How effectively does a modified Bristol Paediatric Early Warning tool identify children at risk of deterioration?

Sefton G¹, Tume L², Horan M³, Holt P¹, Ritson P⁴, L McArthur⁵, Sellers C⁶, Scally A⁶, Marsh D⁶, Rathi S⁷

Alder Hey Children’s NHS Foundation Trust

- Northwest England
- 337 beds; treating >200,000 in-patients per year.
- provides the general paediatric service to the locality
- tertiary referral centre for many specialities:
  - cardiac surgery, cardiology, nephrology, neurosurgery, burns, haematology/oncology, bone marrow transplantation, endocrinology, plastics and cranio-facial surgery.
- 24 hr Casualty department
- 23 Paediatric Intensive Care beds
- 15 High Dependency beds.
A modified ‘Bristol PEW tool’ (Haines et al 2006) was implemented at Alder Hey in August 2006

This is a single parameter screening trigger tool aimed at predicting children at risk of clinical deterioration

A positive trigger should elicit the activation of the response system with locally agreed time frames for a medical review.
Objective

- To determine whether a positive trigger of the modified Bristol Paediatric Early Warning (PEW) tool predicted a Significant Adverse Event (SAE) anytime within the following 7 days.
- SAEs were defined as
  - a cardiopulmonary arrest call
  - unplanned admission to a HDU or PICU area
  - or an unexpected death
Methods

- On a single day [Aug 2010] ten trained observers reviewed all in-patients observation charts, medical and nursing records.
- Patients in PICU, A&E, mental health and day case wards were excluded.
- From the time of inspection (t0) the documented observations were examined for 24 hours in retrospect (t minus 24).
- Observations which would trigger the PEW tool were noted.
- All patients were then prospectively followed up for 7 days, or until discharge (whichever was soonest).
- Data was also collected on patients on the high dependency unit (HDU), but was analysed separately.
Results:

• 1513 sets of observations were reviewed in 179 patients.
• Data from 167 ward patients and 12 HDU patients were analysed separately.

Ward pts

• 6% (n=10) of ward inpatients triggered the tool from T-24 hrs to T0
  - none suffered a cardiopulmonary arrest or were unplanned admission to HDU or ICU in the subsequent 7 days.
  - 20% (n=2) of triggered PEWs were recognised and recorded as a positive trigger by the ward nurse.
• The most common PEW trigger was desaturation <92%
Results: HDU pts

• 8/12 (66%) HDU patients triggered the PEWs on multiple occasions; 3 – 24 triggers in 24 hours.
• 1 patient had been discharged from PICU in the previous 24 hours.
• Persistent tachycardia was the most common parameter triggered.
• 2/8 suffered a SAE; 1 cardiac arrest call for SVT
  1 commenced Ni CPAP for acute deterioration.

None of the deteriorating patients required arrest team or PICU following the initial 24hrs.

• At day seven 7/8 of triggering patients were still in-patients.
Conclusions

• The modified Bristol PEW tool is useful in identifying children at risk of deterioration.
• However, it would appear that the parameter range is too sensitive and may lead to over triggering in some patient groups.
• The recognition and activation of the PEW system by ward nurses is poor and needs to be addressed by further education and training.