

## Oxygen Therapy Guidelines

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### Indications

Oxygen therapy is administered to prevent cellular hypoxia, caused by hypoxaemia (low PaO<sub>2</sub>) which can cause irreversible damage to vital organs.

### Scope

Medical Practitioners, Nurse Practitioners, Registered Nurses and Midwives, Physiotherapists, Enrolled Nurses, Student Nurses/Midwives as per Students Responsibility Policy.

**Please note:** There is a separate policy for [Nasal High Flow Oxygen \(Airvo\)](#)

### Exclusions

- Patients admitted to specialist areas with a specialised oxygen prescribing policy.
- Patients receiving oxygen as part of palliative care and/or end of life care. It should then be indicated by the prescriber that a target saturation is not required.

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- For patients requiring 'Airvo' see the [Nasal High Flow Oxygen policy](#)

## Definitions

For the purposes of this policy when the term EWS is used, this encompasses the New Zealand Early Warning Score, Modified Early Obstetric Warning Score and Paediatric Early Warning Score.

## Associated documents

- CDHB EWS Management Protocols
- Guidelines for Nasal High Flow Oxygen
- Medchart or area specific prescribing chart
- Transfer policies – CDHB and division specific
- Adult Oxygen Therapy Self Learning Package – healthLearn
- Canterbury Hospital Health Pathways - Acute Oxygen Therapy
- Fisher & Paykel MR850 Humidifier Operators Manual
- Respiratory Services Protocols and Guidelines  
<http://respiratory.streamliners.co.nz/>
- Child Health: [Nursing Observation and Monitoring](#)
- [Lippincott Procedures - Pulse oximetry, Paediatric](#)
- [Child Health e-Guidelines – Non-Invasive Respiratory Support](#)
- Cardiology IV Medication & IV Infusion Protocols handbooks page

## Guideline

- Supplemental oxygen is not indicated unless the patient is assessed as being clinically hypoxic.
- This mandates a medical assessment of all patients who have saturations below 93% who do not have a current management plan.
- Oxygen will be prescribed according to a target saturation range
  - In normal healthy adults/children this is accepted as 92-96%
  - With adult patients who have chronic hypoxia this is accepted as 88-92%
- The target saturation range can be user defined within certain clinical scenarios as per specific pathway / policy (see exclusions).
- Oxygen should be weaned / stopped if the saturation is above the target range.
- Those who administer oxygen therapy will monitor the patient to maintain the patient's target saturation range

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## Prescribing Oxygen

- Oxygen is prescribed by an authorised or delegated prescriber to achieve a specific target saturation range. It is accepted that a single target range cannot be applied to all people taking into account the wide ranges of age, acute conditions and co-morbidities. Available evidence suggests target ranges of
  - 92-96% for adult/paediatric Patients
  - 88-92% for adult Patients with COPD or other conditions associated with chronic respiratory failure
- A prescription for Oxygen therapy will include:
  - Indication
  - Target saturation range
  - Device and flow rate/FiO<sub>2</sub>
  - PRN/Continuous route

## Emergency Situations

- In cardiac pulmonary resuscitation (CPR) oxygen will be given at an FiO<sub>2</sub> of 100% via a Bag-Valve-Mask as per [New Zealand Resuscitation Guidelines](#).
- In the event of an acute presentation or acute deterioration
  - Oxygen should be administered immediately to prevent harm from hypoxaemia **without prescription**.
  - Oxygen will be administered via an appropriate device to maintain target saturations of 92-96% (unless there is an existing treatment plan with a lower target range)
  - Acutely deteriorating patients with significant hypoxaemia or unrecordable oxygen saturations will have oxygen delivered via a reservoir mask at 15L/min whilst requesting immediate medical review, oxygen will then be titrated to maintain target saturations.
  - Patients with risk factors for hypercapnia will have the same initial treatment as other critically ill patients, unless there is an existing treatment plan that includes a lower saturation range, pending an urgent arterial blood gas (ABG). If severe hypoxaemia and/or hypercapnia with respiratory acidosis is confirmed, controlled oxygen therapy or supported ventilation may be required
  - Oxygen administration will be reviewed and prescribed as soon as possible after the event.

