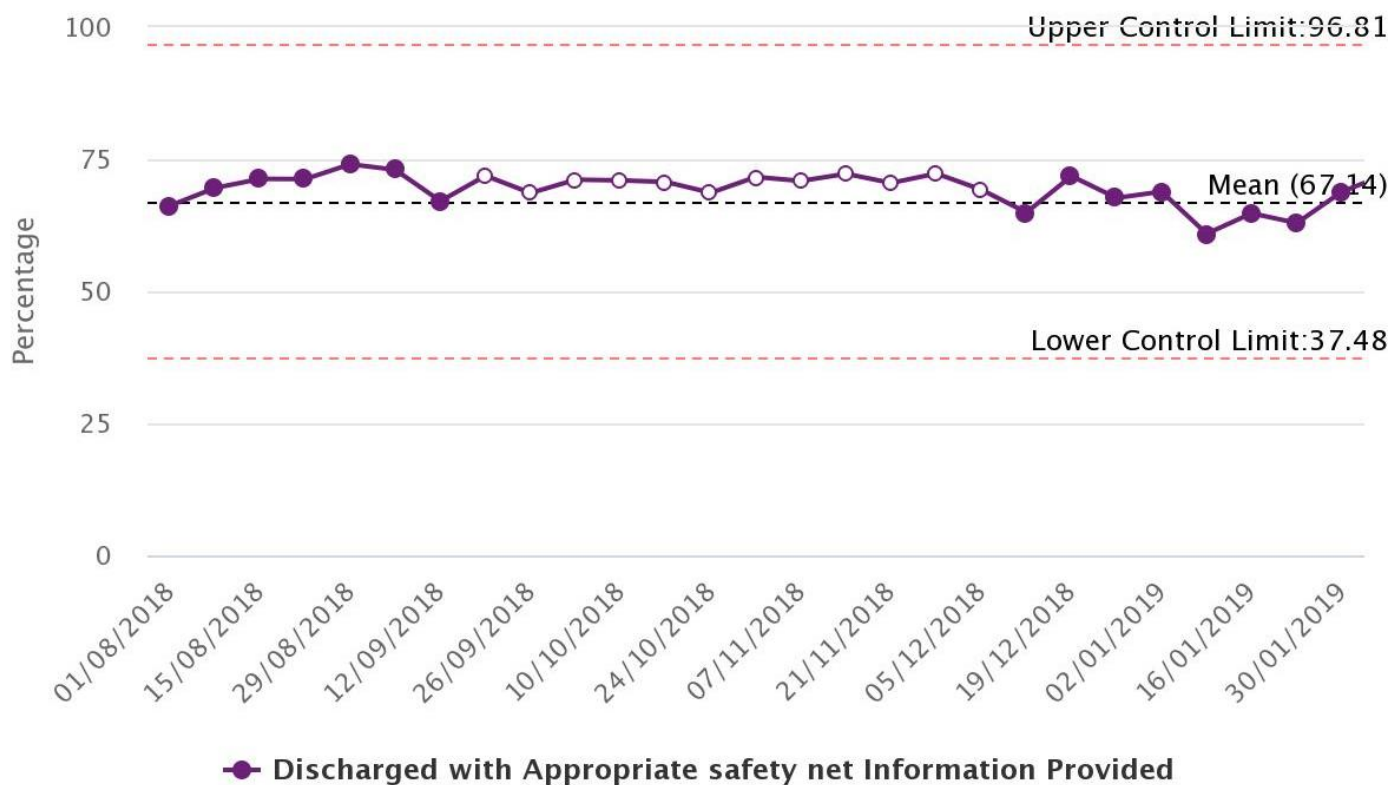
netsolving.com

Sample: Q4.1 = discharged

It was evident that there is good use of safety net advice being applied across EDs with narrow control limits and that EDs were achieving this consistently throughout the year.

The national mean showed that 67% of children presenting to the ED with fever and febrile illness were discharged home with appropriate safety net information and advice.

QIP **QIP suggestion:** Trusts are encouraged to share their learning and tools and types of resources used across the country.

STANDARD 6: Training

✓ **Developmental Standard 6:** EDs should provide training for clinicians in the management of children presenting with febrile illness including recognition of sepsis.

Organisational Q1.5: What training does your trust provide for clinicians managing febrile children (tick all that apply)?
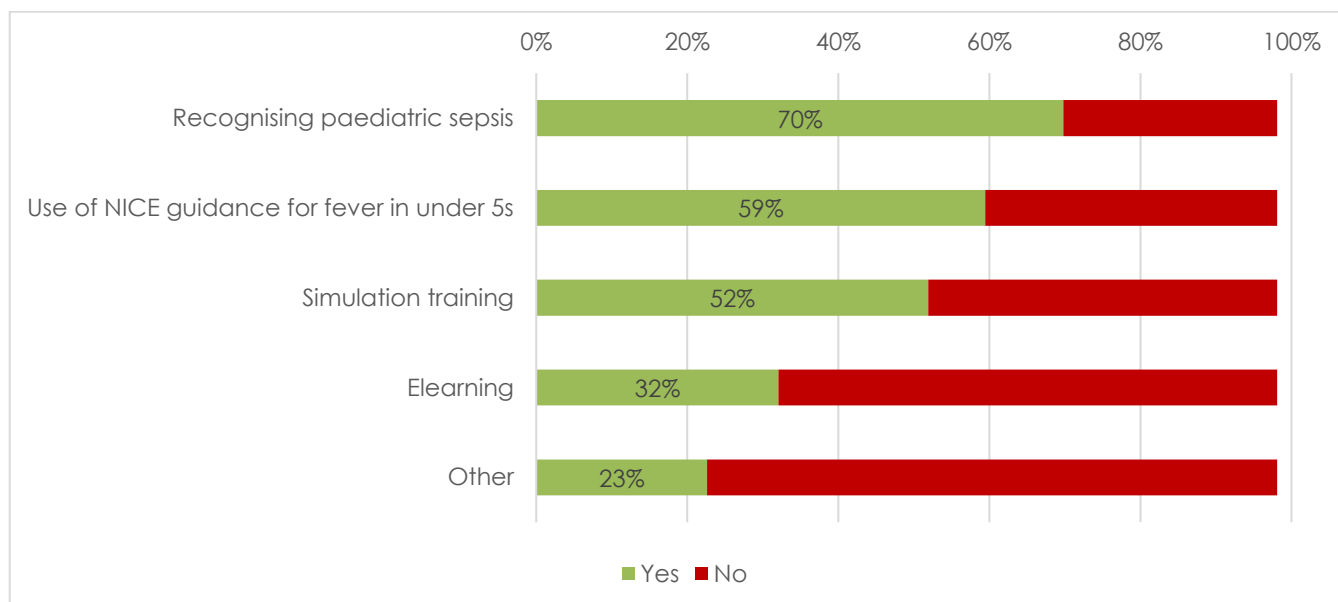
Sample: 106 Emergency Departments (national data)

