Chapter 13
Respiratory Emergencies

Unit Summary
After students complete this chapter and the related course work, they will understand the significance and characteristics of respiratory emergencies in infant, child, and adult populations. Students should be able to demonstrate a fundamental comprehension on the following topics: respiratory anatomy and physiology, pathophysiology, signs and symptoms of various respiratory etiologies (eg, asthma, COPD, pneumonia), and the assessment and management necessary to provide basic care in the prehospital setting.

National EMS Education Standard Competencies

Medicine
Applies fundamental knowledge to provide basic emergency care and transportation based on assessment findings for an acutely ill patient.

Respiratory
Anatomy, signs, symptoms, and management of respiratory emergencies including those that affect the:
- Upper airway (pp 475–482)
- Lower airway (pp 475–482)

Anatomy, physiology, pathophysiology, assessment, and management of:
- Epiglottitis (pp 480–509)
- Spontaneous pneumothorax (pp 487–506)
- Pulmonary edema (pp 480–505)
- Asthma (pp 484–510)
- Chronic obstructive pulmonary disease (pp 483–506)
- Environmental/industrial exposure (pp 489–490)
- Toxic gas (p 490)
- Pertussis (pp 481, 511)
- Cystic fibrosis (p 511)
- Pulmonary embolism (pp 488–489, 507)
- Pneumonia (pp 480–511)
- Viral respiratory infections (pp 490, 510)

Knowledge Objectives
1. List the structures and functions of the upper and lower airways, lungs, and accessory structures of the respiratory system. (pp 475–476)
2. Explain the physiology of respiration, and list the signs of normal breathing. (pp 476–478)
3. Discuss the pathophysiology of respiration, and provide examples of the common signs and symptoms a patient with inadequate breathing may present with in an emergency situation. (pp 476–478)

4. Explain the special patient assessment and care considerations that are required for geriatric patients who are experiencing respiratory distress. (pp 479, 508–512)

5. Describe different respiratory conditions that cause dyspnea, including their causes, assessment findings and symptoms, complications, and specific prehospital management and transport decisions. (pp 479–511)

6. List and review the characteristics of infectious diseases that are frequently associated with dyspnea. (pp 480–481)

7. Describe the assessment of a patient who is in respiratory distress and the relationship of the assessment findings to patient management and transport decisions. (pp 491–500)

8. List and define five different types of adventitious breath sounds, their signs and symptoms, and the disease process associated with each one. (pp 492–493)

9. Describe the primary emergency medical care of a person who is in respiratory distress. (pp 500–502)

10. State the generic name, medication forms, dose, administration, indications, actions, and contraindications for medications that are administered via metered-dose inhalers (MDIs) and small-volume nebulizers. (pp 500–505)

11. Discuss some epidemic and pandemic considerations related to the spread of influenza type A and strategies EMTs should employ to protect themselves from infection during a possible crisis situation. (pp 507–508)

12. Explain the special patient assessment and care considerations that are required for pediatric patients who are experiencing respiratory distress. (pp 508–512)

Skills Objectives

1. Demonstrate the process of history taking to obtain more information related to a patient's chief complaint based on a case scenario. (pp 495–496)

2. Demonstrate how to use the OPQRST assessment to obtain more specific information about a patient's breathing problem. (pp 496)

3. Demonstrate how to use the PASTE assessment to obtain more specific information about a patient's breathing problem. (p 496)

4. Demonstrate how to assist a patient with the administration of an MDI. (pp 503–504, Skill Drill 13-1)

5. Demonstrate how to assist a patient with the administration of a small-volume nebulizer. (pp 504–505, Skill Drill 13-2)

Lecture

I. Introduction to Respiratory Emergencies

A. EMTs often encounter patient’s complaining of dyspnea.

1. Dyspnea is feeling short of breath or having trouble breathing.
B. Dyspnea can be caused by many different conditions:
   1. Asthma
   2. Heart failure
   3. Pulmonary embolism
   4. Common cold

C. Dyspnea’s cause can be difficult to determine.
   1. Several different problems may contribute to a patient’s dyspnea at the same time.

