CHAPTER FIVE


After completing this chapter, you will be able to:

1. Identify the characteristics and early warning signs of the deteriorating patient.
2. Explain the role of early warning systems for activation of rapid response procedures.
3. Describe the administrative and governance structures necessary for establishing, implementing, monitoring and improving rapid response systems performance.
4. Identify the skills, attributes, education and training requirements of critical care nurses’ contribution to the management of clinical deterioration.
5. Identify characteristics of a rapid response system.
6. Understand the purpose and apply the principles of rapid response and critical care outreach systems.
7. Examine the evidence for and against establishing rapid response systems in hospital settings.
8. Describe the evidence for and against the use of electronic monitoring systems in critical care outreach systems.
9. Describe the evidence for and against modifying the rapid response system in hospital settings.

ABBREVIATIONS

RRT - rapid response team
PEWS - paediatric early warning system/score
MOEWS - maternity/obstetric early warning system/score
EWS - early warning system/score
CCON - critical care outreach nurse
CCOT - critical care outreach team
MET - medical emergency team
ICU - intensive care unit
Ward - hospital ward
ED - emergency department
RRT - rapid response team
PEWS - paediatric early warning system/score
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EWS - early warning system/score
CCON - critical care outreach nurse
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CLINICAL CONNECTIONS

CLINICAL CONNECTIONS

LEARNING OUTCOMES
Recognising and Managing the Deteriorating Patient: the Role of Rapid Response Systems, Critical Care Outreach Nurse and Medical Emergency Team

**Case Study**

A 61-year-old male presenting to the emergency department with a chief complaint of pain in the left upper quadrant of the abdomen. He reported a 5-hour history of severe pain, nausea, and vomiting.

**Monitoring and Triggers**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Lower Limit</th>
<th>Upper Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart Rate</td>
<td>&lt; 50 bpm</td>
<td>&gt; 120 bpm</td>
</tr>
<tr>
<td>Blood Pressure</td>
<td>&lt; 90/50 mmHg</td>
<td>&gt; 180/100 mmHg</td>
</tr>
<tr>
<td>Oxygen Saturation</td>
<td>&lt; 90%</td>
<td>&gt; 100%</td>
</tr>
<tr>
<td>Temperature</td>
<td>&lt; 35°C</td>
<td>&gt; 38°C</td>
</tr>
</tbody>
</table>

The rapid response system closed feedback loop model

- **Objective:** To determine which vital-sign parameters and which threshold values can reliably predict dangerous deterioration before it happens.
- **Intervention:** The RRT is sufficiently skilled to intervene in an urgent and critical manner.
- **Stabilise and plan:** The whole team reviews the goals of care and other plans.
- **Monitor and continue to monitor closely:** Any relapse of deterioration is anticipated and recognised early.
- **Emergency time:** The most common vital signs tracked are HR, RR, BP, and SpO2.

The rapid response system closed feedback loop model

- **Afferent limb:**
  - **Doctor arrives:** The patient is presenting an antecedent factor of clinical deterioration.
  - **Junior resident medical officer:** The treating doctor, but the doctor is currently performing a procedure and is unavailable to see the patient. The junior resident medical officer calls the Rapid Response Team (RRT) to come and see the patient.
  - **RRT arrival:** The RRT arrives and is suitably trained and cognisant of the significance of any subtle deterioration in the patient’s condition and the approved protocol driven response required.

- **Effector limb:**
  - **Monitor:** The whole team reviews the goals of care and other plans.
  - **Intervention:** The RRT is sufficiently skilled to intervene in an urgent and critical manner.
  - **Emergency time:** The most common vital signs tracked are HR, RR, BP, and SpO2.

**Table 1: Single parameter track and trigger chart to alert MET.**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Triggers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metabolic derangement</td>
<td>Blood glucose Level &lt; 3.0 and &gt; 20 mmol/L</td>
</tr>
<tr>
<td>Respiratory failure</td>
<td>HR &lt; 50 and &gt; 120/min.</td>
</tr>
<tr>
<td>Seizure or fall in GCS</td>
<td>Systolic BP &lt; 90 and &gt; 180 mmHg</td>
</tr>
<tr>
<td>Hypoxia</td>
<td>SpO2 &lt; 92% (on or off oxygen)</td>
</tr>
</tbody>
</table>

**Figure 1:** The rapid response system closed feedback loop model

- **Afferent limb:** Doctor arrives. The patient is presenting an antecedent factor of clinical deterioration. Patient assessment and monitoring of vital parameters and any abnormalities are noted along with other assessments of the patient’s state. A specific follow-up action plan is developed to ensure any neglect of care and any deterioration is minimised.
- **Effector limb:** The RRT is mobilised to attend the patient. The response team continues to monitor closely to prevent any relapse of deterioration. The 1992 Quality in Australian Healthcare Study examined a random sample of all hospital admissions in the state of Victoria from July 1991 to June 1992, and found that patient harm had been and remains an endemic iatrogenic problem. The study found that patient harm had been and remains an endemic iatrogenic problem. The study found that patient harm had been and remains an endemic iatrogenic problem.
Recognizing and Managing the Deteriorating Patient: the Role of Rapid Response Systems

**Case Study**

The National Early Warning Score (NEWS) trigger system is functioning to achieve best possible outcomes and to ensure continuous monitoring of the patient. It will have data populated automatically from the patient echart and will calculate measurement outcomes.

