

## Clinical and scientific letters

### OVERVIEW

Letters not directly related to articles published in *Clinical Medicine* and presenting unpublished original data should be submitted for publication in this section. Clinical and scientific letters should not exceed 500 words and may include one table and up to five references.

### The national early warning score gives misleading scores for oxygen saturation in patients at risk of hypercapnia

A national early warning score (NEWS) system has been introduced in the UK to identify and protect patients at risk of serious clinical deterioration.<sup>1–3</sup> The system allocates EWS points when oxygen saturation (SpO<sub>2</sub>) is below 96%. Although we strongly support the principles of NEWS, we have previously expressed concern that the SpO<sub>2</sub> score is not appropriate for patients with risk factors for hypercapnic respiratory failure.<sup>4</sup> These patients account for up to 10% of non-elective hospital admissions and up to half of patients requiring oxygen therapy in UK hospitals. The recommended oxygen target range to minimise morbidity and mortality for these vulnerable patients is 88–92% or sometimes less.<sup>5,6</sup> NEWS does not accommodate this high-risk and vulnerable group. To safeguard this group of patients, we have developed a modified NEWS system called Salford NEWS. This modified system allocates EWS points if patients are below or above their optimal target range and documents oxygen usage more clearly than the NEWS chart. We have piloted the Salford NEWS chart successfully on two medical wards and it will be introduced hospital wide during 2014.

To quantify the impact of the NEWS system on patients at risk of hypercapnic respiratory failure, we applied the oxygen section of the NEWS chart to 400 routine observation rounds for 22 patients on a respiratory ward with a target SpO<sub>2</sub> range of 88–92% (19 patients had chronic obstructive pulmonary disease and three had complex lung disease with hypercapnia). The results are shown in Table 1.

Using the NEWS system, 92% of observations gave an inappropriate score for SpO<sub>2</sub>. In addition, 328 of 350 satisfactory oximetry readings (within the safe target range of 88–92% or above this range breathing air) were scored by NEWS as hypoxaemic where SpO<sub>2</sub> was below 96%. The median EWS was 5 using the NEWS system and 2 using Salford NEWS. Scores of 5 and above require medical review. Using the unmodified NEWS chart, review would be required for 56% of at-risk patients during every observation round compared with 18% of patients using the Salford NEWS chart. The majority of extra reviews would be generated by SpO<sub>2</sub> values that were appropriate for the patient. Furthermore, the NEWS system failed to identify the 40 instances where SpO<sub>2</sub> was above the target range due to excessive oxygen therapy. An inappropriate score for hypoxaemia was given in 34 of these cases. Inappropriate NEWS scores could cause inexperienced nurses or doctors to give additional oxygen to patients whose SpO<sub>2</sub> is within or above the safe target range of 88–92%. This is a major concern because of the association of excessive oxygen administration with increased morbidity and mortality in patients at risk of hypercapnic respiratory failure.<sup>5,6</sup>

We believe that bedside documents and electronic observation charts should facilitate improved practice. We are working with colleagues at the Royal College of Physicians and the British

**Table 1. Application of the oxygen section of the NEWS chart to 400 routine observations rounds for 22 patients on a respiratory ward with target oxygen saturation range of 88–92%.**

SpO <sub>2</sub>	Number of observations (%)	Number with appropriate oximetry score in NEWS (%)
Satisfactory	350 (87.5) <ul style="list-style-type: none"> <li>• 270 had saturation within target range</li> <li>• 80 had saturation &gt;92% breathing air</li> </ul>	22/350 (6.3) <ul style="list-style-type: none"> <li>• 22 had SpO<sub>2</sub> ≥96% breathing air</li> <li>• 328 scored 'too low' in NEWS</li> </ul>
<88%	10 (2.5)	10/10 (100.0) All scored 3 points for hypoxaemia
<92% breathing oxygen	40 (10.0)	0/40 (0.0) 34/40 scored 'too low' in NEWS
Total	400 (100.0)	32/400 (8.0)

In total, 19 patients had chronic obstructive pulmonary disease and three had complex lung disease with hypercapnia. NEWS = national early warning score; SpO<sub>2</sub> = oxygen saturation.

Thoracic Society to modify the NEWS chart to enhance the safety of patients with risk factors for hypercapnic respiratory failure who account for up to half of oxygen use in UK hospitals. ■

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## References

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- 3 Jones M. NEWSDIG: The National Early Warning Score Development and Implementation Group. *Clin Med* 2012;12:501–3.
- 4 O'Driscoll BR, Bakerly ND, Murphy P *et al*. Concerns regarding the design of the bedside monitoring chart for use with the NEWS (National Early Warning System). *Clin Med* 2013;13:319–20.
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## Response

The authors of this clinical letter have developed NEWS to accommodate the concern that they have expressed previously about the patients who are risk of hypercapnoeic respiratory failure.

The local development of a modified NEWS does take away the benefit from having a national system of warning of deteriorating physiological parameters and indeed one of the expressed intentions of developing NEWS was indeed to ensure that all clinical staff could develop a working knowledge of a commonly used NEWS system.

In earlier responses to the concerns expressed about hypercapnoea, it has been emphasised that the training package for NEWS recognises that patients who may be at risk of developing this problem should be recognised clinically and indeed clinical review of such patients should indicate whether continued call out for NEWS scores may be modified when the higher scores on NEWS simply reflect a lower (but acceptable) oxygen saturation reading. There remain two concerns – firstly that we do recognise that patients need a proper clinical assessment, and secondly that we should not accept hypoxia when the patient is not at risk of hypercapnoea. No early warning score system alone can replace this clinical assessment and patient safety must be the priority. If clinical assessment suggests that repeated calls for a high NEWS score simply related to lower saturations in the patient where 88–92% saturations are satisfactory, then this sustains patient safety and the need for frequent call out to review hypoxia is removed. If, however, the patient is inadvertently selected into the group where lower saturations are deemed acceptable but this is not appropriate to their needs, then the patient may be put at risk.

NEWS will continue to be reviewed but the benefits of a system that is in widespread use must not be lost. ■

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