## Administering Oxygen

- The goal of oxygen therapy is to achieve adequate tissue oxygenation using the lowest possible FiO<sub>2</sub> / O<sub>2</sub> LPM.

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- The patient will be informed of why they are on oxygen therapy and given information on how to manage the delivery device and when to ask for assistance.
- Oxygen will be administered to maintain the prescribed target saturation range.
- The administrators assessment documentation regarding the SPO2 and titration of the oxygen flow rate to meet target saturations, will be recorded on the area's vital signs chart (Patientrack or areas specific chart)
- The oxygen prescription in MedChart will be 'signed' to certify that the oxygen is being administered to the prescribed target saturation

## Monitoring Oxygen

- All areas where oxygen is used must have pulse oximetry available
- Monitoring of oxygen therapy will always include monitoring respiratory rate (a sensitive marker of deterioration) as well as saturations and oxygen flow rate and will be recorded in the observation chart.
- Medical review will be guided by the prescription and as per EWS pathway or clinical concern in the absence of a high EWS.
- Patients who are critically ill should have their oxygen saturations monitored continuously.
- Adult patients on oxygen will be assessed 4 hrly (unless specified) to ensure that oxygen is still required.
- Within Child Health children on oxygen will be assessed hourly as per the Child Health Nursing Observation & Monitoring policy.
- Patients who maintain their target saturation range on air will have their supplemental oxygen stopped.
- On commencement / titration / weaning SpO2 should be monitored continuously for **at least** 5 minutes to ensure the Patient maintains the desired saturation range unless otherwise stated in the clinical notes e.g. formal oxygen weaning plan.
- If the patient's saturations are below the target saturation range
  - The patient will be assessed for reasons for a transient dip in oxygen saturations and treated accordingly
  - If the saturation remains below the target saturation, Oxygen will be increased to maintain the patients saturation range and a medical review will be requested.
- It is important to recognise that transient drops in oxygen saturations will often occur in;
  - People as they sleep – ACTION: Rouse the patient then re-measure saturations

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- People with chronic disease (e.g. Heart failure, COPD) post mobilisation – ACTION: allow the patient to settle and “regain their breath” then re-measure saturations
- Children after significant intervention – ACTION: allow the child to settle.
- Pulse oximetry will continue as the patient is being weaned from oxygen and recorded on the Vital signs chart.
- Patients receiving oxygen therapy are not permitted to smoke with oxygen insitu.

### Recommended EWS Modifications of Oxygen Saturations in patients with chronic hypoxaemia

- For a Patient who is known or judged clinically to be chronically hypoxic, it may be appropriate to modify the EWS saturations parameter if their “normal” (when well) saturation range will trigger an inappropriate response
- These modifications can only be authorised by a Registrar or SMO

Recommended modifications when using NZEWS

SPO <sub>2</sub> %	RECOMMENDED MODIFICATION TO NZEWS SCORE
<b>&gt;= 90</b>	<b>0</b>
<b>88-89</b>	<b>1</b>
<b>86-87</b>	<b>2</b>
<b>=&lt; 85</b>	<b>3</b>
<b>MODIFICATION OUTSIDE OF THIS RANGE IS AN SMO ONLY DECISION</b>	

- In Child Health tritrate oxygen therapy to maintain saturations above 92%
- Children with chronic hypoxia will have their target oxygen saturation range documented within the variance section of the age appropriate child observation chart by a Registrar or SMO. A Registrar shall discuss what the appropriate modifications for the child should be before documenting.

### Contra-indications

- There are no absolute contra-indications to oxygen therapy if indication for use is judged to be present.
- Supplemental oxygen therapy should be administered with caution in Patients suffering from Paraquat poisoning, with acid inhalation or previous bleomycin lung injury.

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- In Patients with chronic carbon dioxide retention, oxygen administration may cause further increases in carbon dioxide and respiratory acidosis.