D. Even without a definitive diagnosis, you may still be able to save a patient’s life.

II. Anatomy of the Respiratory System

A. The respiratory system consists of all structures that contribute to breathing, including:
   1. Diaphragm
   2. Chest wall muscles
   3. Accessory muscles of breathing
   4. Nerves from the brain and spinal cord to those muscles

B. The upper airway consists of all anatomic structures above the vocal cords:
   1. Nose and mouth
      a. Air enters and is filtered, warmed, and humidified.
   2. Jaw
   3. Oral cavity
   4. Pharynx
   5. Larynx
      a. End of the upper airway

C. The principal function of the lungs is respiration.
   1. Respiration is the exchange of oxygen and carbon dioxide.

D. Air travels through the trachea into the lungs, then on to the:
   1. Bronchi (larger airways)
   2. Bronchioles (smaller airways)
   3. Alveoli
      a. Alveoli are where the actual exchange of oxygen and carbon dioxide takes place.

III. Physiology of Respiration

A. There are two processes that occur during respiration.
   1. Inspiration
      a. The act of breathing in, or inhaling
2. Expiration
   a. The act of breathing out, or exhaling
   b. Oxygen is provided to the blood, and carbon dioxide is removed from it.
      i. In healthy lungs, this exchange of gases takes place rapidly at the level of the alveoli.

B. The alveoli lie against the pulmonary capillary vessels.
   1. Oxygen passes freely through tiny passages in the alveolar wall into these capillaries.
      a. It is then carried to the heart, which pumps the oxygen throughout the body.
   2. Carbon dioxide returns to the lungs.
      a. It diffuses back into the alveoli.
      b. It then travels back up the bronchial tree.
      c. And it exits through the upper airways during exhalation.

C. The brain stem monitors the level of carbon dioxide in the arterial blood.
   1. If the level of carbon dioxide drops too low:
      a. The person automatically breathes at a slower rate and less deeply.
      b. As a result, less carbon dioxide is expired.
         i. Levels in the blood return to normal.
   2. If the level of carbon dioxide rises above normal:
      a. The person breathes more rapidly and more deeply.
      b. More carbon dioxide diffuses out of the bloodstream.
         i. Levels in the blood are thus lowered.

IV. Pathophysiology

A. The proper exchange of oxygen and carbon dioxide can be hindered by:
   1. Abnormal or pathologic conditions in the anatomy of the airway
   2. Disease processes
   3. Traumatic conditions
   4. Pulmonary vessels, which may have abnormalities that interfere with blood flow

B. The EMT must be able to:
   1. Recognize the signs and symptoms of inadequate breathing
   2. Know how to handle it

C. Carbon dioxide retention and hypoxic drive
   1. Patients will sometimes have an elevated level of carbon dioxide in their arterial blood.
      a. Potential causes:
         i. Exhalation process may be impaired by lung disease.
         ii. The body may naturally produce too much carbon dioxide.
      b. If levels stay high for a period of years, the respiratory center in the brain may not function properly.
         i. It could signify chronic carbon dioxide retention.
            (a) If this condition is severe, respiration will stop unless there is a hypoxic drive to stimulate the respiratory center.
2. Patients with chronic lung disease frequently have high levels of carbon dioxide in the blood.
   a. In these patients, giving too much oxygen may actually stop respiration.
      i. Instead, administer low-flow oxygen.
      ii. Do not withhold oxygen.
         (a) If respirations slow, lower the liters per minute.

V. Causes of Dyspnea

A. Dyspnea can be caused by many medical problems.
   1. If the brain is deprived of oxygen, a patient may not be alert enough to complain.
      a. Altered mental status is more commonly a sign of hypoxia of the brain.
   2. Patients often have difficulty breathing and/or hypoxia with the following medical conditions:
      a. Upper or lower airway infection
      b. Acute pulmonary edema
      c. Chronic obstructive pulmonary disease (COPD)
      d. Asthma
      e. Hay fever
      f. Anaphylaxis
      g. Spontaneous pneumothorax
      h. Pleural effusion
      i. Prolonged seizures
      j. Obstruction of the airway
      k. Pulmonary embolism
      l. Hyperventilation syndrome
      m. Environmental/industrial exposure
      n. Carbon monoxide poisoning
      o. Infectious diseases

