Firefighter Pre-Hospital Care Program
Module 10

Respiratory Emergencies
Respiratory Emergencies - Module 10

After reviewing the course materials and after completing the post-course test, the participant will have demonstrated an appropriate level of understanding about how to:

- assess a patient experiencing an illmess or emergency involving the respiratory system
- determine priorities related to a respiratory illness or emergency
- provided emergency patient care in a safe manner, consistent with local standards and Base Hospital direction
- evaluate the effectiveness of treatment measures
- perform ongoing assessments and interventions in response to the patient’s presentation, changing treatment requirements and environmental variables

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Breathing Process: Inhalation

- Diaphragm and intercostal muscles contract, increasing the size of the thoracic cavity.
- Pressure in the lungs decreases.
- Air travels to the lungs.
Breathing Process: Exhalation

- As the muscles relax, all dimensions of the thorax decrease.
- Pressure in the lungs increases.
- Air flows out of the lungs.
- Diaphragm and intercostal muscles relax.
Anatomy of Lung Function

• Oxygen-rich air is delivered to alveoli with inspiration

• Oxygen diffuses into the blood

• The body does not use all the inhaled oxygen (mouth to mouth can still deliver some oxygen)

• Carbon dioxide is removed from blood and exhaled.
Terminology

PREFIXES
A - no/none
Brady - slow
Tachy - swift or rapid
Dys - difficult; bad
Hypo - under / low
Hyper - over / high

SUFFIXES
Oxia - oxygenation
Pnea - breath or breathing

example: **Dyspnea** = trouble breathing
Normal Breathing

Normal Rates
- Adult: 12 to 20 per minute
- Child: 15 to 30 per minute
- Infant: 25 to 50 per minute

Rhythm
- Regular

Quality
- Breath sounds: soft, present and equal
- Chest expansions: adequate and equal
- Minimal effort

Depth
- Adequate, with visible chest rise
Signs of Adequate Breathing

- Normal rate and depth
- Regular breathing pattern
- Equal rise and fall of the chest
- Pink mucous membranes (gums and lips), warm and dry skin
- Good (quiet – may be hard to hear in a noisy environment) breath sounds on both sides of chest (bilateral)
## Inadequate Breathing

<table>
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<th>Adults</th>
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<tbody>
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<td>&lt; 8 breaths per minute</td>
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<td>&gt; 30 breaths per minute</td>
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<table>
<thead>
<tr>
<th>Children</th>
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<td>&lt; 10 breaths per minute</td>
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<td>&gt; 60 breaths per minute</td>
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<table>
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<th>Infant</th>
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<td>&lt; 20 breaths per minute</td>
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<tr>
<td>&gt; 80 breaths per minute</td>
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*remember to treat the patient and not the “numbers”*
Signs of Inadequate Breathing

- Slower than 12 breaths/min (bradypnea)
- Faster than 20 breaths/min (tachypnea)
- Irregular rhythm
- Use of neck or belly muscles to help breathing
Signs of Inadequate Breathing

- Decreased breath sounds
- Pursed lips
- Pale or blue (cyanotic) skin
- Cool, clammy skin
- Unequal chest movement
- Tripod position (sitting leaning forward onto outstretched arms)
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Causes Of Dyspnea
Upper or Lower Airway Infection

**Bronchitis** (swelling of the bronchioles)
- Impairs the lungs ability to exchange gases

**Common Cold**
- Dyspnea is mild
- Patient complains of stuffiness and difficulty breathing through their nose

**Pneumonia**
- Bacterial or viral infection of the lungs
- Fluid accumulates in the surrounding normal lung tissue

**Severe Acute Respiratory Syndrome (SARS)**
- Viral infection caused by the corona virus
- Begins as influenza type symptoms and progresses to pneumonia and respiratory failure
Upper or Lower Airway Infection

Epiglottitis

- Bacterial infection of the epiglottis (just above vocal cords)
- Stridor (noise on inspiration) and hoarse voice may be heard

Croup

- Swelling of the whole airway
- Seen in children from 6 months to 3 years
- Stridor and seal bark cough are common signs
Pulmonary Edema

- Fluid build-up in the lungs
- Signs and symptoms
  - Dyspnea
  - Frothy pink sputum
- History of congestive heart failure
- Often recurs even with treatment
Chronic Obstructive Pulmonary Disease (COPD)

- is the result of direct lung and airway damage from repeated infections or inhalation of toxic agents (such as cigarette smoking).

- Bronchitis and emphysema are two common types of COPD.
  - Bronchitis = ‘Blue Bloater’
  - Emphysema = ‘Pink Puffer’

- Abnormal breath sounds may be present.

Thin pink man struggling to breath has emphysema.
Asthma

- Common but serious disease

- Can be exercise induced or allergen induced

- Asthma is an acute spasm of the bronchioles.