**Output and outcome measures**

The ideal measures to have in place to monitor the efficiency and effectiveness of the RRS will encompass demographic, process, output and outcome measures. All of which are necessary to ensure the system works to help the ward staff understand and "fill" the knowledge gaps they may have.

In addition to educating the staff in this process it is also important that the registered nurse who should decide if a change of frequency of clinical monitoring or an escalation of clinical risk is indicated; iii) A medium score (NEW score 5-6 or a RED score) should prompt assessment by a competent critical care outreach nurse who should decide if a change of frequency of clinical monitoring or an escalation of clinical risk is indicated; iv) A high score (NEW score 7 or above or a RED score) should prompt an urgent review by a clinician skilled in the assessment of acute illness.

**Critical Care Outreach Nurse**

The critical care outreach nurse will use the trigger system to help the ward staff understand and "fill" the knowledge gaps they may have. Their role is in a "teachable moment", having the courage to escalate the issue is critical to encourage others to avoid the common mistake of letting the issue "slip through the cracks". It is NOT to react, but to pause and encourage the moment to understand and analyse the current situation and the potential for escalation and determine the next actions.

The critical care outreach nurse will now be in a "teachable moment", having the courage to escalate the issue is critical to encourage others to avoid the common mistake of letting the issue "slip through the cracks". It is NOT to react, but to pause and encourage the moment to understand and analyse the current situation and the potential for escalation and determine the next actions.

**Education and training**

Critical to the effective utilisation of the above track and trigger systems are training and education for the response team and to give them capacity and confidence to spend time with the patient and staff so that thorough assessment, intervention and follow up education and documentation activities can be provided.

**Clinical staff education and training in track and trigger EWS procedures**

The first step in establishing an appropriate track and trigger process is to provide education and training for the response team and to give them capacity and confidence to spend time with the patient and staff so that thorough assessment, intervention and follow up education and documentation activities can be provided.

**Paper-based observation charts such as the Adult Deterioration and Distress Score (ADDS)**

The ADDS is one example of a track and trigger system used by many hospitals. It is a simple, easy-to-use tool that can be implemented quickly and is effective in alerting clinicians to potential patient deterioration. The ADDS uses a simple scoring system to identify patients who may be at risk of deterioration.

**Mixed method trigger**

Over time single and multi-parameter methods have become merged into scoring systems that accommodate a trigger threshold. Contemporary EWS systems are now fully automated and embedded into nurse to "trigger" a set of similar escalations and help as above (see Figure 2). The coloured zones provide a visual alert cue to the clinician that the patient's measured parameter is in a "coloured zone". In the development of ADDS colour-coded charts, it was demonstrated that more experienced or knowledgeable assistance to the bedside was needed in these situations.

**Acceptable “safe” zone**

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**Clinical education and training in track and trigger EWS protocols**

The education and training of the technical nurses using ADDS at the bedside was shown to be "premature", the response team need to use this as a "teachable moment", having the courage to escalate the issue is critical to encourage others to avoid the common mistake of letting the issue "slip through the cracks". It is NOT to react, but to pause and encourage the moment to understand and analyse the current situation and the potential for escalation and determine the next actions.

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Figure 4: Example of an adult deterioration detection chart. © Royal College of Physicians (2012).
The first tier in the two-tier system is a small team of medical and nursing staff. The efferent limb of Rapid Response Systems (RRS) is designed to achieve specific outcomes. Some of the titles for this role in the literature include but are not limited to rapid response nurse (RRN), ICU liaison nurse, nurse-at-night, clinical team coordinator (CTC), and medical emergency team coordinator (MECTC) (Beadle, personal communication, August 2015). The CCON role may do more than simply respond to MET codes or the EWS, the role is to also attend to the root cause of an emergency in the ward. The RRS programs are designed to provide independent, multidisciplinary support without the immediate presence of a critical care provider (e.g., intensive care unit or emergency department). The CCON needs to be familiar with the clinical and practice aspects of all the teams involved, as well as any difficulty they may face.

The CCON role is to provide multidisciplinary leadership guidance on resource needs and equipment from other departments, e.g., borrowing scarce resources. The CCON is responsible for coordinating and overseeing patient care, including patient flow activity. The CCON is also responsible for providing medical and nursing staff with feedback on their performance, including the effectiveness of their care and the quality of their work. The CCON is responsible for planning the care of a patient at risk of further deterioration in the general ward: Continuously monitors patients at risk, Provides multidisciplinary leadership, Aids with patient flow activity, Measures, Facilitates dispute resolution, refer cases to the CCON: As with the CCON, we also find many differing names and scope of the position reported in the literature. Some of the names and terms include: "single-tier" system, "two-tier" system, "first tier" system, and "second tier" system.