It was pleasing to see that most Trusts have been providing training for clinicians in the management of children presenting with febrile illness including recognition of sepsis. This was evident from the results where nationally 70% taught how to recognise paediatric sepsis, 59% taught NICE guidance for fever in under 5s, and 32% provided simulation training.

In addition to those listed here, the results revealed that teams were providing experiential learning through ad hoc shop floor and board round teaching. Furthermore, it was also evident that many have included it as part of their induction training or departmental training programmes for their teams.

It was worrying that 8 EDs reported they do not provide any training in management of the feverish child.

Useful resources can be found online such as spotting the sick child (3) developed by RCPCH.

Organisational audit

This section provides the data for the organisational audit.

Early warning score

97% EDs use an early warning score

What do they use?
67% use a PEWS
10% use POPs
7% use NEWS or NEWS2

Training

70% recognising paediatric sepsis

59% use of NICE guidance

52% simulation training

32% Elearning

23% other

Identifying sepsis risk

91% EDs use a tool to identify children at risk of sepsis

What tool do they use?
- **40%** locally developed tool
- **28%** UK sepsis Trust ED/AMU sepsis screening and action tool
- **20%** use NICE sepsis risk stratification tool
- **4%** use another tool

Clinical management tool

92% EDs instigate a clinical management tool if a child is identified as at risk of sepsis

What tool do they use?
- **46%** UK sepsis trust sepsis 6
- **30%** locally developed tool
- **12%** NICE sepsis risk stratification
- **4%** use another tool

Patient advice

81% written leaflet

5% app or electronic resource

8% signpost to external resources

18% other (e.g. verbal advice)

Analysis

Patient data

EDs continued to face challenge in achieving timely initial assessment and timely senior decision maker review, with evidence of more challenge during the busy winter months. This continued to highlight that EDs were struggling to staff teams with the necessary resources to meet their demands; with implications on achieving high quality standards of safe care.

Patterns of peak attendance late into the afternoon and evening remain unchanged over time and reflect national data. The demographic of age distribution also remained comparable over the past six years.

The majority of children presenting with feverish illness were below two years of age. This group is one of the most challenging in the ED. The majority recover well from a self-limiting febrile illness, but a small proportion will have a more serious bacterial illness or evolving sepsis.

It was encouraging to see that there was generally good use of the established NICE guidance for assessment and management of those children under five years without a clear diagnosis.

Use of a sepsis risk stratification tool was less consistent, though the lack of a nationally agreed tool has helped highlight the challenge this poses for the management of the paediatric patient.

As previously described earlier in the analysis, many children presented with abnormal physiology in that they were often tachycardic and lethargic with fever, but many recovered quickly.

Though relatively uncommon, the consequences of missing sepsis in a child could be devastating for families and professionals, which is why establishing local safeguards to this is an important strategy for all EDs.

Providing good quality safety net advice was important to help carers identify those children with fever who have an evolving serious bacterial illness or sepsis.

EDs were achieving this a high proportion of the time, with written leaflets the commonest form of safety netting. It would be good for EDs to share other mediums and whether they improved care.

Organisational data

Almost all (97%) EDs reported to be using an early warning score for feverish children which demonstrated good practice.

This was an encouraging improvement as the 2015/16 RCEM audit recommended that all EDs adopt a vital signs scoring system such as a PEWS (or an equivalent early warning score).

Most departments (91%) reported using a tool to identify children at risk of sepsis, however this was not reflected in the patient-level weekly data, suggesting consistent implementation of such a tool was challenging.

Furthermore, the data revealed that 92% of EDs use a clinical management tool having identified children as high risk for sepsis. However the data for investigations performed in ED when a child is deemed high risk did not reflect this. Therefore EDs should look at how they are using their tools to ensure their practice is safe.

Finally, data revealed that there was good use of safety net advice, with most units having a written leaflet for families to refer to.

Patient notes excluded

For the purposes of this audit, the following patient populations were excluded:
- Patients on or past their 5th birthday.
- Be careful to exclude children who have had a recent fever, but do not have a fever or febrile illness on arrival at the ED.

Summary of recommendations

1. EDs should look at ways to improve timely initial assessment consistently at times of pressure and peak activity, ensuring all parameters are checked and recorded to give a comprehensive assessment of febrile children within 15 minutes. Use of QIP methodology such as process mapping involving a wide multidisciplinary team may be helpful to understand issues and generate ideas for improvement.

