Paediatric Sepsis 6
Linda Clerihew
National Clinical Lead for McQIC Paediatrics
# Sepsis in Scotland

## Introductions

Introduction to the Scottish Patient Safety Programme & Adult Sepsis Programme

Recognition and Response to Sepsis in Children in Scotland

## Discussion
National Team

- Professor Kevin Rooney: clinical lead for acute adult safety
- Alison Hunter: improvement advisor for adult safety
- Dr Linda Clerihew: clinical lead for paediatric safety
- Lesley MacFarlane: associate improvement advisor for paediatric safety
A strategic approach to safety

- Acute Adult
- Maternity and Children
- Mental Health
- Primary Care
IHI Breakthrough series model

Select Topic

Recruit Faculty

Develop Framework and Changes

Enroll Participants

Prework

LS1

AP1

LS2

AP2

LS3

AP3

Summative Congresses and Publications

Supports:
Email • Visits • Phone Conferences • Monthly Team Reports • Assessments

LS1: Learning Session
AP: Action Period
P-D-S-A: Plan-Do-Study-Act
STAG Sepsis Management in Scotland

- Signs of sepsis < 2 days
- 2% of emergency admissions (~5000)
- 71% had a EWS
- 34% had severe sepsis
- 21% blood cultures
- 32% IV Antibiotics
- 70% IV fluids

Scottish Defect Rate was 18-74%

doi:10.1136/emermed-2012-201361
Sepsis Driver Diagram

To improve the recognition and timely management of Sepsis in acute hospitals

Outcome:
Reduction in mortality in pilot population from Sepsis
5% by December 2012 - 10% by December 2014

AIM

JOINT COLLABORATIVE - SEPSIS DRIVER DIAGRAM

PRIMARY DRIVERS

- Reliable Recognition & Assessment
- Reliable Care Delivery
- Education & Awareness
- Culture of Safety and Quality Improvement
- Patient & Family Centred Care

SECONDARY DRIVERS

- Reliable Sepsis screening (EWS + SIRS)
  Ensure reliable communication across clinical teams of at risk patients
  Ensure timely rescue of deteriorating patient by competent teams

- Ensure reliable delivery of Sepsis Six within 1 hour
  Source Control
  Ensure reliable escalation of septic patients to higher level of care
  Improve Antimicrobial stewardship - 3-day review

- Education on burden of illness & current performance
  Provide training to staff on clinical knowledge and improvement skills

- Executive Sponsorship
  Clinical Leadership
  Multidisciplinary team working
  Develop measurement frameworks to guide improvement

- Involve patients & families in treatment process and care planning
Sepsis Screening

Sepsis Six

1. Deliver O2 (94 -98% SpO2 or 88-92% in COPD)

2. Take blood cultures and consider source control

3. Give IV antibiotics according to local protocol

4. Start IV fluid resuscitation (min 500ml) and reassess

5. Check lactate & FBC

6. Commence accurate urine output measurement and consider urinary catheterisation

*All within one hour*
At sha14 & feeling privileged to have won the Innovation award with @NHS_Education @SPSP_AcuteAdult & @NHSGGC

Edinburgh, Scotland
Spread & segmentation
Aim
30% reduction in avoidable harm measured by the Paediatric Serious Harm Key Indicators by December 2015
Measuring Harm

Paediatric Serious Harm
Key Indicators

Paediatric Trigger Tool,
Avoidable Harm Tool

Datix, SER
complaints, feedback

The unreported
# Paediatric Serious Harm Key Indicators

<table>
<thead>
<tr>
<th>Category</th>
<th>Operational Definition</th>
<th>Outcome measure of</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serious Safety Event</td>
<td>Datix &gt;4</td>
<td>All</td>
</tr>
<tr>
<td>Serious Medication Event</td>
<td>Datix &gt;4</td>
<td>Medicines safety</td>
</tr>
<tr>
<td>Unplanned Admission to ICU</td>
<td>All in hospital</td>
<td>Deteriorating patient</td>
</tr>
<tr>
<td>CLABSI</td>
<td>All healthcare</td>
<td>HAI</td>
</tr>
<tr>
<td>VAP</td>
<td>PICU only</td>
<td>HAI</td>
</tr>
<tr>
<td>Child protection harm</td>
<td>In development</td>
<td>MDT working</td>
</tr>
</tbody>
</table>
2000 excess deaths <19yo per annum in UK compared with best performing European Nation
Identifiable failures in 26% potentially avoidable in further 43%