## **Blood Gas Monitoring in Adult Patients only**

- Arterial blood gases are the gold standard for monitoring ventilation and should be checked in the following situations:
  - Unexpected or inappropriate hypoxaemia
  - Any patient with risk factors for hypercapnic respiratory failure who develops acute breathlessness, deteriorating oxygen saturation, drowsiness or other symptoms of CO<sub>2</sub> retention.
  - Acutely breathless or critically ill patients with poor peripheral circulation in whom a reliable oximetry signal cannot be obtained.

## **Transferring and Transportation of Patients Receiving Oxygen**

- Patients who are transferred from one area to another must have a clear handover of their oxygen prescription and of their target saturation.
- Staff must ensure that patients maintain their prescribed target saturations during transfers and whilst patients are in diagnostic departments.
- Medically unstable adult patients and patients who require oxygen above 40% FiO<sub>2</sub> and/or 6 L/m whilst being transferred should be accompanied by a Registered Nurse (RN)/Midwife.
- All children requiring oxygen therapy requiring transfer/transport are to be accompanied by an RN.
- All oxygen cylinders must be appropriately restrained at all times including in transit.

## **Nebuliser therapy**

- Nebuliser therapy should only be used if:
  - other forms of drug delivery cannot be used e.g. Metered dose inhaler via a spacer
  - Specialist procedures e.g. Antibiotic therapy, nebulised adrenaline, are required (specialist protocols will advise on this type of use.)
- Patients at risk of hypercapnic respiratory failure should have nebulised therapy administered via compressed air.
- If supplementary oxygen is required this should be administered concurrently by nasal prongs to maintain the specified target saturation range
- If oxygen is used to drive the nebuliser then the rate should be
  - 6 Lpm for medications used to treat the upper airway
  - 8 Lpm for medications used to treat the lower airway

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## Humidification

- Humidified oxygen is helpful to improve Patient comfort and tolerance of therapy and to maintain optimal mucocilliary clearance in the airways. It is indicated in the following situations.

Circumstance	Reason for use of heated humidification
High concentration oxygen (FiO <sub>2</sub> > 40%)	Some Patients find the effects of prolonged treatment (>24hours) with high inspired oxygen concentration uncomfortable, because of drying of the upper airway.
Conditions affecting mucociliary transport	Patients with severe inflammatory conditions of the oropharyngeal mucosa may obtain comfort from humidification therapy even in the absence of high inspired oxygen concentrations. Example: Patients with head and neck cancers undergoing radiation, chemotherapy treatment who develop Mucositis, infants with respiratory illness that cause sticky mucous
Hypothermia	In cases of hypothermia heating inspired gas may help increase core body temperature in some patients if used in conjunction with other devices. All Neonates require heated humidified oxygen
Endotracheal Intubation New Tracheostomy	Humidification of inspired gas during mechanical ventilation is mandatory Tracheostomy and Laryngectomy stoma Patients requiring supplementary oxygen must have humidification provided.

### Paediatric Considerations

- All paediatric patients requiring low-flow oxygen are to have a dual flow meter providing both low flow and high flow as pictured right, to facilitate changing between the two delivery systems i.e titrating flow rates of <1litre while enabling high flow oxygen in the event of deterioration.
- Humidification for infants/children is to be used when Oxygen Therapy is required for greater than 6 hours
- If the child is too hot, a blue extension set can be added to the circuit between the Patient end and mask.



If humidification is required for infants, use Fisher & Paykel humidifier continuous low flow circuit as this circuit is designed for gas flows between 0.3-7 litres per minute.

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## References

Beasley R, Chien J, Douglas J, Eastlake L, Farah C, King G, Moore R, Pilcher J, Richards M, Smith S et al. Thoracic Society of Australia and New Zealand oxygen guidelines for acute oxygen use in adults: 'swimming between the flags'. *Respirology* 2015; 20:

Beasley R, Chien J, Douglas J, Eastlake L, Farah C, King G, Moore R, Pilcher J, Richards M, Smith S and Walters H. (2016) Target oxygen saturation range: 92–96% Versus 94–98%. *Respirology*, 22: 200–202. doi: 10.1111/resp.12879.

Siemieniuk R, et al "Oxygen therapy for acutely ill medical patients: a clinical practice guideline" *BMJ* 2018; 363: k4169.

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