



## Research paper

# Systems for recognition and response to clinical deterioration in Victorian emergency departments

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## ABSTRACT

**Background:** The study aim was to explore the systems for recognising and responding to clinical deterioration in adult and paediatric Victorian emergency department (ED) patients after their initial triage assessment.

**Methods:** A survey of Victorian EDs was conducted. Senior ED nursing staff was asked about ED characteristics, vital sign documentation, systems for recognising and responding to deteriorating ED patients, quality assurance and governance of ED rapid response systems (RRSs).

**Results:** Sixteen EDs participated (17 metropolitan and 13 regional or rural) giving a response rate of 53.3% (16/30). The organisational definition of a deteriorating patient applied to the ED at 50% of sites ( $n = 8$ ). Vital sign documentation was paper-based (43.6%), electronic (37.6%) or a combination (18.8%) of both. The majority of EDs (87.5%,  $n = 14$ ) had an ED RRS; 50% had one tier, single trigger RRS and 31.3% of EDs had a two tier, single trigger RRS. At 68.8% of sites the ED RRS activation criteria were the same as ward MET (medical emergency team) activation criteria. The most common method of escalation of care for deteriorating ED patients were face-to-face communication (87.5%) and overhead announcements within the ED (68.8%). The ED rapid response team (RRT) was composed of ED specific staff in 50.5% of sites, and staff external to the ED at 12.5% of sites. Two thirds of sites (68.7%) collected data about clinical deterioration in ED patients.

**Conclusions:** Most EDs had an RRS but there was variability in activation criteria and members of the responding team both between EDs, and between ED and the ward RRSs.

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## 1. Introduction

Emergency departments (EDs) are a major component of the Australian health care system and in 2015–16, ED clinicians managed almost 7.5 million attendances [1]. Managing the risk of clinical deterioration is fundamental to emergency nursing practice and commences at the point of triage [2]. Over the last three decades, EDs have developed systematic approaches to the assessment, risk management and clinical care of specific patient groups such as trauma, stroke and acute coronary syndrome [2]. rapid response systems (RRSs) are well established for patients who dete-

riorate on hospital wards. In Australia, national standards mandate that all acute care facilities have a RRS for the recognition and response to deteriorating ward patients [3]. However, broader systems for the recognition and response to deteriorating ED patients following their initial triage have only emerged in recent years [2,4,5].

The major components of RRS are the afferent limb to detect clinical deterioration, a response or efferent limb, and audit and governance limbs. Recent research reports that up to 40% of Australian ED patients fulfil hospital Medical Emergency Team (MET) criteria at one or more times during their ED care [4,6–9] and approximately 13% of clinical deterioration episodes in ED patients are unreported [4,9]. Although there are systematic approaches established to respond to patients with sepsis, acute coronary syndrome, stroke, major trauma and cardiac arrest within the ED [2], less is known about systems in EDs to respond to clinical deterioration for the broader, more heterogeneous ED population. These

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systems are important given there is emerging evidence that clinical deterioration in the ED is associated with subsequent adverse events on the wards in admitted patients [6,10]. Although the governance and team composition of ward based RRS has been studied [11], less is known about these variables within ED-based RRSs.

### 1.1. Aim

The aim of this study was to explore the current systems for recognising and responding to clinical deterioration in Victorian ED patients after their initial triage assessment. The specific research questions addressed by this study were as follows:

- How are deteriorating ED patients recognised?
- What strategies are utilised to escalate care for deteriorating ED patients?
- What response is elicited by escalation of care and specifically, who becomes involved in the care of ED patients recognised as deteriorating?

For the purpose of this study, an ED is defined as having on-site access to both nursing and medical staff 24 h/7 days per week [12].

## 2. Methods

### 2.1. Design

A descriptive, exploratory research design was used and study data were collected using survey methods. The study was approved by the Human Research and Ethics Committee at Deakin University (HEAG-H 106.2016).