The first method has been done to notable effect by the Confidential Enquiry into Maternal and Child Health in England, which conducted a meticulous audit into the deaths of a representative sample of children. They reported identifiable failures in a child’s direct care in just over a quarter of deaths, and potentially avoidable factors in a further 43% of deaths. An audit of asthma deaths is due to report soon. From an epidemiological perspective, this type of evidence does not demonstrate causality. However, from a clinical perspective it provides useful information, pointing out where to investigate further in our attempts to improve care. From a parental perspective, it is alarming and demands attention and indeed in the past decade, and especially since the Bristol Royal Infirmary Enquiry in 2001, there has been a welcome degree of scrutiny into the quality of care for children. There is now a systematic multiagency process for gathering data after every childhood death, known as a Child Death Review (CDR), which attempts comprehensively to gather information on potentially avoidable factors in order to make recommendations on changes in practice.
Why children die: avoidable factors associated with child deaths

G A Pearson,1 M Ward-Platt,2 A Harnden,3 D Kelly1

The most significant recurrent avoidable factor between cases was a failure to recognise severe illness in children. This most often occurred at the point of first contact between the sick (and often febrile) child and the healthcare services. In some instances, there was a failure to understand the importance of the history, in others a failure to examine the patient or interpret physical signs correctly. There were also failures in anticipating or recognising complications of illness and failures in clinical supervision. In some cases, the impact was immediate, in others there resulted a critical delay in referral or treatment.
PAEDIATRIC EARLY WARNING SCORE (PEWS)
0 – 11 MONTHS

PEWS is a tool to aid recognition of sick and deteriorating children.

PEWS should be calculated every time observations are recorded.

How to calculate score:
- Record observations at intervals as prescribed
- Record observations in black pen with a dot
- Score as per the colour key
  - 0
  - 1
  - 3
- Add total points scored
- Record total score in PEWS box at bottom of chart
- Action should be taken as below
Paediatric sepsis

• Infection accounts for
  >10% mortality in children <4yo in UK

• Severe sepsis accounts for
  1000 admissions to PICU every year in UK

• 20% of children admitted to PICU with severe sepsis die
  – (ie 200 deaths in UK per annum)

Early Recognition

Meningitis can KILL in under 4 hours

Find out how you can support our
search 4 a vaccine campaign
phone 0117 373 73 73
or visit www.MeningitisUK.org

Thank You!

Meningitis Baby Watch

Tense or bulging soft spot
High temperature
Very sleepy/staring expression/too sleepy to wake up
Vomiting/refusing to feed

Is your baby getting worse fast?
Babies can get ill very quickly, so check often.

NHS Scotland
Feverish illness in children

Assessment and initial management in children younger than 5 years

Issued: May 2013

NICE clinical guideline 160
guidance.nice.org.uk/g160
Clinical practice parameters for hemodynamic support of pediatric and neonatal septic shock: 2007 update from the American College of Critical Care Medicine*

Joe Brierley, Joseph Carcillo et al
Crit Care Med 2009; 37(2) 666-688
Recognize decreased mental status and perfusion. Begin high flow O₂. Establish IV/IO access.

**Initial resuscitation:** Push boluses of 20 cc/kg isotonic saline or colloid up to & over 60 cc/kg until perfusion improves or unless rales or hepatomegaly develop. Correct hypoglycemia & hypocalcemia. Begin antibiotics.

If 2nd PIV start inotrope.

**Fluid refractory shock:** Begin inotrope IV/IO. Use atropine/ketamine IV/IO/IM to obtain central access & airway if needed. 
*Reverse cold shock* by titrating central dopamine or, if resistant, titrate central epinephrine. 
*Reverse warm shock* by titrating central norepinephrine.

**Shock not reversed?**

**Catecholamine resistant shock:** Begin hydrocortisone if at risk for absolute adrenal insufficiency.
Evidence based guidelines

Emergency management of children with severe sepsis in the United Kingdom: the results of the Paediatric Intensive Care Society sepsis audit

D P Inwald,1 R C Tasker,2 M J Peters,3 S Nadel,4 on behalf of the Paediatric Intensive Care Society Study Group (PICS-SSG)

Abstract

Objective: To audit current UK practice of the management of severe sepsis in children against the 2002 American College of Critical Care Medicine/Pediatric Advanced Life Support (ACCM-PALS) guideline.

