

Patient Safety Tip of the Week

September 17, 2013

First MEWS, Now PEWS

We've done numerous columns on the need to recognize clinical deterioration earlier in patients and the potential usefulness of early warning scores such as MEWS (the Modified Early Warning Score). See the columns listed at the end of today's column for links to those discussions on MEWS and early deterioration.

MEWS and all its modifications have been developed and validated for adult populations. So you'd expect that similar early warning scores or systems might be developed for pediatric populations. Indeed, PEWS (Pediatric Early Warning Scores) have been developed and evaluated in several settings. Like their adult counterparts, PEWS use clinical and physiological parameters that are routinely monitored in the care of pediatric patients.

Most recently, the utility of PEWS in identifying children in the emergency department who are in need of ICU care was demonstrated ([Seiger 2013](#)). The researchers evaluated ten different PEWS in a prospective cohort of almost 18,000 children aged <16 years who had presented to the ED of a university hospital in The Netherlands. Most of the PEWS involved scoring systems where individual components were summed into an overall PEWS score. Others were triggering systems where a single parameter might flag the patient as being at risk.

They found that most PEWS systems were pretty good at predicting which children needed ICU care but only fair for predicting the need for hospitalization. In general, the PEWS that used summated scores were better than the triggering systems. None of the tools was great. Those that had high sensitivities had low specificities and vice versa. PEWS scoring systems that were most suited for the emergency department were the one developed by Duncan et al. ([Duncan 2006](#)) and its modification by Parshuram et al. ([Parshuram 2011](#)).

One limitation of the study was that substantial amounts of data were missing (eg. vital signs) and had to be imputed into the scoring tools. However, even with this limitation, it appears there may be utility in use of such PEWS tools at least in helping clinicians decide whether ICU admission might be advisable. It will be interesting to see if these results can be replicated in other pediatric emergency settings. Note also that the authors

do not advise using PEWS systems or scores as the sole triaging tools when prioritizing children in the ED for evaluation.

This is not the first study to demonstrate the utility of PEWS in the emergency room setting. Another study presented as a poster at the 2013 Critical Care Congress of the Society of Critical Care Medicine ([An 2012](#)) had also shown PEWS was valuable in predicting which children in the emergency department were likely to be admitted to the pediatric ICU.

PEWS systems have been demonstrated to be useful in other settings as well. Akre and colleagues ([Akre 2010](#)) retrospectively calculated PEWS scores in children on medical and surgical units at a Children's Hospital (excluding ICU and stepdown units) who had either activation of a rapid response team or a code event. 85.5% of the children having such events had a critical PEWS score in the 24 hours prior to the event. And the median time from the first critical PEWS score to the event was almost 12 hours. This suggests that use of PEWS could identify pediatric inpatients at risk for deterioration much earlier and lead to interventions that might help avoid codes and RRT events. They used the PEWS scoring and color-coded algorithm developed by Monaghan ([Monaghan 2005](#)).

Similarly, a group in Norway ([Solevåg 2013](#)) recently demonstrated in a department of pediatric and adolescent medicine that the modified Brighton PEWS could be used to identify patients with severe illnesses and surrogate markers of cardio-respiratory compromise.

Parshuram et al. ([Parshuram 2011](#)) demonstrated that implementation of a modified PEWS system in a community hospital was associated with fewer late transfers to tertiary pediatric centers, fewer serious clinical deterioration events, and fewer stat calls to pediatricians. In addition, there was no change to pediatrician workload and staff noted decreased apprehension when calling the physician.

Our September 11, 2012 Patient Safety Tip of the Week "[In Search of the Ideal Early Warning Score](#)" summarizes many of the issues associated with development and use of early warning tools in adults. It describes the NEWS (National Early Warning Score) being rolled out in the UK and has links to the [NEWS resources](#) downloadable from the Royal College of Physicians website, which are quite useful. It also has links to a [color-coded clinical observation chart](#) to record and view all the variables and the total score. For examples of a color-coded scoring chart for PEWS, see the article by Akre et al. ([Akre 2010](#)).

Some of our other columns on MEWS or recognition of clinical deterioration:

- February 26, 2008 "[Nightmares: The Hospital at Night](#)"
- April 2009 "[Early Emergency Team Calls Reduce Serious Adverse Events](#)"
- December 15, 2009 "[The Weekend Effect](#)"
- December 29, 2009 "[Recognizing Deteriorating Patients](#)"

- February 22, 2011 “[Rethinking Alarms](#)”
- March 15, 2011 “[Early Warnings for Sepsis](#)”
- October 18, 2011 “[High Risk Surgical Patients](#)”
- March 2012 “[Value of an Expanded Early Warning System Score](#)”
- September 11, 2012 “[In Search of the Ideal Early Warning Score](#)”
- May 2013 “[Ireland First to Adopt National Early Warning Score](#)”

References:

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Parshuram CS, Bayliss A, Reimer J, et al. Implementing the Bedside Paediatric Early Warning System in a community hospital: A prospective observational study. *Paediatr Child Health*. 2011; 16(3): e18–e22.
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<http://www.rcplondon.ac.uk/resources/national-early-warning-score-news>

Royal College of Physicians. National Early Warning Score (NEWS): Standardising the assessment of acute illness severity in the NHS. Report of a working party. London: RCP, 2012

<http://www.rcplondon.ac.uk/sites/default/files/documents/national-early-warning-score-standardising-assessment-acute-illness-severity-nhs.pdf>

color coded chart

Observation chart for the National Early Warning Score (NEWS)

<http://www.rcplondon.ac.uk/sites/default/files/documents/news-observation-chart-with-explanatory-text.pdf>

National Early Warning Score (NEWS)

The scoring system

<http://www.rcplondon.ac.uk/sites/default/files/documents/national-early-warning-score-with-explanatory-text.pdf>

The National Early Warning Score (NEWS) thresholds and triggers

<http://www.rcplondon.ac.uk/sites/default/files/documents/news-thresholds-and-triggers-with-explanatory-text.pdf>

Clinical response to NEWS triggers

<http://www.rcplondon.ac.uk/sites/default/files/documents/outline-clinical-response-to-news-triggers-with-explanatory-text.pdf>



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