2. EDs should work closely with management teams to ensure there is adequate senior decision maker cover at peak times of activity to ensure safe assessment and management of the acutely unwell febrile child.

3. EDs should develop a tool to stratify risk of sepsis for feverish children so that they receive appropriate escalation or de-escalation of treatment and senior review. If teams have a tool that is working well, sharing learning is encouraged so that other units that are struggling to achieve this standard can learn from it and adapt it to their local context.

4. Adequate training should be in place for all staff managing children less than 5 years presenting with fever, so that complete set of observations are performed, and responded to, with recognition of risk of serious bacterial illness or sepsis and appropriate treatment instigated.

Using the results of this audit to improve patient care

Firstly, RCEM would like to extend thanks to all the individuals and EDs who participated in this clinical audit and QIP. By participating, you have made the first step to making sustainable changes in care – and a lot of you have made many more steps depending how extensively you made use of the PDSA capabilities of the portal.

The results of this QI project should be shared widely with staff who have a responsibility for looking after children under 5 years of age presenting to the ED with fever or febrile illness, especially the doctors and nurses directly involved in care provision. In addition to the clinical team RCEM recommend sharing the report with the clinical audit and/or quality improvement department, departmental governance meeting, ED Clinical Lead, Head of Nursing and Medical Director as a minimum. Without having visibility of the data and recommendations we cannot expect to see improvements in practice.

Now that EDs have a six-month picture of their weekly performance on key measures RCEM encourages the clinical team and audit department to work together to review the effectiveness of PDSA cycles already completed, and design further cycles to improve performance where the data shows they are required. Engaging staff in the process of action planning and PDSA cycles will lead to more effective implementation and sustainable improvements. The RCEM portal will remain live so that departments can continue to track their performance and evaluate the effects of further PDSA cycles.

For further QI advice and resources, please visit the [RCEM Quality Improvement webpage](#).

Further Information

Thank you for taking part in this clinical audit and QIP. We hope that you find the process of participating and results helpful.

If you have any queries about the report, please e-mail audit@rcem.ac.uk.

Details of the RCEM clinical audit and national QIP Programme can be found under the Current Audits section of the RCEM website.

Feedback

We would like to know your views about this report and participating in this audit and QIP. Please let us know what you think by completing our feedback survey: https://www.surveymonkey.co.uk/r/RCEM_QIP19

We will use your comments to help us improve our future topics and reports.

Useful Resources

- Site-specific report – available to download from the QIP portal (registered users only)
- Online dashboard charts – available from the QIP portal (registered users only). The dashboard remains open after the end of the national QIP project so you can keep monitoring local performance and doing PDSA cycles.
- Local data file – available from the QIP portal (registered users only)
- Guidance on understanding SPC charts
- RCEM Quality Improvement Guide - guidance on PDSA cycles and other quality improvement methods
- RCEM Learning modules on child fever

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This report is produced by the Quality Assurance and Improvement Committee subgroup of the Quality in Emergency Care Committee, for the Royal College of Emergency Medicine.

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Appendices

Appendix 1: Audit questions

Case mix

1.1	Reference (do not enter patient identifiable data)	
1.2	Date and time of arrival or triage – whichever is earlier	dd/mm/yyyy HH:MM
1.3	Patient date of birth	dd/mm/yyyy

Vital signs

	Were the following vital signs measured and recorded?			
	Yes (tick all applicable)	Time (leave blank if unknown)	Date (for use if different to date of admission)	No (select option where applicable)
2.1	Respiratory rate	HH:MM	dd/mm/yyyy	• No – but the reason was recorded • Not recorded
2.2	Oxygen saturation	HH:MM	dd/mm/yyyy	• No – but the reason was recorded • Not recorded
2.3	Pulse	HH:MM	dd/mm/yyyy	• No – but the reason was recorded • Not recorded
2.4	Systolic blood pressure / capillary refill	HH:MM	dd/mm/yyyy	• No – but the reason was recorded • Not recorded
2.5	GCS score (or AVPU)	HH:MM	dd/mm/yyyy	• No – but the reason was recorded • Not recorded
2.6	Temperature	HH:MM	dd/mm/yyyy	• No – but the reason was recorded • Not recorded

Patient risk and treatment

3.1	Was an early warning score (EWS) recorded?	• Yes • Not recorded
3.2	Was a sepsis risk stratification tool used?	• Yes – low risk • Yes – moderate to high risk (2 or more amber features) • Yes – high risk (1 or more red features) • Not recorded

3.2a-g	If 3.2 = high risk: Is there evidence of the following investigations (tick all that apply)			
	Tick all applicable	Time (leave blank if unknown)	Date (for use if different to date of admission)	No (select option where applicable)
	• Bloods gas	HH:MM	dd/mm/yyyy	• No – but the reason was recorded • Not recorded
	• Blood culture	HH:MM	dd/mm/yyyy	• No – but the reason was recorded • Not recorded
	• FBC	HH:MM	dd/mm/yyyy	• No – but the reason was recorded • Not recorded
	• CRP	HH:MM	dd/mm/yyyy	• No – but the reason was recorded • Not recorded
	• U&E	HH:MM	dd/mm/yyyy	• No – but the reason was recorded • Not recorded
	• Creatinine	HH:MM	dd/mm/yyyy	• No – but the reason was recorded • Not recorded
	• Clotting	HH:MM	dd/mm/yyyy	• No – but the reason was recorded • Not recorded
3.3	Did the patient have a period of observation and review?	• Yes • No		
3.4	Did the patient have an apparent source infection?	• Yes • No		
3.4a	If 3.4 = No: Is it clear from the records whether the patient was at low risk, intermediate risk or high risk of serious bacterial illness as per NICE feverish child traffic light guidance?	• Yes – low risk (green features) • Yes – intermediate risk (amber features) • Yes – high risk (red features) • No		
3.5	When did the patient have a clinical review by a senior (ST4+) EM or paediatric clinician?	• Yes HH:MM dd/mm/yy • Evidence of senior review but no time recorded • Not reviewed by a senior clinician		
3.6	Did the patient receive antibiotics?	• IV antibiotics • Oral antibiotics • No antibiotics	HH:MM dd/mm/yy	