Design: Prospective observational study.

Setting: 17 UK paediatric intensive care units (PICUs) and two UK PICU transport services.

Participants: 290 children accepted for PICU admission within 12 h of arrival in hospital, whether or not successfully transported to a PICU, with a discharge diagnosis of sepsis or suspected sepsis.

Main outcome measures: Medical interventions, physiological and laboratory data to determine the presence or absence of shock, inter-hospital transfer times; predicted mortality (using the Paediatric Index of Mortality, version 2 (PIM2) scoring system) and observed mortality.

Results: 34/290 (11.8%) children died following referral. Although children defined as being in shock received significantly more fluid (p<0.001) than those who were not in shock, overall fluid and intravenous management was not uniform.

In UK in 2008 62% of children did not receive treatment for shock as per ACCM-PALS guideline.
Implementation of Goal-Directed Therapy for Children With Suspected Sepsis in the Emergency Department

Andrea T. Cruz, Andrew M. Perry, Eric A. Williams, Jeanine M. Graf, Elizabeth R. Wuestner and Binita Patel

*Pediatrics*; originally published online February 21, 2011;
DOI: 10.1542/peds.2010-2895
Intubated in ED **3.2% vs 20%**
Inotropes in ED **10.1% vs 16%**
Death during admission **1.9% vs 4%**

**TABLE 4** Comparison of Interventions in Children Used at Triage and not Used in the Shock Protocol

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Protocol Used at Triage (n = 158 Encounters)</th>
<th>Protocol not Used (n = 25 Encounters)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Triage to first bolus, min&lt;sup&gt;a&lt;/sup&gt;</td>
<td>22</td>
<td>72</td>
</tr>
<tr>
<td>Triage to third bolus, min&lt;sup&gt;a&lt;/sup&gt;</td>
<td>61</td>
<td>279.9</td>
</tr>
<tr>
<td>Total volume of fluid given, mL/kg</td>
<td>38.9</td>
<td>58.8</td>
</tr>
<tr>
<td>Triage to first antibiotic, min&lt;sup&gt;a&lt;/sup&gt;</td>
<td>38</td>
<td>143</td>
</tr>
<tr>
<td>Intubated in ED, %</td>
<td>3.2</td>
<td>20</td>
</tr>
<tr>
<td>Vasoactive medications given in ED, %</td>
<td>10.1</td>
<td>16</td>
</tr>
<tr>
<td>Death during that admission, %</td>
<td>1.9 (PICU)</td>
<td>4 (PICU)</td>
</tr>
<tr>
<td></td>
<td>0.6 (ED)</td>
<td>—</td>
</tr>
</tbody>
</table>

Patients for whom the protocol was used after triage were not included in these analyses.

<sup>a</sup> The time to intervention had a nonnormal distribution, and the result is presented as a medians.
Early Reversal of Pediatric-Neonatal Septic Shock by Community Physicians Is Associated With Improved Outcome

Yong Y. Han, Joseph A. Carcillo, Michelle A. Dragotta, Debra M. Bills, R. Scott Watson, Mark E. Westerman and Richard A. Orr

*Pediatrics* 2003;112;793 DOI: 10.1542/peds.112.4.793
Resuscitation by Community Physicians

Shock reversal survival \( \text{OR} = 9.49 \)
Resus consistent with ACCM-PALS Survival \( \text{OR} = 6.81 \)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Survival Odds Ratio</th>
<th>Mortality Odds Ratio</th>
<th>95% Confidence Interval</th>
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<tbody>
<tr>
<td>Shock reversed</td>
<td>9.49</td>
<td>—</td>
<td>1.07–83.89</td>
</tr>
<tr>
<td>Resuscitation consistent with ACCM-PALS Guidelines</td>
<td>6.81</td>
<td>—</td>
<td>1.26–36.80</td>
</tr>
<tr>
<td>Duration of persistent shock (per 1-h increment)</td>
<td>—</td>
<td>2.29</td>
<td>1.19–4.44</td>
</tr>
<tr>
<td>Delay resuscitation consistent with ACCM-PALS</td>
<td>—</td>
<td>1.53</td>
<td>1.08–2.16</td>
</tr>
<tr>
<td>Guidelines (per 1-h increment)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Every additional hr of persistent shock OR  = 2.29
Every additional hr delay in ACCM-PALS OR = 1.53

