Vital Signs in Children

2015/16

Introduction

Sets of vital signs consist of: temperature, respiratory rate, heart rate, blood oxygen saturation measured by pulse oximetry, level of consciousness expressed as Glasgow Coma Scale (GCS) or AVPU (alert, response to voice, responsive to pain or unresponsive) scale, and capillary refill time.

Vital signs are frequently recorded in children presenting at Emergency Departments because, if abnormal, they indicate that a patient has deranged physiology. This derangement is often indicative of a disease process and associated with an increased risk of morbidity and mortality [1]. The detection of abnormal vital signs, appropriate escalation and response can avoid the patients' deterioration and improve patient outcomes.

Objectives

The purpose of the audit is:
1. To provide a baseline for future comparison
2. To allow departments to benchmark their performance in comparison to others nationally
3. To identify areas in need of improvement

Participation

All Emergency Departments in Acute Trusts/Health Boards in England, Ireland, Northern Ireland, Scotland and Wales are invited to participate. This audit is listed in the Department of Health (England) Quality Accounts for 2015/16, which require providers in England to report on their participation in identified national clinical audits.

Reports will be made available by ED and by Trust/Health Board to participants. Each report will identify performance in comparison with the Silver Book standards.

An overall report and data summary for all participating sites will be made publicly available.

Inclusion criteria

Children (patients less than 16 years of age) who present to the ED with a medical illness, including rashes and abdominal pain. By medical illness, we mean presentations unrelated to trauma. The child may be ambulatory or non-ambulatory.
**Exclusion criteria**
Adult patients (aged 16 and over). Trauma patients presenting with injuries.

**Sample size**

RCEM recommend auditing a different number of cases depending on the number of cases you expect to see in this period. If this is an area of concern in your ED, you are able to submit data on more cases for an in depth look at your EDs performance.

Basing the audit sample size on the number of cases in this way increases the robustness and reliability of you ED’s audit results.

<table>
<thead>
<tr>
<th>Expected number of cases</th>
<th>Recommended audit sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 50</td>
<td>All eligible cases</td>
</tr>
<tr>
<td>50-250</td>
<td>50 consecutive cases</td>
</tr>
<tr>
<td>&gt;250</td>
<td>100 consecutive cases</td>
</tr>
</tbody>
</table>

Audited cases should be consecutive cases during the data collection period (1 January 2015 to 31 December 2015).

**Data collection period**

From 1 January 2015 to 31 December 2015.

**NB:** You can start the audit at any point during the data collection period, as long as you submit data for 50 consecutive cases by 31 January 2016

**Data submission period**

Data can be submitted online between 1 August 2015 to 31 January 2016.

**Data Sources**

ED patient records (paper, electronic or both).
### Standards

<table>
<thead>
<tr>
<th>STANDARD</th>
<th>GRADE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. All children attending the emergency department with a medical illness should have a set of vital signs consisting of (a) temperature, respiratory rate, heart rate, oxygen saturation, GCS or AVPU score, and (b) capillary refill time recorded in the notes within 15 minutes of arrival or triage, whichever is the earliest.</td>
<td>(a) F (b) D</td>
</tr>
<tr>
<td>2. Children with any recorded abnormal vital signs should have a further complete set of vital signs recorded in the notes within 60 minutes of the first set.</td>
<td>D</td>
</tr>
<tr>
<td>3. There should be explicit evidence in the ED record that the clinician recognised the abnormal vital signs (if present).</td>
<td>D</td>
</tr>
<tr>
<td>4. There should be documented evidence that the abnormal vital signs (if present) were acted upon in all cases.</td>
<td>F</td>
</tr>
<tr>
<td>5. Children with any recorded persistently abnormal vital signs who are subsequently discharged home should have documented evidence of review by a senior doctor (ST4 or above in emergency medicine or paediatrics, or equivalent non-training grade doctor).</td>
<td>D</td>
</tr>
</tbody>
</table>

**Grade:**

- **F = fundamental standard** - mandatory requirements which providers are expected to be achieve at all times
- **D = developmental standard** - ED should be working towards achieving these requirements in the future if not already met.
- **A = aspiration standard** – recommended for best practice and setting longer term goals
Standards definitions

Standard 2
For the purposes of this audit, abnormal vital signs are defined as:

a) Temperature (degrees Celsius) [3]
   • <35 or >37.9 in children <3 months of age
   • <35 or >38.9 in children 3-6 months of age
   • <35 in children >6 months of age (NB: no upper limit)

b) Respiratory rate (breaths per minute) [2]
   • <30 or >40 in children <1 y of age
   • <25 or >35 in children aged 1-2 years
   • <25 or >30 in children aged 2-5 years
   • <20 or >25 in children aged 5-12 years
   • <15 or >20 in children aged >12 years

c) Heart rate (beats per minute) [2]
   • >160 in children <12 months
   • >150 in children aged 12-24 months
   • >140 in children aged >2 - 5 years
   • >120 in children aged >5 - 12 years
   • >100 in children aged >12 years

d) Oxygen saturation (%) in air ≤95% [3]

e) GCS <15 or less than ‘Alert’ on the AVPU scale

f) Capillary refill time > 3 seconds [3]

Standard 3
Evidence can include terms such as ‘tachycardic’, ‘tachypnoeic’, ‘hypoxic’ etc.