Discharge

4.1	Was the patient:	• Admitted • Discharged • Not recorded	HH:MM dd/mm/yy
4.2	If discharged: Was appropriate "safety net" provided, including information to take home?	• Yes • No • Not recorded	

Organisational data

Please answer these questions once per ED.

1.1	Does your department use an early warning score?	• Yes • No • If yes, please specify which: _____
1.2	Does your department use a tool to identify children at risk of sepsis?	• Yes - NICE sepsis risk stratification tool • Yes - UK sepsis trust ED/AMU sepsis screening and action tool • Yes - locally developed tool • Yes - other - please specify _____ • No
1.3	In your department if a child is identified at being at risk of sepsis, is a clinical management tool instigated?	• Yes - NICE sepsis risk stratification • Yes - UK sepsis trust sepsis 6 • Yes - locally developed tool • Yes - other - please specify _____ • No
1.4	Does your ED provide advice to give to patients, carers or children with febrile illness (tick all that apply)	• Yes - written leaflet • Yes - app/electronic resource • Yes - video • Yes - sign posts to external resources • Yes - other, please specify _____ • No
1.4a	If yes: Does the advice include (tick all that apply):	• Management of febrile illness • Spotting signs of sepsis • When to access services for review • How to access services for review

1.5	What training does your trust provide for clinicians managing febrile children (tick all that apply)?	• Recognising paediatric sepsis • Use of NICE guidance for fever in under 5s with no clear focus • Simulation training • Elearning • Other - please specify _____

Notes
(Optional space to record any additional notes for local use)

Appendix 2: Participating Emergency Departments

- ABERDEEN ROYAL INFIRMARY
- ADDENBROOKE'S HOSPITAL
- AIREDALE GENERAL HOSPITAL
- ALDER HEY HOSPITAL
- ALEXANDRA HOSPITAL
- ANTRIM AREA HOSPITAL
- ARROWE PARK HOSPITAL
- BARNET HOSPITAL
- BARNSLEY HOSPITAL
- BASILDON UNIVERSITY HOSPITAL
- BASINGSTOKE AND NORTH HAMPSHIRE HOSPITAL
- BASSETLAW HOSPITAL
- BEDFORD HOSPITAL
- BIRMINGHAM CHILDREN'S HOSPITAL
- BLACKPOOL VICTORIA HOSPITAL
- BRADFORD ROYAL INFIRMARY
- BRISTOL ROYAL HOSPITAL FOR CHILDREN
- BRONGLAIS GENERAL HOSPITAL
- BROOMFIELD HOSPITAL
- CALDERDALE ROYAL HOSPITAL
- CAUSEWAY HOSPITAL
- CHELSEA & WESTMINSTER HOSPITAL
- CHELTENHAM GENERAL HOSPITAL
- CHESTERFIELD ROYAL HOSPITAL
- CITY HOSPITAL
- COLCHESTER GENERAL HOSPITAL
- CONQUEST HOSPITAL
- COUNTESS OF CHESTER HOSPITAL
- CRAIGAVON AREA HOSPITAL
- CUMBERLAND INFIRMARY
- DAISY HILL HOSPITAL
- DARENT VALLEY HOSPITAL
- DARLINGTON MEMORIAL HOSPITAL
- DERRIFORD HOSPITAL
- DIANA, PRINCESS OF WALES HOSPITAL
- DONCASTER ROYAL INFIRMARY
- DORSET COUNTY HOSPITAL
- DR GRAY'S HOSPITAL
- EAST SURREY HOSPITAL
- EASTBOURNE DISTRICT GENERAL HOSPITAL
- EPSOM HOSPITAL
- FAIRFIELD GENERAL HOSPITAL
- FRIMLEY PARK HOSPITAL
- FURNESS GENERAL HOSPITAL
- GEORGE ELIOT A&E
- GLOUCESTERSHIRE ROYAL HOSPITAL
- GOOD HOPE HOSPITAL
- GRANTHAM A&E
- HAIRMYRES HOSPITAL
- HARROGATE DISTRICT HOSPITAL
- HEARTLANDS HOSPITAL
- HILLINGDON HOSPITAL
- HINCHINGBROOKE HOSPITAL
- HOMERTON UNIVERSITY HOSPITAL
- HUDDERSFIELD ROYAL INFIRMARY
- HULL ROYAL INFIRMARY
- JAMES PAGET UNIVERSITY HOSPITAL
- JOHN RADCLIFFE HOSPITAL
- KETTERING GENERAL HOSPITAL
- KING GEORGE HOSPITAL
- KING'S COLLEGE HOSPITAL (DENMARK HILL)
- KING'S MILL HOSPITAL
- KINGSTON HOSPITAL
- LANCASHIRE TEACHING HOSPITALS NHSFT - CHORLEY AND SOUTH RIBBLE HOSPITAL
- LEEDS GENERAL INFIRMARY
- LEICESTER ROYAL INFIRMARY
- LEIGHTON HOSPITAL
- LINCOLN COUNTY HOSPITAL
- LISTER HOSPITAL
- LUTON & DUNSTABLE HOSPITAL
- MACCLESFIELD DISTRICT GENERAL HOSPITAL
- MANOR HOSPITAL
- MEDWAY MARITIME HOSPITAL
- MILTON KEYNES HOSPITAL
- MORRISTON HOSPITAL
- MUSGROVE PARK HOSPITAL
- NEVILL HALL HOSPITAL
- NEW CROSS HOSPITAL
- NEWHAM GENERAL HOSPITAL
- NOBLE'S HOSPITAL
- NORFOLK & NORWICH UNIVERSITY HOSPITAL
- NORTH DEVON DISTRICT HOSPITAL
- NORTH MANCHESTER GENERAL HOSPITAL
- NORTH MIDDLESEX HOSPITAL
- NORTHAMPTON GENERAL HOSPITAL (ACUTE)
- NORTHUMBRIA SPECIALIST EMERGENCY CARE HOSPITAL
- NORTHWICK PARK HOSPITAL
- NOTTINGHAM UNIVERSITY HOSPITALS NHS TRUST
- ORMSKIRK & DISTRICT GENERAL HOSPITAL

