FACTSHEET

Patient deterioration and supplemental oxygen

Introduction

Patients who require supplemental oxygen to maintain their oxygen levels are at increased risk of deterioration. A need for supplemental oxygen scores '2' in the New Zealand Early Warning Score (NZEWS). Oxygen is prescribed for the relief of hypoxaemia, not breathlessness.(1)

Oxygen is a drug with specific indications and contraindications. As such it must be prescribed on the national medication chart and administered using appropriate equipment for the prescribed flow rate to achieve a targeted oxygen saturation range.(2)

This factsheet provides guidance to clinicians on modifying the NZEWS trigger for patients receiving supplemental oxygen.

There are risks for patients who receive either too much or too little supplemental oxygen. For example, too much oxygen can cause increased infarct size in patients who have had a myocardial infarction; atelectasis may worsen due to administration of high concentration oxygen; and respiratory depression may be worsened in patients with hypoxaemic respiratory drive.(2) Too little oxygen will reduce oxygen delivery to tissues, worsening cellular hypoxia and contributing to multiple organ dysfunction.

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Routine administration of oxygen

Supplemental oxygen is given frequently to hospital inpatients regardless of specific indications. For example, in many hospitals patients receiving opiates via epidural or patient-controlled analgesia routinely receive a low dose of oxygen even if they are not hypoxaemic. In this situation, the patient's NZEWS will be increased by two even if they are physiologically stable. The appropriate action may be to stop supplemental oxygen administration and continue to monitor for signs of respiratory depression or hypoxaemia.

Modifying the NZEWS triggers

Modifications may be made to the NZEWS triggers for individual patients when chronic disease, drug therapies or other factors cause patients' vital signs to fall outside of the normal ranges on the national vital signs chart.

When making modifications, clinicians must consider the clinical risk to the patient if vital sign abnormality is normalised. Clinical risk can be mitigated by discussing modifications with a senior clinician and reviewing them at regular intervals so they remain appropriate as the patient's condition changes.

Anaesthesia or sedation

Patients recovering from general anaesthesia or sedation may require short-term administration of supplemental oxygen until they are normoxic and awake. It may be appropriate to modify the supplemental oxygen trigger so it does not contribute to an elevated NZEWS.

All modifications must be time-limited to ensure that an unexpected ongoing oxygen requirement does trigger escalation and review from an appropriately skilled responder.(3) An appropriate modification is shown in Figure 1.

Figure 1: An example of EWS modification for supplemental oxygen after anaesthesia

Vital sign (use abbreviation)	Accepted values and modified EWS	Date and time	Duration (hours)	Name and contact details
Oxygen	EWS 0 if 2 L/min or less	3/5/17 11:30	4 hrs	N. Riviera #6137
Reason: Post-anaesthesia				

Chronic disease

Patients with chronic disease may require continuous supplemental oxygen during an acute hospitalisation. Examples include patients with chronic obstructive pulmonary disease (COPD), cystic fibrosis or pulmonary hypertension. For these patients, supplemental oxygen may not be a useful indicator of acute deterioration. Therefore, modification of the NZEWS for the duration of their admission may be needed. An appropriate modification is shown in Figure 2.

Figure 2: An example of EWS modification for supplemental oxygen in chronic disease

Vital sign (use abbreviation)	Accepted values and modified EWS	Date and time	Duration (hours)	Name and contact details
Oxygen	EWS 0 if 4 L/min or less	3/5/17 14:40	until discharge	D. Ramoray #6785
Reason: COPD on home oxygen				

Flow rate and delivery device

Supplemental oxygen flow rate, delivery device and target saturation range should be prescribed on the national medication chart in the 'Oxygen Therapy & Medical Gases' section (see Figure 39 in the *National Medication Chart User Guide*).(2) If a patient is not achieving the target saturation range with the prescribed supplemental oxygen flow rate or delivery device, further assessment of the patient and alteration of the prescription are required. Oxygen saturation contributes to a patient's total NZEWS and will prompt escalation of care if deterioration is detected.

Summary

A need for supplemental oxygen is a marker of patient deterioration. There are few conditions where this may not be the case and escalation would be inappropriate. The national vital signs chart allows modifications to the NZEWS trigger in such situations. Modifications should be used with caution as they have the potential to cause harm by preventing the appropriate escalation of patient deterioration.

References

1. Beasley R, Chien J, Douglas J, et al. 2015. Thoracic Society of Australia and New Zealand oxygen guidelines for acute oxygen use in adults: 'Swimming between the flags'. *Respirology* 20(8): 1182–91.
2. Health Quality & Safety Commission. 2012. *The National Medication Chart User Guide*. Wellington: Health Quality & Safety Commission. URL: www.hqsc.govt.nz/assets/Medication-Safety/NMC-PR/NMC-UserGuide-Oct2012.pdf.
3. Health Quality & Safety Commission. 2017. *Capabilities for recognising and responding to acute deterioration in hospital*. Wellington: Health Quality & Safety Commission. URL: www.hqsc.govt.nz/assets/Deteriorating-Patient/PR/Factsheet_-_Recognising_and_responding_to_acute_deterioration.pdf.