B. As you treat patients with disorders of the lung, be aware of the following:
   1. Gas exchange between the alveoli and pulmonary circulation is obstructed by fluid in the lung, infection, or collapsed alveoli (atelectasis).
   2. The alveoli are damaged and cannot transport gases properly across their own walls.
   3. The air passages are obstructed by muscle spasm, mucus, or weakened floppy airway walls.
   4. Blood flow to the lungs is obstructed by blood clots.
   5. The pleural space is filled with air or excess fluid, so the lungs cannot properly expand.

C. Besides shortness of breath, a patient with dyspnea may also report:
   1. Chest tightness
   2. Air hunger

D. Dyspnea is a common complaint in patients with cardiopulmonary diseases.
   1. Congestive heart failure causes the heart to pump inefficiently and deprives the body of oxygen.
      a. Pulmonary edema is a condition associated with congestive heart failure.
E. Severe pain can cause a patient to experience rapid, shallow breathing without the presence of a primary pulmonary dysfunction.

F. In some patients, breathing deeply causes pain because it causes expansion of the chest wall.

G. Upper or lower airway infection
   1. Infectious diseases causing dyspnea may affect all parts of the airway.
      a. Some cause mild discomfort.
      b. Some obstruct the airway.
      c. Oxygenation is a problem of not enough oxygen getting to the tissues.
   2. The problem causing dyspnea is always some form of obstruction:
      a. To the flow of air in major passages:
         i. Colds, diphtheria, epiglottitis, croup
      b. To the exchange of gases
         i. Pneumonia

H. Acute pulmonary edema
   1. Sometimes the heart muscle cannot circulate blood properly.
   2. The left side of the heart cannot remove blood from the lung as fast as the right side delivers it.
   3. Fluid builds up within the alveoli and in lung tissue.
      a. This accumulation of fluid is referred to as pulmonary edema.
      b. Condition usually results from congestive heart failure.
      c. Patient usually experiences dyspnea with rapid, shallow respirations.
      d. In severe cases, a frothy pink sputum forms at the nose and mouth.
      e. Pulmonary edema is a common cause of hospital admission in the United States.
      f. Repeat bouts are common.
      g. Not all patients with pulmonary edema have heart disease.
         i. Inhaling large amounts of smoke or toxic chemical fumes can produce pulmonary edema.
         ii. Traumatic injuries to the chest can cause pulmonary edema also.

I. COPD
   1. Slow process of dilation and disruption of airways and alveoli
   2. Caused by chronic bronchial obstruction
   3. COPD is reported in 12.1 million adults over 25 years of age.
   4. It is the fourth leading cause of death.
   5. Tobacco smoke is a bronchial irritant and can create chronic bronchitis, an ongoing irritation of the trachea and bronchi.
      a. With bronchitis, excessive mucus is constantly produced, obstructing small airways and alveoli.
      b. Airways are weakened as the lungs’ protective devices are destroyed.
      c. Chronic oxygenation problems can also lead to right heart failure and fluid retention.
         i. Pneumonia develops easily.
         ii. Repeated episodes of irritation and pneumonia cause scarring in the lung and some dilation of the obstructed alveoli, leading to COPD.
   6. Emphysema is another type of COPD.
a. Emphysema is the loss of elastic material around the air spaces as a result of chronic stretching of the alveoli.

b. Smoking can directly destroy the elasticity of the lung tissue.

7. Most patients with COPD have elements of both chronic bronchitis and emphysema.

8. Wet lungs versus dry lungs, and ŷcardiac asthmaö

a. The ŷwet lungsö sounds of pulmonary edema and the ŷdry lungsö sounds of COPD can sometimes be confused.
   i. Do not assume that all COPD patients have wheezing and all congestive heart failure patients have rales.
   ii. Treat the patients, not the lung sounds.

J. Asthma, hay fever, and anaphylaxis

1. Asthma, hay fever, and anaphylaxis result from an allergic reaction to an inhaled, ingested, or injected substance.

a. In some cases, the allergen cannot be identified.

