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The Children's Early Warning Tool

Kevin McCaffery

Staff Specialist in Paediatric Intensive Care, Brisbane Senior Medical Advisor, Patient Safety Centre, Brisbane



Objective

 To design a suite of tools to meet the needs of bedside clinicians

- Observation chart
- Reference ranges for age
- Early warning score
- Clinical escalation
- Tool to assess interventions
- Triage tool
- Customisable



Design

- Blank canvas
- What observations predict deterioration?
 - Normal ranges for age?
 - Single point vs. cumulative score? (both...?)
 - Weighting of observations
- What observations pragmatic
 Human factors approach to design





DO NOTWRITE N THIS BNDING MARGIN





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Queensland Government CHILDREN'S EARLY WARNING TOOL (CEWT) For children less than 1 year old Evention	Queensland Government CEWT CLINICAL REVIEW Exciter
raunty	
A full CEWT score should be calculated: - on admission - if patient is deteriorating (1 score, clinical concern) - for all patients each morning	Heview requested Date Time Ward doctor Registrar Emergency Reason CEWT score Other (specify)
Aside from the above, do appropriate observations at a appropriate frequency for clinical state	Review undertaken Dato Timo
Any abnormal observations should continue to be checked until normal	✓ Normal Not examined Abnormal if abnormal, give details
Any observations outside the range of the graph should be written as a number	Aiway
	Broathing
Modifications	Circulation
If abnormal observations are expected for patient's clinical condition, please note below accepted parameters for	Abdoman
tuture calls Doctor's name Designation	Skin
Respiratory rate to	ENT Z
SaO ₂ to Doctor's signature	Bones / Joints 9
Heart rate to Data Time	Impression:
Blood pressure to Date Time	Management Z
	Observe / No change
Interventione	Destaria pame (please print) Designation
Interventions	
1	
2	🛱 Review requested Date Time Ward doctor Registrar Emergency
3	Beason CEWT score Other (specify)
4	
5	P Review undertaken Dato
	✓ Normal Not examined Abnormal if abnormal, give details
6	Aiway
7	2 Breathing
8	
9	Abdomen
10	Ŏ Skin
	ENT
	A Bones / Joints
12	Impression:
13	Management
14	Management changed (specify)
	Dector's name (cleare print) Designation Signature

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Validation

Retrospective

- All patients admitted PICU from ward in 2007
- CEWT detected patients before PICU admission

Prospective

- Twelve pilot sites (tertiary / regional / rural)
- Two month trial
- Phased roll-out
- Retrieval population
- Root Cause Analysis
- Semi-qualitative implementation study

Retrospective validation

ICU admissions



CEWT – Bronchiolitis



CEWT – Bronchiolitis controls

Bronchiolitis - Controls



Prospective trial

- Approximately 1900 patients
- Currently analysing data
 - Optimise physiological weighting
 - Optimise action box (for different institutional capabilities)
- Impression is that scoring seems appropriate
- Two critical incidents
 - Patients had respiratory arrests
 - In both cases, CEWT had been overruled by registrar



Maximum CEWT score



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CEWT scores by centre



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Bronchiolitis: Index vs. Controls





Respiratory Rate: Index vs. Controls





Can physiological variables and early warning scoring systems allow early recognition of the deteriorating surgical patient?*

Brian H. Cuthbertson, MD, FRCA; Massoud Boroujerdi, PhD; Laurin McKie, MB, ChB; Lorna Aucott, PhD; Gordon Prescott, PhD

Objective: Early warning scoring systems are widely used in clinical practice to allow early recognition of the deteriorating patient, but they lack validation. We aimed to test the ability of physiologic variables, either alone or in existing early scoring systems, to predict major deterioration in a patient's condition and attempt to derive functions with superior accuracy.

Design: A comparative cohort study.

Setting: A teaching hospital in Scotland.

Patients: Two cohorts of general surgical high-dependency patients. The cohorts are a group of surgical high-dependency care patients who did not require intensive care admission and another group of patients who did require admission.

Interventions: None.

Measurements and Main Results: Prospective physiologic data on consecutive surgical high-dependency unit patients were collected and compared with physiologic data on patients admitted to the intensive care unit from the same surgical high-dependency units. Data were quality checked and summarized, and discriminant analysis and receiver operator curves were used to discriminate between the groups. There were significant physiologic differences between groups with regard to heart rate (p < .001, area under the receiver operating characteristic curve [AUC] 0.7), respiratory rate (p < .001, AUC 0.71), and oxygen saturation (p < .001, AUC 0.78) across time points. This was not present for systolic blood pressure or temperature. Existing early warning scoring systems had good discriminatory power (AUC 0.83–0.86). We derived discriminant functions, which have a high predictive ability to determine differences between groups (p < .0001, AUC 0.86–0.90). We found that heart rate and respiratory rate could detect differences between groups at 6 and 8 hrs before ICU admission, but oxygen saturation and the discriminant function 2 could detect differences 48 hrs before ICU admission.

Conclusions: Some commonly used physiologic variables have reasonable power in determining the difference between patients requiring intensive care unit admission, but others are poor. Existing early warning scores have comparatively good discriminatory power. We have derived functions with excellent predictive power in this derivation cohort. (Crit Care Med 2007; 35:402–409)

KEY WORDS: surgery; early warning scores; scoring systems; intensive care; screening; risk prediction

Retrieval CEWT

- 4 month convenience sample of retrieval referrals
- Evaluate state-wide implemetation
- Identify early and late referrers
- Improve objectivity in co-ordination



Retrieval patients - CEWT score



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CEWT score by diagnostic group



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Retrieval team composition vs. CEWT



Root Cause Analysis

- Currently reviewing state-wide data in last 3 years
- 20 cases filed (RCAs not total deaths)
- 1 late identification spinal injury
- 2 haemorrhage during / post surgery
- 1 out-of-hospital arrest (discharged that day)
- 1 SUDEP





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Semi-quantitative implementation study

Questionnaire at end of prospective trial period

Evaluation of trial-site experience

- Staff demographics
- Impact on perceived ability to care for hospitalised children
- Ease of use
- Educational material / support

Inform design of state-wide implementation strategy



Children's Early Warning Tool - Respondents



What impact has CEWT had on your ability to care for children in hospital?



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How difficult was the CEWT chart to use?



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How did you rate the educational material and support?



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What next...

- Complete prospective analysis
- Optimise CEWT
- Design state-wide implementation
- Work collaboratively across borders
- Further projects
 - Other charts
 - Telemedicine
 - Computers







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- Ruth McCaffery

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