

TRACHEOSTOMY REVIEW AND MANAGEMENT SERVICE

CLINICAL PROCEDURE

HUMIDIFICATION OF INSPIRED GASES IN PATIENTS WITH TRACHEOSTOMY

Staff this document applies to:

Nurses, Physiotherapists, Medical Staff and Speech Pathologists involved in the care of patients with a tracheostomy on all campuses, including ICU, outpatient clinics, the Ambulatory Care Centre (ACC), and the community.

Related Austin Health policies, procedures, or guidelines:

[Mandatory Tracheostomy Equipment & Emergency Tracheostomy Management Poster](#)

[Oxygen Therapy Manual](#)

[Tracheostomy Care Changes in Response to Suspected or Confirmed Covid-19](#)

[Tracheostomy Procedure – Heat Moisture Exchangers](#)

[Tracheostomy Procedure – Recognising & Clearing a Blocked Tracheostomy Tube](#)

[Tracheostomy Procedure – Suctioning via the Tracheostomy Tube](#)

Purpose:

To describe the rationale for providing humidification to patients with tracheostomy and the different methods used for inpatients and patients in the community.

Clinical Alert:

- Inadequate humidification can lead to sputum plugging and partial or complete occlusion of the patient's airway. Appropriate humidification is essential in order to keep the tracheostomy tube patent.
- A completely blocked tracheostomy tube is a medical emergency. Call a Respond Blue.

See: [Tracheostomy Emergency Management Poster](#)

- A partially blocked tracheostomy tube may quickly progress to a completely blocked tube. Be alert for signs of partial blockage (e.g.: difficulty passing a suction catheter, a “whistling” noise or inspiratory stridor when the patient breathes, patient vocalising without a Passy Muir Valve in place).
- The Optiflow delivery systems require a 30 L/min medical air flow meter to provide adequate flow and humidification to patients with a tracheostomy.
- Refer to the [Oxygen Therapy Manual](#) for more information on the Airvo 2

Rationale:

During normal breathing, the body heats and humidifies air as it passes through the mouth and nose to the trachea. When a patient is breathing via a tracheostomy tube, these natural mechanisms are bypassed; therefore, artificial means of heating and humidifying air must be employed.

All patients with a tracheostomy tube must have their humidification needs assessed and monitored by a physiotherapist and/or nursing staff to ensure:

- The air or oxygen supplied to the airways of a patient with a tracheostomy tube is heated and humidified appropriately.
- The tracheostomy tube is free from accumulated dried secretions and sputum clearance is enhanced by a well humidified airway.

Signs that a patient is not adequately humidified include:

- An irritable cough.
- Thick or tenacious secretions.
- Difficulty expectorating secretions.
- An absence of secretions in a normally productive patient.
- Resistance felt on suctioning.
- Secretions slow to move up the catheter during suctioning.
- Secretions collecting on the outside of the catheter during suctioning.
- Secretions visibly collecting within the tracheostomy tube.

Equipment:

For acute inpatient

- A humidifier that delivers to a guaranteed 37°C (MR850, MR950 or Airvo 2).
- Disposable corrugated tubing and chamber kit specific to the MR850, MR950 or Airvo 2
- Tracheostomy direct connector with or without a green straight connector 15M - 22F
- Bottle of sterile water specific for use with heated humidification systems
- Tracheostomy shield/mask
- A patient who is an existing TRAMS community patient or is being set up for discharge to the community with a tracheostomy may have an Airvo 2 unit on loan from TRAMS
- For short term use, [heat moisture exchangers \(HME\)](#) may also be considered if deemed appropriate by physiotherapists or senior nursing staff.
- Nebuliser kit (optional)

For non-ventilated patients in the community

- A humidifier that delivers to 37°C e.g., Airvo2
- F&P 900PT560 disposable tubing
- F&P HC365S reusable chamber
- Patients will also be provided with [heat moisture exchangers \(HME\)](#)

For ventilated patients in the community

- Individualised requirements are assessed by the Victorian Respiratory Support Service (VRSS) Outreach nurses or physiotherapist.
- Equipment may include a humidifier that delivers between 33-37°C with reusable tubing and water chambers, or [heat moisture exchangers \(HME\)](#).

