

	Department: Respiratory Services	Date Originated: September 1986 Date Reviewed/Revised: July 2010
POLICY & PROCEDURE	Topic: <u>Critical Care</u> – Heliox Gas Therapy for Non- Ventilated Patients (Respiratory Therapy) Number: B-00-12-12035	Related Links:

APPLICABLE SITES:

St. Paul's Hospital
 Mount Saint Joseph Hospital

POLICY STATEMENT:

Helium-oxygen gas mixtures (Heliox) may be administered as a short-term, temporary therapy in critical care areas where continuous monitoring capabilities are available. Heliox therapy should not be used on the general wards.

GENERAL INFORMATION:

Heliox has a lower density than that of oxygen or nitrogen, therefore Heliox may reduce airway resistance and work of breathing in patients with airway narrowing secondary to inflammation, bronchoconstriction or partial mechanical obstruction.

The therapeutic effect is most pronounced with higher concentrations of helium such as Heliox 80:20, but may still be present in concentrations as low as 60% helium. Below 50% helium the reduction in density offers no additional benefit when compared to conventional gas mixtures.

Heliox gas therapy is supportive only – it has no curative or permanent corrective properties. Any interruption in therapy may result in an immediate return of the original symptoms unless the primary problem has been corrected.

There are no known adverse effects from Heliox apart from the possibility of hypoxemia due to inadequate FiO_2 . Supplemental oxygen should not exceed 6 L/min via nasal prongs. If greater oxygen delivery is required, alternative therapy (i.e. intubation) should be considered.

Oxygen flow meters are not calibrated to the lower density of the helium gas in the Heliox mixture, thus calculations must be made to determine the ACTUAL flow of the Heliox gas being delivered.

To determine the delivered flow from an 80:20 gas mixture, multiply the set flow rate on the oxygen flowmeter by 1.8.

The cylinder duration can be calculated as:
$$\frac{(\text{tank psi} - 500) \times 3.14}{\text{flowmeter reading} \times 1.8} = \text{duration (minutes)}$$

At St. Paul's Hospital, Heliox cylinders are located in the ICU ventilator storage area, in the Emergency Trauma room, Katmandu and the main Tank Room.

At Mount Saint Joseph Hospital, Heliox cylinders are located in the ICU ventilator storage area and the main Tank Room.

For replacement cylinders, a medical gas cylinder requisition must be filled out and returned to Stores as soon as possible.

EQUIPMENT:

- H-size Heliox cylinder with regulator (80:20 mixture)
- Non-rebreather mask
- Nasal prongs
- Pulse oximeter
- Personal protective equipment

PROCEDURE if SPO₂ greater than 92% on room air (no supplemental oxygen required):

1. Verify physician order and review the patient record for pertinent information.
2. Gather equipment and explain procedure to the patient.
3. Wash hands and don personal protective equipment as appropriate.
4. Perform pulse oximetry on Room Air prior to initiation of therapy to obtain a baseline measurement and confirm that the patient's oxygenation status is adequate (SpO₂ > 92%).
5. Attach the non-rebreather mask to the flow meter of the Heliox regulator and initiate the flow of gas. Usually 8 – 10 L/min is adequate.
6. Place mask over patient's face and adjust fit to ensure minimal entrainment of ambient air.
7. Adjust the flow of Heliox to ensure that the reservoir bag of the mask does not collapse more than 1/3 at peak inspiration.
8. Auscultate and assess the patient for effects of therapy.
9. Remove personal protective equipment and wash hands.
10. Document procedure and patient response in the Interdisciplinary Notes of the patient record including the Heliox concentration and flow rate (set & calculated), cylinder pressure,

SpO₂, and any other pertinent information.

PROCEDURE if SPO₂ less than 92% on room air (requires supplemental oxygen):

Follow steps 1 – 7 as listed above with the following additions:

1. Connect nasal prongs to an oxygen gas source and place on the patient under the non-rebreather mask.
2. Adjust oxygen flow on nasal prongs (1 – 6 L/min) to maintain SpO₂ > 92%.

NOTE: The effectiveness of helium is lost if it is less than 60% of the gas mixture. If the patient cannot maintain adequate oxygenation saturation with FiO₂ less than 0.40 (less than 6 L/min nasal prongs), the physician should be notified immediately and Heliox therapy should be discontinued in favour of other options.

3. Auscultate and assess the patient for effects of therapy.
4. Remove personal protective equipment and wash hands.
5. Document procedure and patient response in the Interdisciplinary Notes of the patient record, including the Heliox concentration and flow rate (set & calculated), supplemental oxygen, cylinder pressure, SpO₂, and any other pertinent information.