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Adherence to PALS Sepsis Guidelines and Hospital Length of Stay

Raina Paul, Mark I. Neuman, Michael C. Monuteaux and Elliot Melendez

*Pediatrics* 2012;130;e273; originally published online July 2, 2012;
DOI: 10.1542/peds.2012-0094
Adherence to 5 algorithmic time-specific goals

Hospital LOS: 57% reduction
ICU LOS: 42% reduction

<table>
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<th>TABLE 2</th>
<th>Association of Fluid Adherence With LOS</th>
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<tr>
<td>Fluid Adherence, n = 46, Mean No. Days(^a)</td>
<td>Fluid Nonadherence, n = 80, Mean No. Days(^a)</td>
</tr>
<tr>
<td>Hospital LOS</td>
<td>8</td>
</tr>
<tr>
<td>ICU LOS</td>
<td>5.5</td>
</tr>
</tbody>
</table>

\(^a\) Unadjusted means.

\(^b\) P value references “percent decrease in LOS” by using negative binomial regression, adjusting for PIM2 score at presentation and other comorbidities.
[Clinical research of timing of application of antibiotics in septic shock of pediatric patients]

Antibiotic timing in pediatric septic shock

Antibiotics within 1 hour  \( n = 40 \)
Antibiotics 1 – 6 hours  \( n = 40 \)

Lactate lower  \( 8.65 \text{ vs } 11.75 \text{ mmol/L} \)  \( P < 0.01 \)
CRP lower  \( 66.25 \text{ vs } 91.77 \text{ mg/L} \)  \( P < 0.01 \)
PCT lower  \( 0.67 \text{ vs } 1.16 \mu g/L \)  \( P < 0.01 \)

Time to shock reversal:  \( 6.80 \text{ vs } 12.80 \text{ hours} \)  \( P < 0.05 \)
Double-Blind Prospective Randomized Controlled Trial of Dopamine Versus Epinephrine as First-Line Vasoactive Drugs in Pediatric Septic Shock

Andréa M. C. Ventura, MD; Huei Hsin Shieh, MD; Albert Bousso, MD; Patrícia F. Góes, MD; Iracema de Cássia F. O. Fernandes, MD; Daniela C. de Souza, MD; Rodrigo Locatelli Pedro Paulo, MD; Fabiana Chagas, RN; Alfredo E. Gilio, MD

Epinephrine survival OR of 6.49

Ccmjournal: Nov 2015 vol 43 no 11 pg 2292-2302
Respond with Paediatric Sepsis 6 within 1 hour:

1. **Give high flow oxygen**

2. **Obtain intravenous or intraosseous access and take blood tests:**
   - Blood cultures
   - Blood glucose - treat low blood glucose
   - Blood lactate (or gas)

3. **Give IV or IO antibiotics:** Broad spectrum as per local policy
   
   If shocked:

4. **Consider fluid resuscitation:**
   - Titrate 20 ml/kg isotonic fluid over 5 - 10 min and repeat if necessary
   - Aim to reverse shock – trend to normal heart rate, BP and peripheral perfusion
   - Assess for fluid overload after ≥ 40 ml/kg fluids.
   - If no signs of fluid overload and remains shocked titrate further 20 mls/kg fluid

5. **Consider inotropic support early:**
   - Adrenaline (reconstitute whilst administering 3rd fluid bolus. 0.3mg/kg in 50mls 5% dextrose. Commence 1ml/hr = 0.1mic/kg/min).
   - Can be given via peripheral IV or IO access

6. **Involve senior clinicians / specialists early**
   - Discuss with PICU if inotropes commenced
International pediatric sepsis consensus conference:
Definitions for sepsis and organ dysfunction in pediatrics*

Brahm Goldstein, MD; Brett Giroir, MD; Adrienne Randolph, MD; and the Members of the
International Consensus Conference on Pediatric Sepsis

At least 2 of the following 4,
1 must be abnormal temp (reported within 4 hours of admission if afebrile at presentation)

- Core temp <36 or > 38.5
- Tachycardia
- Bradycardia
- Tachypnoea
- Leucocyte count elevated for age or >10% immature neutrophils
SIRS criteria

Table 3. Age-specific vital signs and laboratory variables (lower values for heart rate, leukocyte count, and systolic blood pressure are for the 5th and upper values for heart rate, respiration rate, or leukocyte count for the 95th percentile)

