



Original article

What are the patterns of compliance with Early Warning Track and Trigger Tools: A narrative review



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ABSTRACT

Background: Early Warning Scores were introduced into acute hospitals in 2000. 99% of acute hospitals employ a EWS to monitor deteriorating patients with 97.9% of these linked to a referral protocol. Despite this high level of adoption, there has been little improvement in the recognition and response to deteriorating patients over the last decade.

Objective: To explore the patterns of compliance with Early Warning Track and Trigger Tools.

Design: A narrative review.

Data sources: Electronic databases (Medline, CINAHL, EmBase, the Cochrane library, the Centre for Reviews and Dissemination (CRD) and PROSPERO) were searched from 1 January 2000 to 5 July 2018. Titles, abstracts and full text papers were screened (two independent reviewers) against inclusion criteria and seven papers were included in the review. Data were extracted by one reviewer and checked by a second reviewer using a bespoke data collection sheet.

Review methods: All papers were quantitative in design but demonstrated clinical and methodological heterogeneity therefore a meta-analysis was not possible. A qualitative approach was undertaken to synthesise findings using a framework analysis and narrative synthesis. Themes were identified, named, defined and reported according to outcome measure.

Results: 7/27 papers representing over 3000 patients and 963,000 data points were included in the analysis. Reported studies were conducted in the United Kingdom (n = 4), Denmark (n = 2) and Amsterdam (n = 1). Three key themes were identified, early warning score calculation accuracy, monitoring frequency and clinical response. This review identifies poor compliance with the Early Warning Score (EWS) protocol in all three themes. There is significant scoring inaccuracy with omitted EWS, missing elements of the EWS and incorrectly calculated EWS. Adherence to monitoring frequency is poor with a higher EWS being associated with reduced compliance with the escalation protocol. There is inadequate compliance with the escalation element of the EWS protocol with concerning extended delays to clinical review. There is evidence of worsening clinical response with increasing EWS. Although significant improvement is demonstrated in clinical response with the use of electronic EWS protocols, non-compliance still occurs at all EWS stages.

Conclusion: Compliance with EWS is poor but the cause is unidentified. Outcomes can only improve if staff complete the EWS fully, calculate the score accurately, monitor according to protocol and escalate according to clinical response. Social, environmental and professional behaviours that affect effective use of track and trigger tools should be explored to improve our understanding of suboptimal management of the deteriorating patient.

1. Introduction and background

A review of 1000 medical records of adults who died in 10 acute hospitals across England found that one in twenty patients die as a result of medical error with one death in 20 having a greater than 50%

chance of being preventable and 31% of preventable deaths being due to poor clinical monitoring (Hogan et al., 2012). There is evidence to suggest that a lack of knowledge and skills, inadequate appreciation of clinical urgency and failure to seek expert advice in a timely fashion contributes to inadequate recognition of and response to the

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deteriorating patient (Mcquillan et al., 1998).

Approximately 80% of hospital in-patients who suffer cardiac arrest show signs and symptoms of deterioration in the hours leading up to the event (Resuscitation Council (UK), 2010; NCEPOD, 2012). Failure to recognise physiological deterioration in acutely ill adults, combined with a failure to seek appropriate help promptly and intervene in a timely manner, results in increased rates of cardiac arrest and unanticipated intensive care admissions (Franklin & Mathew, 1994; Hogan et al., 2012; Mcquillan et al., 1998; Smith, 2006). In such patients' mortality is high, with only 7% of non-shockable cardiac arrests surviving to discharge (Intensive Care National Audit Research Centre, 2012).

Historically, several key reports highlighted sub-optimal management of patients both discharged from Intensive Care Unit's (ICU) and at risk of deterioration on general wards, with evidence of deficits in their care and management (Garrard & J., 1998; Goldhill, Worthington, Mulcahy, Tahling, & Sumner, 1999; Mcgloin, Adams, & Singer, 1999; Mcquillan et al., 1998). The reasons for the failure to detect patients at risk of acute deterioration include poor critical care knowledge of ward based medical teams (Franklin & Mathew, 1994; Goldhill et al., 1999; Welsh, 2000). It is also recognised that lack of resources, increasing volume and acuity of patients can compromise acute care provision compounding failure to detect deterioration (Mcgloin et al., 1999). Only 2% of acute hospital beds are designated for critical care (Audit Commission, 1999) so the optimisation of ward based patient management requires timely identification and intervention to support deteriorating patients (Mcgloin et al., 1999; Welsh, 2000). Hogan et al. (2012) suggests that, despite implementation of track and trigger systems, there has been little improvement over the last decade with sub-optimal care still evident on general wards impacting directly on patient outcome.