2. Asthma

a. An acute spasm of the smaller air passages (bronchioles)

b. Associated with excessive mucus production and swelling of the mucous lining of the respiratory passages

c. Approximately 22.9 million Americans had asthma in 2007.

d. Affects all ages but is most prevalent in children 5 ý 17 years of age

e. Produces a characteristic wheezing caused by partially obstructed airways
   i. Wheezing is indicative of a partial lower airway obstruction.
   ii. Wheezing may be so loud that you can hear it without a stethoscope.
   iii. In other cases, the airways are so blocked that no air movement is heard.
   iv. Obstruction may be caused by allergic reaction to specific foods or some other allergen.
   v. Obstruction may also be caused by severe emotional distress, exercise, and respiratory infections.
   vi. In its most severe form, an allergic reaction can produce anaphylactic shock.
      (a) May result in respiratory distress severe enough to lead to coma or death.
   vii. Most patients with asthma are familiar with their symptoms and know when an attack is imminent.
      viii. Listen to the needs of the patient; they often know exactly what they need.

3. Hay fever

a. Causes coldlike symptoms, including a runny nose, sneezing, congestion, and sinus pressure

b. Symptoms are caused by an allergic reaction, usually to outdoor, airborne allergens.
   i. Allergens include pollen, dust mites, and pet dander.

c. Patients with hay fever rarely call 9-1-1.

d. Patients with hay fever tend to be atopic, meaning they are more likely to have other allergies.

4. Anaphylactic reactions

a. Can produce severe airway swelling

b. Similar to asthmatic reactions

c. Characterized by airway swelling and dilation of blood vessels all over the body, which can lower blood pressure

d. Condition is sometimes referred to as anaphylactic shock.

e. The airway can swell so much that total obstruction is possible.

f. Patients may or may not be aware of their sensitivity to certain substances.
i. Therefore, this may be their first anaphylactic reaction.
g. In most cases, epinephrine is the treatment of choice.
i. Oxygen and antihistamines are also helpful.

K. Spontaneous pneumothorax
1. Pneumothorax is the partial or total accumulation of air in the pleural space.
2. It is most often caused by trauma.
a. May also be caused by medical conditions; labeled "spontaneous"
3. A vacuum-like pressure in the pleural space keeps the lungs inflated.
a. When the lung is disrupted, air escapes into the pleural cavity and the negative vacuum pressure is lost.
i. The accumulation of air in the pleural space may be mild or severe.
4. Condition occurs in patients with certain lung infections or in young people born with weak areas of the lung.
a. People with emphysema or asthma are at higher risk.
b. Tall, thin males are also at higher risk.
5. A patient with spontaneous pneumothorax becomes dyspneic and might complain of pleuritic chest pain (a sharp, stabbing pain on one side that is worse during breathing or with certain movements of the chest wall).
6. You can sometimes tell that breath sounds are absent or decreased on the affected side.

L. Pleural effusion
1. A pleural effusion is a collection of fluid outside the lung.
2. It compresses the lung and causes dyspnea.
3. It can stem from an infection, congestive heart failure, or cancer.
4. Patients feel better if they are sitting upright.

M. Prolonged seizures
1. A seizure is a disruption in the electrical activity in the brain.
a. In a tonic-clonic seizure (formerly called a grand mal seizure) the patient:
i. Has a sudden loss of consciousness
ii. Has tonic-clonic movement of the body
iii. Is often incontinent
b. In most cases, the seizure only lasts a few minutes, and the patient regains consciousness.
i. There are cases where the patient continues to have seizures every few minutes without regaining consciousness.
   (a) This is called epilepticus and could be life threatening.
2. During a brief seizure, the patient may have impaired breathing.
3. In a prolonged seizure, other airway issues emerge.
a. The patient has no control over the airway while unconscious.
b. Blood and saliva can be aspirated into the airway.
c. If the patient is on his or her back, the tongue can block the airway.
d. Constant muscle contractions can interfere with the chest's ability to expand, and the patient will hyperventilate and become hypoxic.
e. The patient could also become apneic.

f. Other effects of a prolonged seizure include:
   
i. Hyperthermia
   
   ii. Dehydration
   
   iii. Hypoglycemia

N. Obstruction of the airway

1. A patient with dyspnea may have a mechanical obstruction.

2. Treat quickly.

3. In semiconscious and unconscious patients, the obstruction may be the result of aspirations of vomitus or a foreign object, or improper positioning of the head causing the tongue to block the airway.

