Improving management of deteriorating acutely ill patients

May 2017

<table>
<thead>
<tr>
<th>Trust name</th>
<th>Central Manchester University Hospitals NHS Foundation Trust</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provider type</td>
<td>Teaching hospital providing general and specialist services</td>
</tr>
<tr>
<td>Site (if applicable)</td>
<td>Manchester Royal Infirmary and Trafford Hospitals</td>
</tr>
<tr>
<td>Core service</td>
<td>Trust-wide</td>
</tr>
<tr>
<td>CQC rating (SAFE)</td>
<td>Good</td>
</tr>
<tr>
<td>CQC rating (Overall)</td>
<td>Good</td>
</tr>
</tbody>
</table>

The challenge

Central Manchester University Hospitals NHS Foundation Trust (CMFT)\(^1\) started to look at its management of deteriorating patients around 2008, when the National Institute for Health and Care Excellence (NICE) introduced guideline CG50 *Acutely ill adults in hospital: recognising and responding to deterioration.*\(^2\) An internal review revealed several opportunities for improvement with:

- poor documenting of early warning scores (EWS)
- poor compliance with escalation of care to the appropriate staff member, and poor response rate
- 25% of all scores added up incorrectly
- observations that were often inaccurate, particularly those that could not be automated, such as alert, voice, pain, unresponsive (APVU) scale observations and respiratory rate.

At the time, the trust had a bed capacity of 900 and around 350 patients suffered in-hospital cardiac arrests each year.

---

\(^1\) CMFT was created when Central Manchester and Manchester Children’s University Hospitals Trust was given foundation trust status on 1 January 2009. There are six main hospitals in the trust, four of which are registered collectively as Manchester Royal Infirmary (Manchester Royal Infirmary and three specialist hospitals: Manchester Royal Eye Hospital, Saint Mary’s Hospital and the Royal Manchester Children’s Hospital). Trafford General Hospital and Altrincham Hospital are registered as separate locations but are known collectively as the Trafford Hospitals. The trust provides an extensive range of community services.

\(^2\) [www.nice.org.uk/guidance/cg50](http://www.nice.org.uk/guidance/cg50)
The solution

Over the years, the trust created several initiatives to address these issues.

First, they introduced emergency bleep meetings at which a multidisciplinary team would review the records of all patients who had suffered a cardiac arrest to identify opportunities to improve care. The overarching finding from these meetings was that deterioration was often clearly documented but not acted on until late in the process.

Second, they carried out a comprehensive review of competencies and skills among junior doctors, nurses and healthcare assistants on all wards, against the acute care competencies developed by the Department of Health to help providers implement the NICE guideline. From this they developed an acute care competency framework and then a structured education programme, which covered two main areas. They rolled out the Greater Manchester Critical Care Skills Institute’s acute illness management (AIM) course across the trust and embedded it as part of compulsory training for all new staff. They also introduced skills training on how to measure and record vital signs, with a particular focus on appropriate measurement of respiratory rate, AVPU score and manual blood pressure monitoring.

Third, given increasing evidence that staff had not been escalating care appropriately, they developed an internal protocol that clearly indicated who a patient should be escalated to. This linked the needs of a patient based on their EWS score to the competence of responder as determined by the acute care competency framework (primary, secondary, tertiary responders). This responding algorithm was then automated through an electronic solution that uses the bleep system to send alerts but instead of displaying a number to call, it displays a patient’s name, ward and EWS score. Only the appropriate level of responder is allowed to acknowledge attendance and intervention.

For example, an initial score of EWS 3 would trigger nursing review, and the nurse, provided they had completed the AIM course and extra study, would be able to initiate some treatment, such as provide a first bag of IV fluids or oxygen support. A further EWS score of 3 would trigger review by a foundation doctor (FY1) or core trainee; a score of 4 or 5 would trigger a middle grade response (from the parent team); and a score of 6 and higher would require response within 30 minutes from both the parent team and critical care middle grade or consultant.

Each week, the electronic system produces an automated report at hospital and specialty levels with a clear overview of the EWS profile, timeliness of observations, adherence to standards for response (all scores, and high EWS (>=6), and number of medical emergency calls and cardiac arrests.
Enablers and challenges

Before the automated alerts were introduced, clinical staff were concerned about the possibility of alert fatigue. This has not happened; indeed clinicians are confident that the system is appropriately distributing alerts to the correct level of responder. On the wards this has translated into a greater role for the primary responders and led to the upskilling of nursing staff.

Impact

Following the introduction of automated alerting system, the trust observed a statistically significant reduction in length of stay within less than a year from when baseline data was collected. Moreover, evaluation of the intervention showed an increase in response to EWS scores of 3, 4 and 5 from 29% to 78% and from 76% to 96% for patients with EWS score higher than 5. This was associated with a reduction of admissions to intensive care unit.

Although the reduction in mortality and cardiac arrests observed during evaluation of the automatic alert system did not reach statistical significance, since 2010 the trust has documented a 50% reduction in in-hospital cardiac arrests, without an associated increase in the use of Do Not Attempt Cardiopulmonary Resuscitation forms, although it would be difficult to attribute this exclusively to the interventions described above.

Next steps and sustainability

The trust has continued to scope opportunities to align clinical conditions with bedside monitoring, record results and introduce prompts using a system of flags and monitoring tools linked to a pre-determined alert/response. To date they have introduced flags for:

- patients who have a central line in position
- diabetic patients
- patients with sepsis.

The team has worked with partners in industry and the NHS to develop tools to help identify frail patients and monitor observations of the comfort of patients on the end of life pathway (for example whether they are hydrated and what their pain level is).

In partnership with the University of Manchester and other stakeholders, they are also starting to use cognitive computing analysis to establish whether predictive analytics could better anticipate a patient’s pathway. This could include, for example, whether surgical patients could be discharged earlier as soon as their observations stabilise, or whether length of stay for a patient with chronic obstructive pulmonary disease exacerbation could be predicted on the basis of their clinical status on admission.
Want to know more?

Have a look at the following documents:

- flowchart highlighting level of escalation based on EWS score
- article originally published in *Journal of Critical Care and Resuscitation*, highlighting the clinical benefits of automated electronic clinical alerts to improve compliance with EWS protocol

Contact:

- Dr Jane Eddleston, Deputy Medical Director/Clinical Head for the Clinical and Scientific Services division: Jane.Eddleston@cmft.nhs.uk
- Dawn Pike, Director of Nursing: dawn.pike@cmft.nhs.uk
- Richard Cox, Matron/ Patientrack Project Lead, Acute Care Team: Richard.Cox@cmft.nhs.uk

To see the other case studies in this series: visit the NHS Improvement website at: Improving quality and safety in healthcare.