- PETERBOROUGH CITY HOSPITAL
- PILGRIM HOSPITAL
- PINDERFIELDS GENERAL HOSPITAL
- POOLE GENERAL HOSPITAL
- PRINCE CHARLES HOSPITAL SITE
- PRINCESS ALEXANDRA HOSPITAL
- PRINCESS OF WALES HOSPITAL
- PRINCESS ROYAL UNIVERSITY HOSPITAL
- QUEEN ALEXANDRA HOSPITAL
- QUEEN ELIZABETH HOSPITAL (GATESHEAD)
- QUEEN ELIZABETH THE QUEEN MOTHER HOSPITAL
- QUEEN'S HOSPITAL
- QUEEN'S HOSPITAL, BURTON UPON TRENT
- ROTHERHAM DISTRICT GENERAL HOSPITAL
- ROYAL ALEXANDRA CHILDREN'S HOSPITAL
- ROYAL BERKSHIRE HOSPITAL
- ROYAL BLACKBURN HOSPITAL
- ROYAL BOLTON HOSPITAL
- ROYAL BOURNEMOUTH GENERAL HOSPITAL
- ROYAL CORNWALL HOSPITAL (TRELISKE)
- ROYAL DERBY HOSPITAL
- ROYAL DEVON & EXETER HOSPITAL (WONFORD)
- ROYAL FREE HOSPITAL
- ROYAL GWENT HOSPITAL
- ROYAL LANCASTER INFIRMARY
- ROYAL MANCHESTER CHILDREN'S HOSPITAL
- ROYAL OLDHAM HOSPITAL
- ROYAL PRESTON HOSPITAL
- ROYAL SHREWSBURY HOSPITAL
- ROYAL STOKE UNIVERSITY HOSPITAL
- ROYAL SURREY COUNTY HOSPITAL
- ROYAL UNITED HOSPITAL
- RUSSELLS HALL HOSPITAL
- SALFORD ROYAL
- SALISBURY DISTRICT HOSPITAL
- SANDWELL GENERAL HOSPITAL
- SCARBOROUGH GENERAL HOSPITAL
- SCUNTHORPE GENERAL HOSPITAL
- SHEFFIELD CHILDREN'S HOSPITAL
- SOUTH TYNESIDE DISTRICT HOSPITAL
- SOUTH WEST ACUTE HOSPITAL
- SOUTHAMPTON GENERAL HOSPITAL
- SOUTHEND HOSPITAL
- SOUTHMEAD HOSPITAL AWP
- ST GEORGE'S HOSPITAL (TOOTING)
- ST HELIER HOSPITAL
- ST JOHN'S HOSPITAL AT HOWDEN
- ST MARY'S HOSPITAL
- ST MARY'S HOSPITAL (HQ)
- ST PETER'S HOSPITAL
- ST RICHARD'S HOSPITAL
- ST THOMAS' HOSPITAL
- STEPPING HILL HOSPITAL
- STOKE MANDEVILLE HOSPITAL
- SUNDERLAND ROYAL HOSPITAL
- TAMESIDE GENERAL HOSPITAL
- THE GREAT WESTERN HOSPITAL
- THE IPSWICH HOSPITAL
- THE JAMES COOK UNIVERSITY HOSPITAL
- THE MAIDSTONE HOSPITAL
- THE PRINCESS ELIZABETH HOSPITAL
- THE PRINCESS ROYAL HOSPITAL
- THE ROYAL LONDON HOSPITAL
- THE ROYAL VICTORIA INFIRMARY
- THE TUNBRIDGE WELLS HOSPITAL
- THE WHITTINGTON HOSPITAL
- TORBAY HOSPITAL
- ULSTER HOSPITAL
- UNIVERSITY COLLEGE HOSPITAL
- UNIVERSITY HOSPITAL OF NORTH DURHAM
- UNIVERSITY HOSPITAL OF NORTH TEES
- UNIVERSITY HOSPITAL OF WALES
- UNIVERSITY HOSPITALS COVENTRY AND WARWICKSHIRE NHS TRUST
- WARRINGTON HOSPITAL
- WARWICK HOSPITAL
- WATFORD GENERAL HOSPITAL
- WEST CUMBERLAND HOSPITAL
- WEST MIDDLESEX UNIVERSITY HOSPITAL
- WEST SUFFOLK HOSPITAL
- WESTON GENERAL HOSPITAL
- WEXHAM PARK HOSPITAL
- WHIPPS CROSS UNIVERSITY HOSPITAL
- WHISTON HOSPITAL
- WILLIAM HARVEY HOSPITAL (ASHFORD)
- WISHAW GENERAL HOSPITAL
- WITHYBUSH GENERAL HOSPITAL
- WORCESTERSHIRE ROYAL HOSPITAL
- WORTHING HOSPITAL
- WYTHENSHAWE HOSPITAL
- YEOVIL DISTRICT HOSPITAL
- YORK HOSPITAL
- YSBYTY GWYNEDD

Appendix 3: Definitions

Question and answer definitions:

Term	Definition
EWS	Early warning score. This includes EWS, a PEWS, POPS, or equivalent.