### 2.2. Setting and sample

The setting for this study was publicly funded Victorian EDs. There are a total of 39 public EDs in Victoria including one specialist children's hospital, two specialist women's hospitals, two specialist adult hospitals and one hospital specialising in eye and ear conditions [1]. One participant from each Victorian emergency department was recruited using snowballing methods [13]. Senior nursing staff including nurse unit managers (NUMs), clinical nurse educators (CNEs), and associate nurse unit managers (ANUMs) were targeted as informants to the study as they are familiar with local policies, procedures and practices. Email contact was made with the NUM or CNE inviting them to participate in the study and asking them to recommend peers from other EDs who may participate. Respondents were emailed the survey and instructed that they could commence the survey at any time. A follow-up phone call was made to enable clarification of questions, and to ensure the survey was completed. In circumstances where we thought snowballing might not have reached certain EDs, the research team waited four weeks and then made contact with the NUM or CNE via telephone and/or email with an invitation to participate in the study. These requests were well received.

### 2.3. Survey tool and data collection

In the absence of an existing, validated tool that would adequately address the study objectives, a study-specific data collection tool was developed comprising fixed and open-ended responses about: the ED, vital sign documentation, systems for recognising deteriorating ED patients and escalating care, the ED response to deteriorating patients, quality assurance and governance of ED RRSs. Reliability, content validity, and face validity of the survey tool were established using an expert panel review (six

PhD and one Masters' prepared emergency nurses from three Australian states) and pilot testing. The pilot study resulted in removal of three redundant questions.

### 2.4. Data analysis

Data were analysed using Statistical Package for Social Sciences (SPSS) Version 24.0 [14]. Descriptive statistics (frequencies and percentages) were used to summarise study data. Where data were not normally distributed, medians and interquartile range (25th–75th percentiles) are presented.

## 3. Results

A total of 30 EDs agreed to participate (17 metropolitan and 13 regional or rural). The response rate was 53.3% with surveys returned from 11 metropolitan and 5 regional or rural EDs. Of the respondents, 56.3% ( $n=9$ ) were CNEs, 31.3% ( $n=5$ ) were NUMs and the other respondents were a clinical nurse specialist ( $n=1$ ) and a clinical nurse consultant ( $n=1$ ). Most EDs in this study were reported as Level 3 (Table 1) according to the Australasian College for Emergency Medicine (ACEM) criteria [12]. There are currently 24 ACEM accredited EDs in Victoria [15]: 30% are Level 2 ( $n=7$ ), 50% are Level 3 ( $n=12$ ) and 20% are Level 4 EDs. Comparison of the study EDs with ACEM accreditation documents [15] suggest the study sample is reflective of Victorian EDs. The median number of annual attendances and treatment numbers in each ED was 46,893 (IQR = 16,631–69,250, range 650–82,310) and 29 (IQR = 11–41, range 5–58), respectively.

All sites had an organisational policy that defined a deteriorating patient. The organisational definition of a deteriorating patient applied to the ED at 50% of sites ( $n=8$ ). In 37.5% of the EDs studied ( $n=6$ ), the ED had a separate policy defining a deteriorating ED patient. There was no definition of deteriorating patient in the remaining 12.5% ( $n=2$ ) of sites. In the 14 EDs that defined clinical deterioration, all definitions included vital sign derangements. In relation to governance, 43.8% ( $n=7$ ) of sites had an ED specific policy about recognising and responding to clinical deterioration, 31.3% ( $n=5$ ) had a hospital policy that applied to both ED and inpatient areas, and 18.8% ( $n=3$ ) had a hospital policy that did not apply to the ED.

### 3.1. Recognition of deteriorating ED patients

Vital sign documentation was paper-based (43.6%,  $n=7$ ), electronic (37.6%,  $n=6$ ) or a combination of both (18.8%,  $n=3$ ). In the nine EDs with electronic documentation, 66.7% ( $n=6$ ) had electronic alerts when abnormal vital signs were entered into the

**Table 1**  
Australasian college for emergency medicine classifications of study sites.

ACEM classification	<i>n</i>	%
Level one – emergency care within a remote or rural hospital 24/7 nursing staff, medical staff on-call out of hours	2	12.5
Level two – 24/7 nursing and medical staff, able to provide primary critical care, a part of a hospital capable of managing some complex cases and offers some sub specialty services	4	25.0
Level three – 24/7 nursing and medical staff, capable of managing most complex cases, a part of a major regional, metropolitan or urban hospital	7	43.8
Level four – A part of a large multifunctional tertiary or major referral hospital, capable of managing complex conditions with significant level of sub-specialty services	3	18.8
	16	100

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