- Wheezing may be audible without a stethoscope.
Pneumothorax
(Collapsed Lung)

- Accumulation of air in the pleural space
- Caused by trauma or some lung diseases
- Dyspnea and sharp chest pain on one side
- Absent or decreased breath sounds on one side
Anaphylactic Reactions
(Severe Allergic Reaction)

• An allergen (such as insect stings and food allergies) can trigger severe breathing problems

• Breathing problems may be airway swelling or wheezing (as in asthma)

• Asthma and anaphylactic (severe allergic) reactions can be similar.

• Hay fever is a mild, seasonal allergy response to allergens and is NOT anaphylaxis.
Mechanical Obstruction of the Airway

- Be prepared to treat quickly.
- Obstruction may result from the position of head, the tongue, vomit, or a foreign body.
- Opening the airway with the head tilt-chin lift maneuver or modified jaw thrust may solve the problem.
- If this does not resolve the problem, abdominal or chest thrusts may be needed.

Tongue blocking the airway
Pulmonary Embolism

• A blood clot that forms in the legs and breaks off, travels through the veins, and lodges in the lungs

• Signs and symptoms include
  – Dyspnea
  – Cyanosis
  – Tachypnea
  – Varying degrees of hypoxia
Hyperventilation

- Fast breathing (usually from anxiety) resulting in a decrease in the level of carbon dioxide

- May be difficult to tell from a more serious breathing problem

- Signs and symptoms include
  - Anxiety
  - Numbness
  - A sense of dyspnea despite rapid breathing
  - Dizziness
  - Tingling in hands and feet
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Signs and Symptoms Of Respiratory Distress
Signs and Symptoms

- Difficulty breathing (dyspnea)
- Altered mental status
- Anxiety or restlessness
- Increased or decreased respirations (tachypnea / bradypnea)
- Increased heart rate (tachycardia)
- Irregular breathing
- Cyanosis
Signs and Symptoms

- Abnormal breath sounds
- Difficulty speaking
- Use of accessory muscles
- Coughing
- Tripod position
- Barrel chest
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Medications Used by Respiratory Patients
Respiratory Medications

Many patients with breathing problems use puffers or inhalers:

- Salbutamol (Ventolin)
- Fexofenadine (Allegra)
- Montelukast (Singular)
- Salmeterol (Advair)
- Fluticasone (Flonase)
- Mometasone (Nasonex)
- Fluticasone Propionate (Flovent)
- Ipratropium / Albuterol (Combivent)

All these medications are designed to improve airflow in and out of the lungs and decrease secretions in the respiratory tract.
Respiratory Medications

Possible Side Effects:

- Increased pulse rate
- Nervousness
- Muscle tremors
Medication Delivery Devices

Metered Dose Inhaler (MDI)

Aero Chamber

Discus Inhaler

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Contraindications for Medications

• Patient unable to help take their medication
• Patient too short of breath to take puffers
• Inhaler not prescribed for patient
• Maximum dose prescribed has already been taken
• No permission from medical director/base hospital

At present, Toronto Fire Services personnel are **NOT PERMITTED** to assist or administer **ANY** respiratory medications.

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Treatment for Respiratory Distress
Treatment for Respiratory Distress

• Complete a full primary assessment
• Administer supplemental oxygen at 10 L/min via non-rebreathing mask.
• Place patient in a position of comfort (usually sitting up)
• Patients with COPD may be given oxygen.

DO NOT withhold oxygen from a patient in respiratory distress
Obstruction of the Airway

• Clear the obstruction following the guidelines of the Heart and Stroke Foundation of Canada and the Sunnybrook Osler Centre for Prehospital Care
• Abdominal thrusts or chest compressions as needed
• Provide appropriate airway management
• Administer oxygen
• Complete a primary assessment
Acute Pulmonary Edema

- Administer 100% oxygen by either a non-rebreather oxygen mask or bag valve mask
- Suction secretions
- Complete a primary assessment
- Place patient in a position of comfort (usually sitting up)
- If patient is barely breathing or passing out, help their breathing using a bag valve mask
Chronic Obstructive Pulmonary Disease (COPD)

- The patient may be on home supplemental oxygen being delivered by a nasal cannula
- Switch the patient over to your oxygen delivery device (i.e. non-rebreather)
- Place patient in a position of comfort
- Complete a primary assessment
Pneumothorax

- Complete primary assessment
- Administer supplemental oxygen
- Place patient in position of comfort
- Be ready to support the airway and assist respirations

CT scan and x-ray showing collapsed lung

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Hyperventilation Treatment

• Complete initial assessment and history of the event

• Difficult to distinguish hyperventilation from lung disease - assume underlying problems

• Do not have patient breathe into a paper bag

• Administer supplemental oxygen via non-rebreather
For All Questions Pertaining to this Module,
Contact Your E.M.S. Command Coordinator.

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