Appendix 4: Calculations

This section explains how the RCEM team will be analysing your data. You are welcome to use this analysis plan to conduct local analysis if you wish. Analysis sample tells you which records will be included or excluded from the analysis. The analysis plan tells you how the RCEM team plan to graph the data and which records will meet or fail the standards.

STANDARD	GRADE	Analysis sample	Analysis plan – conditions for the standard to be met
1. Children presenting to Emergency Departments (EDs) with fever or febrile illness should have the following recorded as part of the initial assessment (within 15 mins): • respiratory rate • oxygen saturation, • pulse, • blood pressure/capillary refill, • GCS/AVPU • temperature	F	All patients	SPC chart Met: 2.1-2.6 within 15 mins of 1.2 (include 15:00 mins) Not met: all other cases
2. Children presenting to EDs with fever or febrile illness should be assessed as to their risk of sepsis using a stratified risk assessment/screening tool.	F	All patients	SPC chart Met: 3.2 = yes Not met: all other cases
3. Children presenting with fever or febrile illness and without an apparent source of infection should be assessed as per NICE guidance traffic light system to guide further investigation and management.	D	Include: 3.4 = no	SPC chart Met: 3.4a = yes Not met: all other cases
4. There should be timely senior review (by an EM or paediatric consultant/ST4+) for children presenting to EDs with fever or febrile illness who: • are < 1 year of age • **OR** have no apparent source of infection with red features as per NICE feverish illness guidance • **OR** are assessed to be at intermediate or high risk of sepsis (2 or more amber features, or one red feature)	D	Include: 1.3 = < 1 year OR 3.4a = high risk OR 3.2 = moderate OR 3.2 = high	SPC chart Met: 3.5 = within 4 hours Not met: all other cases

5. Children presenting to EDs with fever or febrile illness who are discharged home should be provided with an appropriate "safety net" including information to take home e.g. written advice, video, app.	**A**	Include: 4.1 = discharged	SPC chart Met: 4.2 = yes Not met: all other cases
6. EDs should provide training for clinicians in the management of children presenting with febrile illness including recognition of sepsis.	**D**	Include: all EDs	Bar chart Met: organisational 1.5 = recognising paediatric sepsis Not met: organisational 1.5 ≠ recognising paediatric sepsis

Analysis plan for casemix

Question	Analysis sample	Chart type and details
1.2 Date and time of arrival	All patients	Chart showing frequency of patient arrival day (Mon-Sun) and time
1.3 Patient date of birth	All patients	Chart showing age breakdown

Analysis plan for vital signs

Question	Analysis sample	Chart type and details
2.1 – 2.6 Were the following vital signs measured and recorded?	All patients	SPC for each of the following within 15 mins of arrival: • respiratory rate • oxygen saturation, • pulse, • blood pressure/capillary refill, • GCS/AVPU • temperature

Analysis plan for patient risk and treatment

Question	Analysis sample	Chart type and details
3.1 Was an early warning score (EWS) recorded?	All patients	SPC Chart
3.2. Was a sepsis risk stratification tool used?	All patients	SPC Chart
3.2a-f Is there evidence of the following investigations	All patients	SPC chart for: • blood gas • blood culture • FBC • CRP • U&E • Creatinine • Clotting
3.4 Did the patient have an apparent source infection?	Include: 3.4 = no	Pie Chart: - 3.4 - yes - 3.4a – yes low risk - 3.4a – yes intermediate risk - 3.4a – yes high risk - 3.4a - no
3.6 Did the patient receive antibiotics?		SPC for IV antibiotics SCP for oral antibiotics

Analysis plan for discharge

Question	Analysis sample	Chart type and details
4.1 Was the patient:	All patients	Pie chart Admitted vs Discharged Run chart Admitted within 4 hours (0:00-4:00) Run chart Admitted Over 4 hours (4:01+)
4.2 Was appropriate "safety net" provided, including information to take home?	4.1 =discharged	Run chart – safety net

Appendix 5: Inclusion and exclusion criteria

Inclusion criteria

Patients must meet the following criteria for inclusion:
- Children under 5 years of age
- Presenting to an ED
- Children who attend your ED with **fever** or **febrile illness** as part of their presenting complaint.
- For the purposes of the audit, a fever is defined as a **temperature ≥ 38 °C**.

Exclusion criteria

- Patients on or past their 5th birthday
- Be careful to exclude children who have had a recent fever, but do not have a fever or febrile illness on arrival at the ED.

Appendix 6: Understanding your results

Statistical process control (SPC) charts

The charts in this report and your new online dashboard can tell you a lot about how your ED is performing over time and compared to other EDs. If you're not used to seeing data in this way it can take a little time to get used to. This section of the report will help you understand the charts and interpret your own data.

The main type of chart is known as a **Statistical Process Control (SPC) chart** and plots your data every week so you can see whether you are improving, if the situation is deteriorating, whether your system is likely to be capable to meet the standard, and also whether the process is reliable or variable.

As well as seeing your actual data plotted each week you will see a black dotted average line, this is the **mean** percentage of patients. The SPC chart will point out if your data has a run of points above (or below) the mean by changing the dots to white. If your data is consistently improving (or deteriorating) the dots will turn red so the trend is easy to spot. If a positive run or trend of data happens when you're trying a PDSA/change intervention this is a good sign that the intervention is working.