See also [TRAMS Pulse site](#) for pictures of humidification equipment commonly used.

Procedure:

For acute inpatients

- Obtain a MR850, MR950 or Airvo 2 humidifier
- Refer to the [Oxygen Therapy Manual](#) for equipment setup guides
- Check that the humidifier is set to 37°C and a minimum flow of 30 L/min flow.
- Ensure that the desired oxygen concentration and flow is being delivered via the system in use
See [Oxygen Therapy Manual](#)
- Change the disposable circuit weekly, or more frequently if visibly soiled.



Direct connector



Passy Muir Valve (PMV) attached to direct connector using green 15mm-22mm connector (Intersurgical, Straight connector 15M - 22F, Item number 1962000)

For non-ventilated patients in the community

- An AIRVO 1 or AIRVO2™ is provided by TRAMS.
- Fill the chamber with distilled water and attach to the unit.
- Connect the disposable circuit to the unit.
- Connect a direct connector to the distal end of the corrugated tubing
- Change the disposable circuit as instructed by TRAMS or more frequently if visibly soiled

For ventilated patients in the community

- Ventilated patients in the community will have their humidification needs assessed by a senior physiotherapist, VRSS Outreach nurse or member of medical staff. The appropriate humidification device should be obtained from the VRSS, and set up to individual specifications, including oxygen therapy as required.
- Clean the reusable circuitry components as directed by the VRSS

Use of nebulisers with tracheostomy:

- Routine or PRN use of 0.9% sodium chloride (normal saline) nebulisers are not required. For acute inpatients with tracheostomy, nebulisers should not be used routinely however may be used in an emergency or after approval by medical staff. For patients living in the community, nebuliser recommendations will be tailored to the individual. See also [Tracheostomy Care Changes In Response To Suspected Or Confirmed Covid-19](#)
- If inhaled medications are required, these should be administered via meter dose inhalers (MDI):
 - For spontaneously breathing patients: using a spacer. The Bird Healthcare e-Chamber spacer is available from pharmacy and fits directly to the tracheostomy hub)
 - For invasively ventilated patients: using a MDI connector, such as the Teleflex Medical Hudson RCI MDI Adaptor (REF 1659) or Intersurgical connector 22M-22F with MDI insert (REF 1964001) or comparable products.
- Nebuliser delivery is an aerosol generating procedure which increases the risk of transmission of droplet borne pathogens.
- Nebulisers should not be used in patients who are placed in droplet or airborne precautions/ isolation, unless discussed with Respiratory Unit medical staff. If nebulisers are deemed necessary, staff should refer to the appropriate guidelines for use of PPE.
- In some patients who have significantly thick secretions despite optimal humidification, additional nebulisers may be prescribed (e.g., 0.9% sodium chloride, bronchodilators, or a mucolytic medication). This should always be discussed with the treating unit medical staff and physiotherapist. Ongoing requirements should be reviewed on a regular basis. Particular caution should be taken for patients who are placed in droplet/airborne isolation as mentioned above.
- If nebulisers are deemed to be necessary after discussion with medical staff, they can be placed within the oxygen delivery + humidification system as shown:

Set up for nebuliser in use with tracheostomy shield and Airvo 2 heated breathing tube



Set up for nebuliser in use with Optiflow direct connector and Airvo 2 heated breathing tube



Note:

- To connect to a tracheostomy shield, you will need to obtain an Airvo 2 Direct Connector Adaptor for Tracheostomy Shield (CODE OPT980, available from sterile stores).
- For patients who do not require supplemental oxygen and are being humidified on FiO2 21%, the nebuliser chamber can be attached directly to a tracheostomy shield.
- If a patient is receiving oxygen therapy using a dual flow adaptor with Optiflow direct connector, an additional medical air flow meter needs to be available to drive the nebuliser. This can be achieved if there is a double adaptor for a single air outlet or if there are dual airflow outlets at the bedside.



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