

# 92322 Medical Surgical Nursing

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## Week One

### Lab – Oxygen

When is oxygen indicated?

- How had the patient is working
- Sound and depth of breathing
- Increased respiratory rate ( $>20/\text{min}$ )
- Nasal flaring
- Accessory muscle use
- Patient colour
- Increased blood pressure
- Tachycardia
- Decreased mental status (GCS)

What is oxygen?

- Colourless, odourless gas that sustains normal cell functioning within the body
- Considered a drug
- Depending upon hospital protocol, can be nurse initiated
- Room air is 21% oxygen, 78% nitrogen and 1% other gases. Therefore fraction of inspired air ( $\text{FiO}_2$ ) is 21%
- 97% of oxygen is bound to haemoglobin in the blood with 35 dissolved in plasma

Which mask?

- Nasal prongs/cannula
  - $\text{FiO}_2$ 
    - 1 litre/min = 24%
    - 2 litres/min = 28%
    - 3 litres/min = 32%
    - 4 litres/min = 36%
- Hudson mask (simple or variable performance mask)
  - Recommended for type 1 respiratory failure (hypoxia)
  - Flexible percentage of  $\text{O}_2$  ranging from 5L – 7L/min ( $\text{FiO}_2$  30 – 60%)
  - Adjusting  $\text{O}_2$  flow rate can accurately alter the  $\text{O}_2$  concentration delivers to the patient
  - Patient re-breathes their expired air along with air from outside the mask with the  $\text{O}_2$  flow
  - Mixture varies with patient rate and depth of breathing, and  $\text{O}_2$  inspired can be inconsistent

- FiO<sub>2</sub>
  - 5 litres/min = 40%
  - 6 litres/min = 44%
  - 7 litres/min = 50%
  - 8 litres/min = 55%
  - 9 litres/min = 60%
  - 10 litres/min = 60 – 65%
- Venturi Mask (percentile, accurox, or fixed performance mask)
  - Recommended for type 2 respiratory failure (CO<sub>2</sub> retention)
  - Delivers a set percentage of O<sub>2</sub> ranging from FiO<sub>2</sub> 24 – 55% through a range of valves
  - O<sub>2</sub> reaches valve through narrow tubing where it is mixed with room air
  - Air sucked through small holes in barrel of the venturi valve due to high flow rate of O<sub>2</sub>
  - Valves are colour coded for the flow rate required for FiO<sub>2</sub> concentration on each valve
  - Therefore patient's respiration pattern doesn't affect accurate concentration of FiO<sub>2</sub>
  - Number of side holes allow escape for exhaled air therefore eliminating CO<sub>2</sub> rebreathing
  - FiO<sub>2</sub>
    - 4 litres/min = 24%
    - 4 litres/min = 28%
    - 6 litres/min = 31%
    - 8 litres/min = 35%
    - 8 litres/min = 40%
    - 12 litres/min = 55%
- Reservoir mask (non re-breather mask)
  - Recommended for type 1 respiratory failure (hypoxia) and acute situations
  - For high flow of oxygen
  - Short term therapy
  - Reservoir bag attached to bottom of mask fills with O<sub>2</sub> and must be kept inflated
  - Can deliver higher O<sub>2</sub> than simple face mask
  - On inhalation, one way valve opens, directing O<sub>2</sub> from reservoir bag into mask therefore patient breathes air from reservoir bag only
  - Prevents room air entering the masks, therefore most O<sub>2</sub> inhaled
  - Valves allow expired CO<sub>2</sub> to leave the mask
  - FiO<sub>2</sub>
    - 8 – 15 litres/min = 80 – 100%
- More advanced oxygen delivery systems