As well as the dotted mean line, you will see two other lines which are known as the **upper and lower control limits**. The control limits are automatically determined by how variable the data is. Around 99% of all the data will fall between the upper and lower control limits, so if a data point is outside these lines you should investigate why this has happened.


Interpreting your data

1. **Performance is improving (or deteriorating)**

A consistent run of data points going up or down with be highlighted with **red dots** so they are easy to spot. A run of data going up is a good sign that your service is making improvements that are really working. If the data is going down this may indicate that service is deteriorating for some reason – watch out for a lack of resources or deterioration as a result of a change somewhere else in the system.
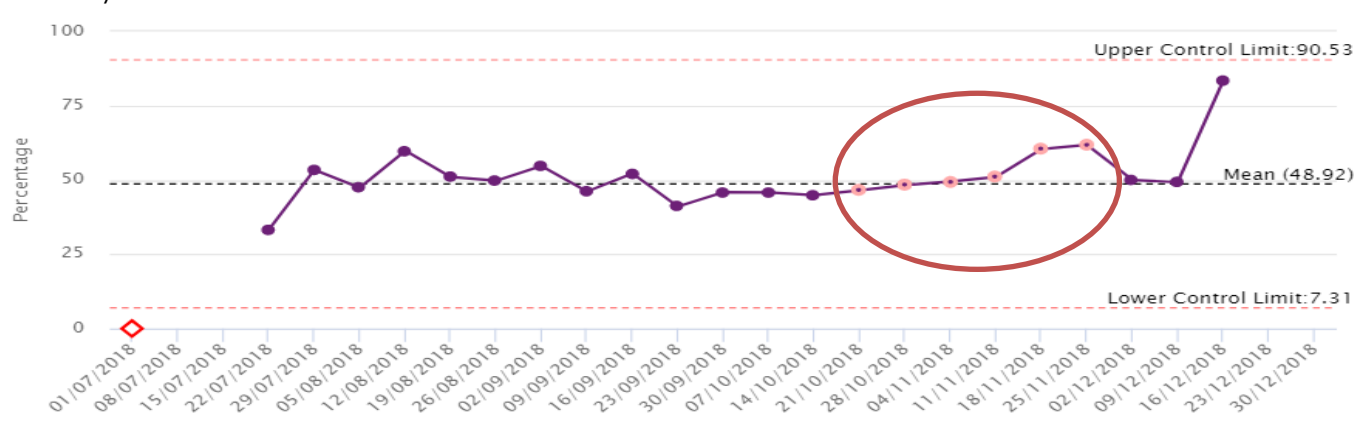
## 2. Performance is consistently above (or below) the mean

A consistent run of data that is above or below the mean will be highlighted with **white dots** so they are easy to spot. If your data has been quite variable this is a good sign that the process is becoming more reliable.
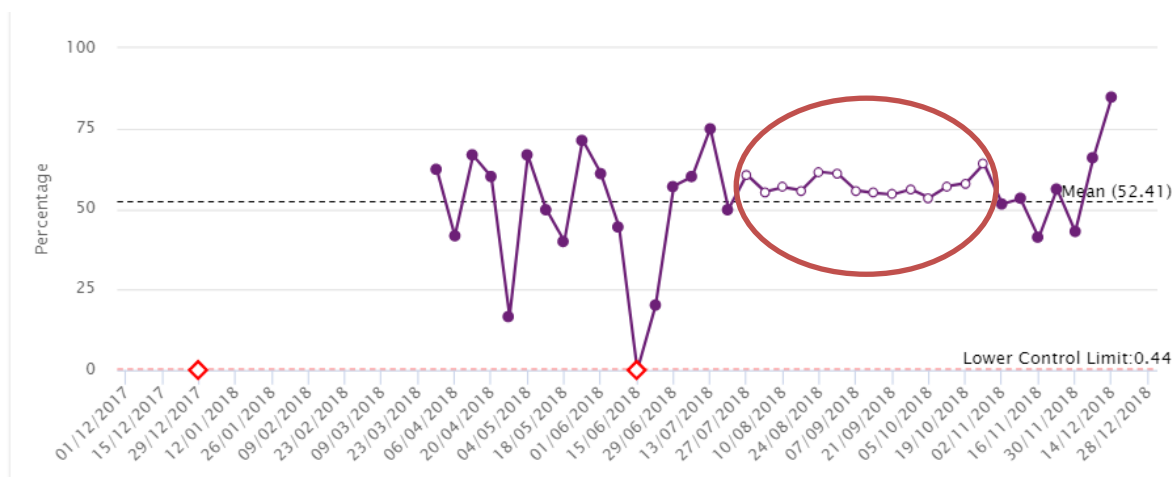
3. Is your system likely to be capable of meeting the standard?

The **control limits** show where you can assume 99% of your data will be. If you find that the standard is outside your control limits, it is very unlikely that your system is set up to allow you to meet the standard. If you do achieve the standard, this will be an unusual occurrence and very unlikely to be sustained. If this is the case, it is recommended that you look at how the process can be redesigned to allow you to meet the standard.