Early Warning Scores (EWS) with an associated escalation strategy (often referred to as track and trigger systems) were first introduced into acute hospitals in 2000 (Department of Health (DoH), 2000). Ninety nine percent of acute hospitals employ a EWS to monitor deteriorating patients with 97.9% of these linked to a referral protocol (NCEPOD, 2015). Despite this high level of adoption, there has been little improvement in the recognition and response to deteriorating patients over the last decade. Sub-optimal care is still evident on general wards despite the comprehensive introduction of EWS and escalation strategies (Hogan et al., 2012).

This review aimed to examine international research relating to the relationship between early warning track and trigger tools and compliance. The research question guiding the review was:

What are the patterns of compliance with Early Warning Track and Trigger Tools?

2. Methods

The review protocol was registered on Prospero (CRD42017074401) (PROSPERO, 2014). The search methods employed for this review are adapted from the Cochrane Handbook of Systematic Reviews (Higgins & Green, 2011) and reported according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Statement (Moher et al., 2015).

2.1. Selection criteria

2.1.1. Inclusion and exclusion criteria

The Population, Intervention, Comparison, Outcome (PICO) acronym (O'Connor, Green, & Higgins, 2008) was used to develop inclusion and exclusion criteria (Table 1). An inclusive approach was used as there is a dearth of evidence and it was important to capture all the relevant research available that answered the research question.

Table 1
Eligibility criteria.

Population	Included
	- Adult patients not managed in critical care areas (intensive care and high dependency)
	Excluded
	- Patients managed in critical care areas (intensive care and high dependency)
	- Paediatric track and trigger tool research
	- Obstetric track and trigger tool research
Intervention	Included
	- Aggregate weighted track and trigger systems
	- Primary empirical, peer reviewed research including systematic reviews, RCT's, cohort and case controlled studies and cross-sectional surveys.
	Excluded
	- Opinion papers, case reports and papers using a qualitative methodology
	- Single parameter systems
Outcome	Included
	- Studies which presented quantitative data measuring compliance with early warning scoring systems
	Excluded
	- Studies with no compliance outcome measures
	- Studies that explored qualitative aspects of compliance with track and trigger systems

2.2. Search strategy

Data bases searched were Medline, CINAHL and the Cochrane library. Population (i.e. adult patients only) was not used as a search term but non-adult studies filtered during the screening process. As Early Warning Scores were only introduced in 2000 this date was used to limit the search. Citation searching, searches of reference lists for missed studies and 'find similar' options in other databases such as 'Scopus' and 'Web of Science' along with a search of Google Scholar were also conducted to identify missed, non-indexed and unpublished material. Studies known to the researcher prior to the search were used for cross-checking to ensure that the search strategy had not missed these studies. A search of the grey literature (government reports, non-published literature) was also undertaken. Relevant Government and clinical reports have been discussed previously and no further studies were identified. A preliminary scoping review was used to identify the full spectrum of search terms. These were "track and trigger*" OR "early warning scor*" and "compliance*". A librarian checked the strategy to ensure a robust search.

2.3. Study selection

After removal of duplicates, titles and abstracts were independently screened by NC and JD against the inclusion and exclusion criteria. Full texts were similarly reviewed. MJ was available to support resolution of any disagreements in whether papers were appropriate for inclusion however, in all cases agreement was achieved.

2.4. Quality assessment

Critical Appraisal Skills Programme (CASP) Critical Appraisal tools were used to assess the quality of the included papers (CASP, 2014). Numerical scores were derived by attributing 1 mark for a yes answer and 0 marks for a no/don't know answer.

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