Providence HEALTH CARE	Department: **Respiratory Services**	Date Originated: October 2009 Reviewed/Revised: **September 2014**
CLINICAL GUIDELINE	Topic: Critical Care – OPTIFLOW Heated Humidity High Flow Oxygen Therapy (Respiratory Therapy) Number: B-00-12-12066	Related Links:

APPLICABLE SITES:

St. Paul's Hospital
Mount Saint Joseph Hospital

GENERAL INFORMATION:

The OPTIFLOW system allows for the provision of increased oxygen concentration at higher flow rates, while at the same time providing optimal heated humidity via a nasal interface or direct tracheostomy connection. Use of a nasal interface to deliver heated humidified oxygen may also improve patient comfort and compliance with therapy.

OPTIFLOW is the high flow oxygen delivery device of choice for patients under airborne or droplet precautions due to the absence of aerosol generation.

INDICATIONS:

The OPTIFLOW system may be beneficial for non-ventilated patients who present with one or more of the following (listed in order of importance):

1. Hypothermic core body temperature
2. Isolation precautions (droplet/airborne)
3. Retained secretions and/or poor clearance of secretions (i.e. COPD, CF)
4. Tracheostomy tube in-situ
5. Poor tolerance with conventional high-flow oxygen delivery devices (i.e. mask)
6. High oxygen requirements
7. High inspiratory flow demands

NOTE: Although there have been various claims that the use of high flow nasal cannula may provide low level CPAP, this has not been consistently demonstrated in the literature, probably because it is highly dependant on patient-interface sizing, flow rate, respiratory rate, and patient position. Therefore there is no indication for the use of this therapy as an alternative to conventional CPAP.

APPLICATION OF USE:

CRITICAL CARE AREAS: Optiflow is to be used for **ALL** non-ventilated tracheostomy patients and for **ALL** patients requiring oxygen greater than 5 L/min.

GENERAL WARDS: Optiflow is to be used for **ALL** tracheostomy patients and with **ALL** patients requiring oxygen greater than 45% **AND** anticipated to require the therapy for longer than 4 hours. If availability of equipment is limited, patient suitability will be determined as per the respiratory therapist's clinical assessment with respect to the indications above as listed in order of importance.

EQUIPMENT:

- Personal Protective Equipment
- Optiflow circuit (RT202) with MR290 humidifier chamber
- Temperature probe
- Optiflow System (MaxVenturi Oxygen/Air mixer with analyzer & MR850 humidifier)
- Sterile 2L H_2O bag
- Disposable inspiratory filter (Pall)
- Appropriate OPTIFLOW patient interface
    - Adult nasal cannula (small, medium, large)
    - Tracheostomy direct connection

PROCEDURE:

1. Wash hands and don PPE as appropriate.

2. Gather the required equipment.

3. Calibrate the MaxVenturi Oxygen/Air Mixer and Analyzer.

    a. Remove the oxygen sensor from the port on the MaxVenturi.
    b. Allow equilibration to Room Air, which may take up to 2 minutes.
    c. Press and hold the ▼ key until the display reads **CAL**.
    d. When calibration is complete the oxygen % will be displayed on the screen (for RA calibration it should read 20.9%).
    e. Reinsert the sensor into the MaxVenturi port.

    NOTE: RA calibrations are the quickest to perform, while 100% calibrations are more accurate. A RA calibration must be performed prior to use and weekly; 100% calibration must be performed monthly.

4. Connect the high pressure oxygen hose from the MaxVenturi to a high pressure oxygen source. Ensure the control valve at the rear of the MaxVenturi is turned to the **ON** position.

5. Attach the inspiratory filter to the air inlet on the MaxVenturi.

    NOTE: The inspiratory filter is to be changed between patients.

6. Set the flowmeter of the MaxVenturi to 35-45 L/min. Flow may be adjusted to meet patient inspiratory demands.

   NOTE: Flows may be increased up to 60 L/min to meet patient demand.

7. Set the FiO_2 on the MaxVenturi to the desired level (available range is 0.32 – 1.0). Ensure the oxygen analyzer component of the MaxVenturi is functioning and accurate.

   NOTE: It may take up to 15 seconds for the analyzer measurement to become stable after a change in FiO_2.

8. Slide the humidifier chamber onto the humidifier and remove the blue caps. Spike the water bag with the fill line from the humidifier chamber and hang the water bag from the pole at least 50 cm above the humidifier.

9. Attach one end of the short blue tubing to the output port of the MaxVenturi and connect the other end of the short blue tubing to the top of the humidifier chamber.

10. Attach the elbow end of the blue inspiratory limb to the top of the humidifier chamber. Insert the temperature probes and heater wire adaptor.

11. Turn on the humidifier to allow time for it to heat up before placing it on the patient. This may take several minutes.

    NOTE: The humidifier should be set to **INVASIVE** mode. If the patient complains of too much discomfort (i.e. too hot) while in invasive mode, it may be changed to non-invasive mode, however less humidity will be delivered.

12. Select and size the most appropriate interface to be used for the patient.

    a. Nasal:
    - Ensure the appropriate sized nasal cannula is used
    - Ensure the prongs do not fit snugly into the nares or positive pressure may inadvertently be delivered to the upper airway

    b. Tracheostomy:
    - The tracheostomy direct interface connects to the tracheostomy tube
    - An inline suction system and/or PMV may still be used

13. Place the interface on the patient by placing the lanyard around their neck and fit the nasal interface or direct tracheostomy connection comfortably onto the patient.

14. Once the patient is comfortable with the interface, connect the swivel end of the OPTIFLOW interface to the inspiratory heated limb.

15. Assess the patient and adjust flow rate and FiO_2 to achieve the desired oxygen saturation and patient comfort.

16. **NOTE:** When weaning from the OPTIFLOW system ensure the patient's inspiratory flow demands are met and then decrease the FiO_2. Inspiratory flow can then be reduced in accordance with inspiratory demand.

17. Document therapy and patient response in the Respiratory Flowsheet. Patients on OPTIFLOW should be assessed and monitored a minimum of every 4 hours in critical care areas, and a minimum of every 6 hours on the general wards.

SPECIAL CONSIDERATIONS:

1. If the patient is going to be temporarily off the OPTIFLOW (i.e. internal transport or weaning trial), the main control valve at the rear of the MaxVenturi can be turned to the off position which prevents the flow of gas through the system, and can then be turned back ON when required. The advantage to this is that the flow rate and FiO_2 will remain where they were initially set and it will not be necessary to repeat steps 6 & 7 in the procedure.

2. Calibration of the oxygen analyzer must be performed in any of the following situations:

    a. Initiation of OPTIFLOW therapy on a new patient
    b. It has been longer than 1 week since the last calibration
    c. If on 100% oxygen the analyzer displays an oxygen concentration less than 97% or greater than 103%
    d. If there is uncertainty in the analyzed and displayed value

3. The OPTIFLOW circuit and interface should be changed weekly and when visibly soiled or worn out.

REFERENCES:

1. Boyer A, Vargas F, Declacre M, et al. *Prognostic impact of high flow nasal cannula oxygen supply in an ICU patient with pulmonary fibrosis complicated by acute respiratory failure* (letter). Intensive Care Medicine, Aug 2010; 37(3): 558.

2. Kubicka ZL, Limauro J, Darnall RA. *Heated, humidified high flow nasal cannula: yet another way to delivery continuous positive airway pressure?* Pediatrics Jan 2008; 121(1): 82-8.