In the below example, the process is performing consistently at around 50%. The control limits show us that most of the time we would expect the process to be between 33% - 62%. If the standard for this process was 50%, then the process is well designed. If, however, the standard was 75% then the chart warns us that the system is not currently set up to allow the process to achieve the standard.
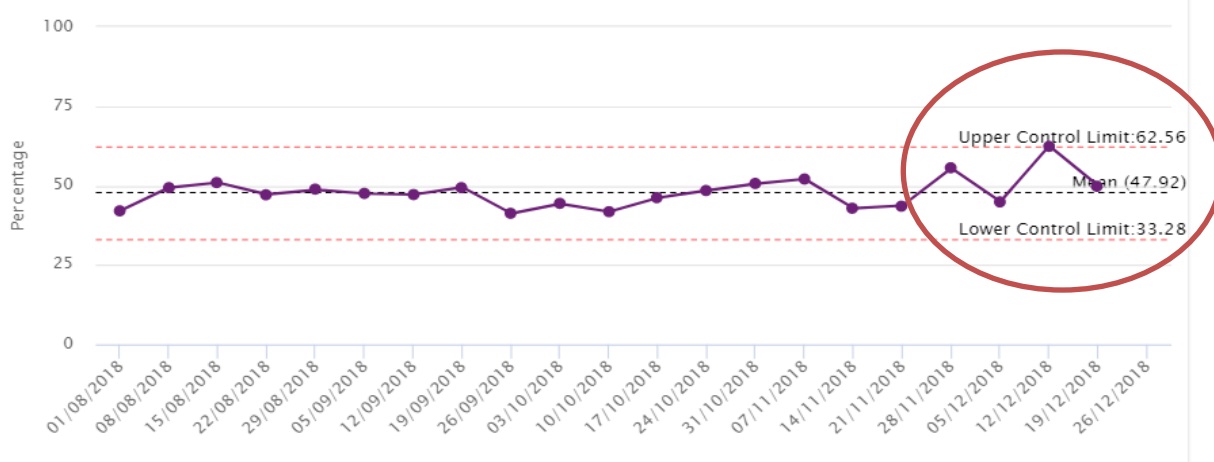
5. Something very unusual has happened!

The majority of your data should be inside the upper and lower control limits, these are automatically calculated by the system. If a single data point falls outside these limits then something very unusual has happened. This will be flagged up with a **red diamond** so you can spot it.

In some cases it may mean that the data has been entered incorrectly and should be checked for errors. It may also mean that something unexpected has had a huge impact on the service and should be investigated.
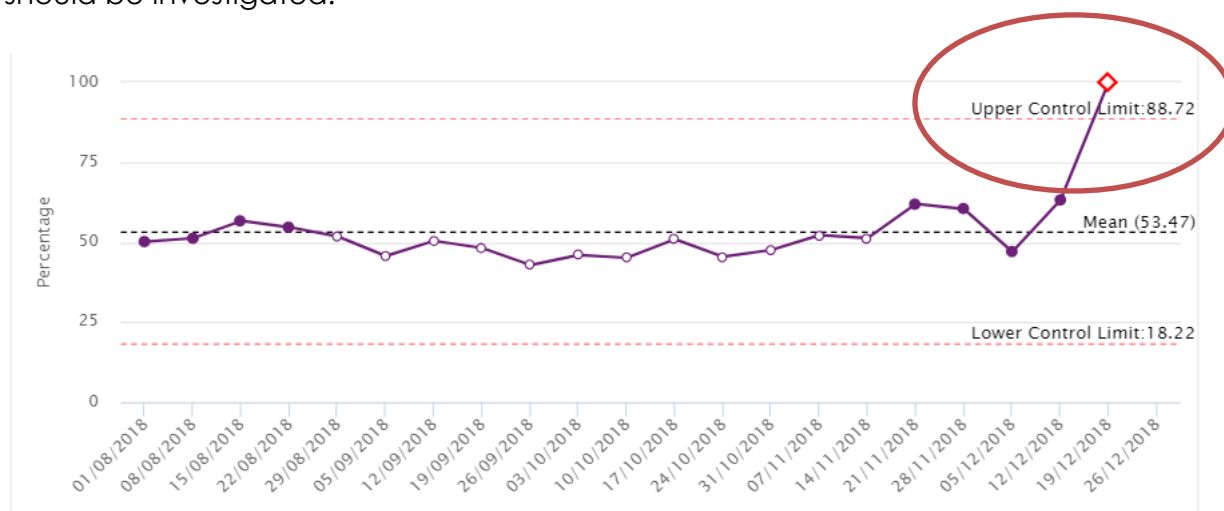
Appendix 7: References

1. **National Institute for Health Research.** Emotional-mapping. *Better Services by Design.* [Online] March 2019. https://www.bsbd.org.uk/cards/emotional-mapping/.

2. *Fever in the under 5s: assessment and initial management (CG160).* **National Institute for Health and Clinical Excellence.** 2017, NICE guideline.

3. *Sepsis: recognition, diagnosis and early management.* **National Institute for Health and Clinical Excellence.** 2017, NICE guideline.

4. *Making sense of vital signs.* **Armstrong BP, Clancy M, Simpson H.** 25, 2008, EMJ, pp. 790-1.

Appendix 8: Template to submit your QI initiatives for publication on the RCEM website

If you would like to share details of your QI initiative or PDSA cycle with others, please complete this document and email it to audit@rcem.ac.uk.

Name: _____

Email address:_____

Hospital: _____

Trust: _____

Plan State the question you wanted to answer – what was your prediction about what would happen? What was your plan to test the change (who, what, when, where)? What data did you collect, how did you plan to collect it?	
Do How did you carry out the change? Did you come across any problems or unexpected observations? How did you collect and analyse the data?	
Study What did the analysis of your results show? How did it compare to your predictions? Summarise and reflect on what you learnt.	
Act Based on what you learnt, what did you adapt (modify and run in another test), adopt (test the change on a larger scale) or abandon?	

Did you prepare for another PDSA based on you learning?	
Reflection and learning What did you and the team learn from this QI initiative? What advice would you give to someone else in your position?	