Standard 5
This includes children under one year old with fever.
## Questions

### Casemix

<table>
<thead>
<tr>
<th>Q1</th>
<th>Date of arrival (dd/mm/yyyy)</th>
<th>dd/mm/yyyy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q2</td>
<td>Time of arrival or triage – whichever is earliest (use 24 hour clock e.g. 11.23pm = 23:23)</td>
<td>HH:MM</td>
</tr>
<tr>
<td>Q2a</td>
<td>Time patient first assessed by doctor</td>
<td>HH:MM</td>
</tr>
</tbody>
</table>
| Q2b | Grade of doctor first assessing patient | ST3 or below  
ST4 or above |
| Q3 | Age of patient on attendance | Below 1  
1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15 |

### First vital sign recording

<table>
<thead>
<tr>
<th>Q4</th>
<th>Were the following vital signs recorded in the ED notes?</th>
</tr>
</thead>
</table>
| Q4a | Temperature | Yes  
No |
| | Time | HH:MM  
Time not recorded |
| Q4b | Respiratory rate | Yes  
No |
| | Time | HH:MM  
Time not recorded |
| Q4c | Heart rate | Yes  
No |
| | Time | HH:MM  
Time not recorded |
| Q4d | Oxygen saturation | Yes  
No |
| | Time | HH:MM  
Time not recorded |
| Q4e | GCS or AVPU score | Yes  
No |
| | Time | HH:MM  
Time not recorded |
| Q4f | Capillary refill time | Yes  
No |
| | Time | HH:MM  
Time not recorded |
| Q5a | Were the vital signs recorded as a part of a formalised scoring system (e.g. PEWS, POPS or ManChEWS)? | Yes  
No | (go to Q6) |
| Q5b | (Only answer if YES to Q5a) What formal scoring system was used? | Paediatric early warning score (PEWS)  
Paediatric observation and priority score (POPS)  
Royal Manchester Children’s Hospital early warning score (ManChEWS)  
Other (please specify) |
## Abnormal vital signs

**Q6**  Were any of the recorded vital signs abnormal (as defined in the audit standards)?
- Yes
- No  \( \Rightarrow \) (go to Q9)

**Q7**  (Only answer if YES to Q6) Is there specific evidence in the ED record that the clinician recognised the abnormal vital signs?
- Yes
- No

**Q8**  (Only answer if YES to Q6) Is there evidence in the ED record that the abnormal vital signs were acted upon?
- Yes
- No

## Repeat vital sign recording

**Q9a**  Was a repeat set of vital signs recorded in the ED record?
- Yes
- No  \( \Rightarrow \) (go to Q11)

*b*  (Only answer if YES to Q9a) Temperature
- Yes
- No
  - Time HH:MM
  - Time not recorded

*c*  (Only answer if YES to Q9a) Respiratory rate
- Yes
- No
  - Time HH:MM
  - Time not recorded

*d*  (Only answer if YES to Q9a) Heart rate
- Yes
- No
  - Time HH:MM
  - Time not recorded

*e*  (Only answer if YES to Q9a) Oxygen saturation
- Yes
- No
  - Time HH:MM
  - Time not recorded

*f*  (Only answer if YES to Q9a) GCS or AVPU score
- Yes
- No
  - Time HH:MM
  - Time not recorded

*g*  (Only answer if YES to Q9a) Capillary refill time
- Yes
- No
  - Time HH:MM
  - Time not recorded

**Q10**  (Only answer if YES to Q9a) Were any of the recorded repeat vital signs abnormal (as defined in the audit standards)?
- Yes
- No

## Discharge

**Q11**  Was the patient discharged home?
- Yes
- No  \( \Rightarrow \) END

**Q11a**  (Only answer if YES to Q11) When the patient was discharged home, were their vital signs normal?
- Yes
- No
- Not recorded

**Q12**  (Only answer if YES to Q11) Is there documented evidence of review by a senior doctor (ST4 or above in emergency medicine or paediatrics, or equivalent non-training doctor)?
- Yes
- No
Question and answer definitions

Q4 – If the notes record an incorrect or impossible time, for example before patient arrival, please enter ‘time not recorded’

Q7 – recognition of the abnormal vital signs has to refer to documentation of abnormal findings with a plan, or a plan that is in line with abnormal vitals.

Q8 – Evidence of acting on abnormal vital signs. This includes but is not limited to: prescribing antibiotics, antipyretics, fluids, investigations or further observations. Prescribing an inhaler without commenting on respiratory rate in child with asthma is NOT evidence of acting on vital signs.

Q9 – If the notes record an incorrect or impossible time, for example before patient arrival or before the initial set of vital signs, please enter ‘time not recorded’
References