4. If the patient was eating just before onset of the dyspnea, always consider the possibility of foreign body obstruction.

O. Pulmonary embolism

1. An embolus is anything that moves from its point of origin to another place in the body, obstructing subsequent blood flow.
   
a. Circulation can be cut off completely or partially.
   
b. Emboli can result in a serious, life-threatening condition.
   
c. Emboli can be fragments of blood clots in an artery or vein that break off and travel through the bloodstream.
   
d. They can also be foreign bodies that enter the circulation, such as a bubble of air.

2. A pulmonary embolism is the passage of blood clots through the venous system.

   a. May be the result of:
      
      i. Damage to the lining of the vessels
      
      ii. A tendency for blood to clot unusually fast
      
      iii. Slow blood flow in a lower extremity
             (a) Slow blood flow in the legs is often the result of long-term bed rest.
   
      b. Signs and symptoms of pulmonary emboli include the following:
         
         i. Dyspnea
         
         ii. Acute chest pain
         
         iii. Hemoptysis (coughing up blood)
         
         iv. Cyanosis
         
         v. Tachypnea
         
         vi. Varying degrees of hypoxia
   
   c. With a large enough embolism, complete obstruction of the output of blood from the right side of the heart can result in sudden death.

P. Hyperventilation

1. Hyperventilation is defined as overbreathing to the point that the level of arterial carbon dioxide falls below normal.

   a. This may be an indicator of a life-threatening illness.

2. Acidosis is the buildup of excess acid in blood or body tissues.

3. Alkalosis is the buildup of excess base (lack of acids) in body fluids.
a. This can cause symptoms of hyperventilation syndrome (panic attack), including:
   i. Anxiety
   ii. Dizziness
   iii. Numbness
   iv. Tingling of the hands and feet
   v. A sense of dyspnea, despite rapid breathing

4. The decision whether hyperventilation is being caused by a life-threatening illness or a panic attack should not be made outside the hospital.
   a. Verbally instruct patient to slow his or her breathing.
   b. If that does not work, give supplemental oxygen and transport to the hospital.

Q. Environmental/industrial exposure
1. Pesticides, cleaning solutions, chemicals, chlorine, and other gases can be accidentally released at industrial sites.
2. Carbon monoxide is produced in industrial settings by vehicles, gasoline-powered tools, and heaters.
   a. Carbon monoxide is odorless and highly poisonous.
3. An exposed patient needs decontamination and medical care.
   a. After the patient is decontaminated, gather information about the substance and the cause of dyspnea.
   b. Pay special attention to the patient’s lung sounds.
      i. Inhalation injuries can cause serious lung damage.
4. Carbon monoxide poisoning is the leading cause of accidental death in the United States.
   a. People who have carbon monoxide poisoning complain of flu-like symptoms and even dyspnea.
   b. High-flow oxygen by nonrebreathing mask is the best treatment for conscious patients.

R. Bacterial and viral respiratory infections
1. Methicillin-resistant *Staphylococcus aureus* (MRSA)
   a. MRSA is a bacterium that causes infections in different parts of the body.
   b. It is transmitted by different routes, including the respiratory route.
   c. It is difficult to treat.
   d. MRSA often affects people with weak immune systems in hospitals and nursing homes.
2. TB
   a. TB is a bacterial infection that most commonly affects the lungs.
   b. It also can be found in almost any other organ.
   c. TB can remain inactive for years before producing any symptoms.
   d. Patients often complain of fever, coughing, fatigue, night sweats, and weight loss.
   e. Prevalence is higher in homeless people, prison inmates, and nursing home residents.
   f. TB is also found in persons who abuse intravenous drugs or alcohol, or those with HIV.

