

# Pulse oximetry and respiratory disease in primary care

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The portability and 'easy to use' nature of pulse oximeters, which make them potentially attractive for primary care workers, has prompted researchers to consider the accuracy and usefulness of this tool in diverse patient groups. In this issue of *Primary Care Respiratory Journal*, Jones and colleagues<sup>1</sup> argue that pulse oximetry is a useful and affordable tool for assessing both acute and chronic hypoxaemia in patients with chronic obstructive pulmonary disease in primary care. Interestingly, one of the main outcomes of their pragmatic study was the reassurance felt by the majority of patients and clinicians using the tool. Typically in primary care, the negative predictive value of testing is the hallmark of good practice. But is that the case with pulse oximetry?

### Acute severe asthma

The value of pulse oximetry in the assessment of acute severe asthma patients has been subject to debate for the past ten years or so. Used as a screening tool at initial presentation in the respiratory unit, an oxygen saturation (SpO<sub>2</sub>) greater than 92% suggests that respiratory failure is unlikely.<sup>2</sup> Another study reported that in severely asthmatic children the relative risk for requiring additional treatment increased by 6.3 using this cut-off, making it suitable for monitoring purposes.<sup>3</sup> As a predictor of requirement for admission, however, pre-treatment SpO<sub>2</sub> was poor in two larger studies,<sup>4,5</sup> in contrast with post-treatment levels of SpO<sub>2</sub> below 92% which did increase the odds of admission 16-fold.<sup>4</sup>

### Community acquired pneumonia

In a case-control study of acutely infected nursing home residents it was demonstrated that a decrease greater than three percent from the baseline oxygen saturation level was a strong indicator of community acquired pneumonia (CAP), while a drop less than four percent from baseline suggested CAP was unlikely.<sup>6</sup> An American study observed a wide variation in initial management, but particularly among outpatients with CAP the assessment of arterial oxygenation seemed likely to increase the detection of arterial hypoxaemia.<sup>7</sup>

### Chronic and acute management of COPD

When assessing long-term oxygen requirement in COPD out-patients, pulse oximetry has been shown to be a sensitive but unspecific tool when used alone, and therefore unsuitable for deciding upon prescription of oxygen.<sup>8</sup> The same holds true for SpO<sub>2</sub> measurement to detect hypoxia in acute exacerbations: only fair agreement is reached with arterial blood gas analysis.<sup>9</sup> Pulse oximetry was therefore considered particularly helpful in selecting patients eligible for arterial blood gas assessment,<sup>10</sup> which is now confirmed by Jones and co-workers.<sup>1</sup> Their pragmatic study reflects the positive change in

daily care that can be achieved in real-life practice, and it also expresses some real-life flaws, as they point out in the discussion section. An unknown number of patients may have appeared more than once, and the fate of roughly half of the desaturated patients remains obscure, probably due to registration problems. The choice of a saturation cut-off point of 90% has clearly been pragmatic (because of referral pressure on the local hospital) but may in theory have resulted in false negative reassurance of some patients. It has been demonstrated in a diagnostic study of patients with acute exacerbations that the optimal cut-off by receiver operating characteristic (ROC)-curve analysis is 92%, with a sensitivity of 100% and a specificity of 86%.<sup>9</sup>

It seems that pulse oximetry can be used in primary care as a screening tool or as an adjunct to the clinical assessment of respiratory patients, but not as a replacement of arterial blood gas analysis in the diagnosis of hypoxia. This development is especially relevant now that the equipment has become more affordable and the ill respiratory patient is an increasingly prevalent appearance in primary care. Measurement of oxygenation is easy and leads to satisfactory results according to both patients and clinicians. To be confidently reassured, however, it is important to choose a clear and validated cut-off point (92%), to measure chronic patients' baseline (to detect a drop of greater than three percent) and eventually their reaction to therapy, in order to make an even more targeted use of scarce hospital-based specialist services. ■

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