Objectives

Upon completion of this module, the learner will be able to:

• Review the basics of PaO2 vs. SaO2
• Identify common Supplemental Oxygen - Low Flow Systems
PaO₂

- Partial pressure of dissolved O₂ in arterial blood
- Normal range 80 to 100 mmHg
- Measured by arterial blood draw
- Decreased PaO₂ seen with increased age and elevation (Denver residents: 65 to 80 mmHg is normal)
Pulse Oximetry (SaO2)

• O2 combines with hemoglobin to form oxyhemoglobin
• Uses absorption of specific waveforms of light to compare oxyhemoglobin vs deoxyhemoglobin wavelengths
• SaO2 is ratio of oxygenated hemoglobin to total hemoglobin
• Indirectly measures PaO2. Less invasive
Oxyhemoglobin Dissociation Curve

![Graph showing the oxyhemoglobin dissociation curve]

**FIGURE 5.1.** Oxyhemoglobin dissociation curve.

Korupolu R GJ, Needham DM. Contemporary Critical Care. 2009;6(9):1-11
Supplemental Oxygen
Low Flow Systems

• Provides relatively stable FiO2 levels as long as respiratory rate and pattern are stable
• Can deliver high FiO2, but actual amount will vary from breath to breath
• Examples include nasal cannula, simple face mask, face tent & non-rebreather mask
Supplemental Oxygen High Flow Systems

- Indicated in patients with variable respiratory rate and pattern to provide appropriate FiO2 to meet a patient's respiratory demand
- Examples include Venturi mask, nebulizer, high flow nasal cannula, and mechanical ventilation (generally utilize corrugated tubing)
Nasal Cannula

http://www.vitalitymedical.com/nasal-cannula.html

Nasal Cannula

- Low flow device
- Most common device used for mild hypoxia
- Can be set between 1 and 6 LPM (24% to 40% FiO2)
- FiO2 increases approximately 4% with each liter of O2

Simple Face Mask

https://www.indiamart.com/proddetail/simple-face-mask-10653961173.html

https://openlibrary.ca/clincials/hi/chapter/5-5-oxygen-therapy-systems/
Simple Face Mask

• Low flow device
• Can be set between 5 and 10LPM (35-55% FiO2)
• Useful when moderate amount of O2 needed
Non-Rebreather Mask

https://medtree.co.uk/non-rebreathing-mask

Non-Rebreather Mask

• Low flow device with high FiO2
• Uses a reservoir bag to deliver a higher concentration of O2
• One way valve prevents patient from inhaling expired air
• Can be set between 10 and 15 LPM (80 to 95% O2)
• Useful in severely hypoxic patients who are ventilating well

Korupolu R GJ, Needham DM. Contemporary Critical Care. 2009;6(9):1-11
Venturi Mask

http://www.ecvv.com/product/2855402.html
Venturi Mask

- High flow device
- Allows precise measurement of O2 delivered
- Utilizes different sized ports to change amount of FiO2 (24% to 50%)
- Useful in COPD patients where precise O2 prescription is crucial

Korupolu R GJ, Needham DM. Contemporary Critical Care. 2009;6(9):1-11
Trach Collar

Trach Collar

- High flow device
- Provides O2 or humidified room air to trach
- Settings similar to Venturi mask

Humidifier

Humidification

- Can be connected to any flow meter to provide moisture to O2
- Useful in long-term use of O2 or when high amount of O2 is required