In addition, the CCON needs to be familiar with the clinical and practice aspects of all the teams involved, as well as any difficulty they may face.
Recognizing and Managing the Deteriorating Patient: The Role of Rapid Response Systems, Critical Care Outreach Nurse and Medical Emergency Team

Recent studies...
Recognizing and managing patient deterioration

**A. Threatened airway**

- B. Respiratory rate change

**B. Management of physiological deterioration**

- Medical officer with broad management skills, usually an anaesthetist
- **A. Airway/breathing management**
  - Medical officer with advanced airway response to a deteriorating patient?

**QUESTIONS**

- **1. Name the eight of most common signs used to track and trigger a rapid response to a deteriorating patient?**
  - EXCEPT:

**QUESTIONS**

- **2. According to Bell et al. (2006), what is the 30-day mortality rate of critically ill American patients with single-parameter vital sign change?**
  - A. They could not tell the time
  - B. They were too busy and could not manage any greater workload
  - C. They would “feel like an idiot if they called unnecessarily”
  - D. They did NOT call for help in a timely manner

- **3. There are essentially three types of EWS methods used to alert clinicians.**
  - A. They are summarised as follows, EXCEPT:

**QUESTIONS**

- **4. What is meant by “Tracking”?

**QUESTIONS**

- **5. There are essentially three types of EWS methods used to alert clinicians.**
  - A. Trending change
  - B. Mean arterial pressure change
  - C. Oxygen saturation level change

**QUESTIONS**

- **6. Which of the following is NOT normally considered a clinical assessment tool of the CCON?**
  - A. Only experienced nurses
  - B. 92%
  - C. 62%
  - D. Only novice nurses

**QUESTIONS**

- **7. Why is tracking of clinical workload important?**

**HISTORY**

- **8. Beadle et al. (2015) surveyed and interviewed 124 nurses following the introduction of an electronic patient record system that contain an automated EWS and alert function. Of the nurses that responded what percentage preferred the electronic EWS system over the previous paper based version?**
  - A. 0%
  - B. 10%
  - C. 20%
  - D. 25%

**HISTORY**

- **9. Which of the following is NOT normally considered a clinical assessment tool of the CCON?**
  - A. Only experienced nurses
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**HISTORY**

- **10. Generally, the skill sets expected of the Critical Care Outreach Team (CCOT) are summarised as follows, EXCEPT:**
  - A. Doctors are required to undertake appropriate further training.
  - B. Multi-parameter score
  - C. Mixed method trigger
  - D. Closed feedback loop model

**CONCLUSION**

- **Recognizing and managing patient deterioration**
  - Critical care knowledge and skills, patient safety and infection control
  - An awareness of physiological deterioration – medical officer with broad management skills
  - An awareness of physiological deterioration – medical officer with broad management skills
  - A new/maintenance management – medical officer with advanced expertise
  - The CCON informs prioritization of clinical workloads of teams
  - The CCON contributes to all patients having access to the care they need in a timely manner.

**FUTURE DIRECTIONS**

- **B. Respiratory rate change**

**RESPONSIBLE CARE PROFESSIONAL**

- Case study
  - Comprehension of the need to act on deteriorating patients
  - Rapid response systems. RRS is a systematic approach for responding and managing clinical deterioration hospital wide. Indeed, it is a strategy that contributes to all patients having access to the care they need in a timely manner.

**CONCLUSION**

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Answer

1. A. Election, influence, resources and sustainability

2. B. Direction, knowledge, political savvy and resilience

3. C. Direction, knowledge, resources and support

4. D. 90%

5. C. 75%

6. B. 55%

7. D. Cloud

8. A. Critical Care Outreach Nurse - Regular Adult RRS, Cardiac Arrest or Unplanned Admission to Intensive Care

9. A. Advanced Clinical Nursing Skills – CCON (Critical Care Outreach Nurse)

10. A. Advanced Clinical Nursing Skills – CCON

11. In the Tibbals and Kinney study the impact of a paediatric MET system on the outcome of patients who showed impairment in clinical status over time and looking for abnormalities and signs of deterioration.

12. 19.7% 24.7% 29.8% 34.7% 40.0% 45.4% 50.8% 56.2% 61.6% 67.0% 72.4% 77.8% 83.2% 88.6% 94.0% 99.4%

13. C. No substitute orinnacle with an observation chart

14. D. Direction, kindness, reason and support.
Recognizing and Managing the Deteriorating Patient: the Role of Rapid Response Systems, Critical Care Outreach Nurse and Medical Emergency Team