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Heart Rate, Beats/Min&lt;sup&gt;a,c&lt;/sup&gt;</th>
<th>Respiratory Rate, Breaths/Min&lt;sup&gt;d&lt;/sup&gt;</th>
<th>Leukocyte Count, Leukocytes × 10&lt;sup&gt;3&lt;/sup&gt;/mm&lt;sup&gt;3&lt;/sup&gt;&lt;sup&gt;b,c&lt;/sup&gt;</th>
<th>Systolic Blood Pressure, mm Hg&lt;sup&gt;b,c,e,f&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 days to 1 wk</td>
<td>&gt;180</td>
<td>&lt;50</td>
<td>&gt;34</td>
<td>&lt;65</td>
</tr>
<tr>
<td>1 wk to 1 mo</td>
<td>&gt;180</td>
<td>&lt;40</td>
<td>&gt;19.5 or &lt;5</td>
<td>&lt;75</td>
</tr>
<tr>
<td>1 mo to 1 yr</td>
<td>&gt;180</td>
<td>&lt;34</td>
<td>&gt;17.5 or &lt;5</td>
<td>&lt;100</td>
</tr>
<tr>
<td>2–5 yrs</td>
<td>&gt;140</td>
<td>&lt;22</td>
<td>&gt;15.5 or &lt;6</td>
<td>&lt;94</td>
</tr>
<tr>
<td>6–12 yrs</td>
<td>&gt;130</td>
<td>NA</td>
<td>&gt;13.5 or &lt;4.5</td>
<td>&lt;105</td>
</tr>
<tr>
<td>13 to &lt;18 yrs</td>
<td>&gt;110</td>
<td>NA</td>
<td>&gt;11 or &lt;4.5</td>
<td>&lt;117</td>
</tr>
</tbody>
</table>

NA, not applicable.

<sup>a</sup>Modified from Ref. 24; <sup>b</sup>modified from Ref. 25; <sup>c</sup>modified from Ref. 22; <sup>d</sup>modified from Ref. 55; <sup>e</sup>Ref. 26; <sup>f</sup>Ref. 56.
Paediatric Sepsis 6

Recognition: A child with suspected or proven infection AND at least 2 of the following:

- Core temperature < 36°C or > 38°C (observed or reported in previous 4 hours)
- Inappropriate tachycardia (Refer to National PEWS)
- Altered mental state (including: sleepiness/irritability/lethargy/floppiness)
- Reduced peripheral perfusion/prolonged capillary refill/cool or mottled peripheries
Reduce Threshold:
Some children are at higher risk of sepsis. You may consider treatment with fewer signs than above. These include, but are not restricted to;

- Infants < 3/12
- Immunosuppressed / Immunocompromised / chemotherapy / long term steroids
- Recent surgery
- Indwelling devices / lines
- Complex neurodisability / Long term conditions (may not present with high PEWS but observations may vary from their baseline)
- High index of clinical suspicion (tachypnoea, rash, leg pain, biphasic illness, poor feeding)
- Significant parental concern
Severe sepsis is a CLINICAL EMERGENCY. Early treatment improves outcomes.

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- Altered mental state (including: sleepiness / irritability / lethargy / floppiness)
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- High index of clinical suspicion (tachypnoea, rash, leg pain, biphasic illness, poor feeding)
- Significant parental concern

**Think is this SEPSIS? If yes**

1. **Respond with Paediatric Sepsis 6 within 1 hour:**
   - Give high flow oxygen
   - Obtain intravenous or intraosseous access and take blood tests:
     - Blood cultures
     - Blood glucose - treat low blood glucose
     - Blood lactate (or gas)
   - Give IV or IO antibiotics: Broad spectrum as per local policy
   - If shocked:
     - Consider fluid resuscitation:
       - Titrate 20 ml/kg isotonic fluid over 5 - 10 min and repeat if necessary
       - Aim to reverse shock – trend to normal heart rate, BP and peripheral perfusion
       - assess for fluid overload after ≥ 40 ml/kg fluids.
       - If no signs of fluid overload and remains shocked titrate further 20mls/kg fluid
     - Consider inotropic support early:
       - Adrenaline (reconstitute whilst administering 3rd fluid bolus. 0.3mg/kg in 50mls 5% dextrose. Commence 1ml/hr = 0.1mic/kg/min ).
       - Can be given via peripheral IV or IO access
     - Discuss with PICU if inotropes commenced
   - Involve senior clinicians / specialists early

   **Time Points:**
   - 0 min
   - 15 min ideal
   - 60 min acceptable
What are the aims?

- Reduced sepsis related mortality
- Reduced sepsis related ICU admissions
- Reduced sepsis related length of stay ICU/HDU/hospital

- Long term morbidity (difficult data to measure)

- ? How much by when
- ? Start with pilot populations shock, <3 months, immunocompromised
Outcome Measures

- Mortality
- PICU admission
- LOS

Process Measures

- Compliance with each element
- Compliance with the whole bundle
- Time to treat – 1st bolus, 3rd bolus, inotropes, antibiotics
- Time to shock reversal or “normal physiology”

Balancing Measures

- Antimicrobial stewardship
- Contaminated blood cultures
- False positives
- False negatives
National measures

• Sepsis
  – % compliance with each bundle component
  – % compliance with bundle
  – % compliance with all clinically appropriate elements within 60mins

• Deteriorating Patient work
  – Paediatric Serious Harm Key Indicators
    • Unplanned admission to PICU
    • Significant Safety Event
  – Watchers, PEWS, FADE
What is the data telling us?

Interim data – unpublished please apply caution!
Think is this SEPSIS? If yes

If NO then what is wrong with this child? If unsure review in 1 hour
• So the recognition element works  
• The response element works  

• How do we get better at doing it more reliably?
Simulation Course in Paediatric Emergencies (SCiPE)

Simulation Training on Paediatric Meningococcal Disease
# Paediatric Safety Programme: Data Overview

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSHK1</td>
<td>Serious Safety Events</td>
</tr>
<tr>
<td>PSHK2</td>
<td>Ventilator associated pneumonia</td>
</tr>
<tr>
<td>PSHK3</td>
<td>Central venous catheter related blood stream infections</td>
</tr>
<tr>
<td>PSHK4</td>
<td>Unplanned admission to Paediatric Intensive Care Unit (PICU)</td>
</tr>
<tr>
<td>PSHK5</td>
<td>Medicines Harm</td>
</tr>
<tr>
<td>PSHK6</td>
<td>Child Protection Harm</td>
</tr>
<tr>
<td>DPO1</td>
<td>% of at-risk observations identified that are acted upon and have appropriate interventions undertaken in terms of their management as identified by Paediatric Early Warning System (PEWS)</td>
</tr>
<tr>
<td>DPP1</td>
<td>% compliance with PEWS bundle</td>
</tr>
<tr>
<td>SO1</td>
<td>% of children &amp; young people who receive the Sepsis 5 bundle within 1 hour</td>
</tr>
<tr>
<td>SP1</td>
<td>% compliance with Sepsis 6 bundle</td>
</tr>
<tr>
<td>DPO2</td>
<td>Number of Failure to Act on Deterioration Events (FADE) per month</td>
</tr>
<tr>
<td>DPP2</td>
<td>% compliance with “Watchers” bundle</td>
</tr>
<tr>
<td>MMO1a</td>
<td>% of prescriptions of [locally identified drug] where the correct concentration, rate &amp; dose are prescribed</td>
</tr>
<tr>
<td>MMO2</td>
<td>% uninterrupted intravenous drug reconstitutions</td>
</tr>
<tr>
<td>MMP1</td>
<td>% compliance with the high risk drug [locally identified] bundle</td>
</tr>
<tr>
<td>MMP2</td>
<td>% of appropriate children and young people with medicines reconciled within 24 hours of admission</td>
</tr>
<tr>
<td>MMP3</td>
<td>% of medicines errors$\star$ can be segmented to specific drugs, parts of the prescribing or administration process</td>
</tr>
<tr>
<td>PO01a</td>
<td>Rate of patients / 1000 surgical cases readmitted with surgical site infections within 30 days</td>
</tr>
<tr>
<td>POP1</td>
<td>% on time prophylactic antibiotics administration</td>
</tr>
<tr>
<td>POP2</td>
<td>% of eligible children &amp; young people with peri-operative normo-thermia</td>
</tr>
<tr>
<td>POP3</td>
<td>% of known diabetic children &amp; young people with peri-operative glucose control</td>
</tr>
</tbody>
</table>