VI. Patient Assessment
A. Scene size-up
   1. Scene safety
      a. Use standard precautions.
b. Use PPE.
c. Consider the possibility of a toxic substance.
d. Consider the potential for violence.

2. Mechanism of injury/nature of illness
   a. If in question, ask why 9-1-1 was activated.
   b. The nature of illness is often based on a history of chronic medical problems.

B. Primary assessment

1. Identify immediate life threats.
   a. Problems with the airway
      i. Inhibitions of normal breathing
      ii. Issues preventing normal circulation

2. Form a general impression.
   a. Form an overall general impression of the patient's level of distress.
      i. Age, anxiety, and body positioning will help you assess.
   b. Use AVPU (Alert to person, place, and day; responsive to Verbal stimuli; responsive to Pain; Unresponsive) scale.

3. Assess airway and breathing.
   a. Make sure airway is patent and adequate.
      i. If there is any question about airway patency, it must be opened immediately using the head tilt–chin lift or jaw-thrust maneuver.
   b. Determine if breath sounds are normal.
      i. Assess the rate, rhythm, and quality of respirations.
      ii. Are there snoring sounds in an unresponsive patient?
         (a) You may need to insert an oral or nasal airway.
   c. Ask yourself the following questions:
      i. Is the air going in?
      ii. Does the chest expand with each breath?
      iii. Does the chest fall after each breath?
      iv. Is the rate adequate for the victim's age?
   d. Determine whether the patient's breath sounds are normal (vesicular breath sounds or bronchial breath sounds) or decreased, absent, or abnormal (adventitious breath sounds).
   e. Listen to breath sounds for a full respiratory cycle.
   f. Abnormal sounds include wheezing, rales, rhonchi, and stridor.

   a. Assess the pulse rate, quality, and rhythm.
      i. Tachycardia is an increased pulse rate and is a normal response to pain, fear, excitement, and exertion.
      ii. Bradycardia is a decreased pulse rate and could mean problems with the cardiac conduction system, medication reaction, organophosphate poisoning, or decompensation.
      iii. Is the pulse strong, bounding, or weak?
      iv. Is the pulse rhythm regular or irregular?
   b. Evaluate for shock and bleeding.
   c. Assess perfusion by evaluating skin color, temperature, and condition.
d. Reassess and identify any life threats in your patient. They would include any of the following signs or symptoms.
   i. Problems with the ABCs
   ii. Poor initial general impression
   iii. Unresponsiveness
   iv. Potential hypoperfusion or shock
   v. Chest pain associated with a low blood pressure
   vi. Severe pain anywhere
   vii. Excessive bleeding

5. Make transport decision.
   a. If the patient’s condition is unstable and there is a possible life threat:
      i. Address the life threat.
      ii. Proceed with rapid transport.

C. History taking
   1. Investigate the patient’s chief complaint.
      a. Objective and subjective observations are important in building a general assessment.
      b. Different respiratory complaints offer different clues and different challenges.
   2. With patients in respiratory distress, a SAMPLE history can be collected from bystanders or family, if they are present.
      a. Be sure to ask the following about a patient in respiratory distress:
         i. What is the patient’s general state of health?
         ii. Has the patient had any childhood or adult diseases?
         iii. Have there been any surgeries or recent hospitalizations?
         iv. Are there any psychiatric or mental health illnesses?
         v. Have there been any traumatic injuries?
   3. The OPQRST assessment can be used to assess for pain and can gather information about the breathing problem.
      a. When did the breathing problem begin (onset)?
      b. What makes the breathing difficulty worse (provocation or palliation)?
      c. How does the breathing feel (quality)?
      d. Does the discomfort move (radiation/region)?
      e. How much of a problem is the patient having (severity)?
      f. Is the problem continuous or intermittent? If it is intermittent, how frequently does it occur and how long does it last (timing)?
   4. The PASTE assessment is a specific alternative assessment for a complaint of shortness of breath or difficulty breathing.
      a. Progression
      b. Associated chest pain
      c. Sputum
      d. Talking tiredness
      e. Exercise tolerance

D. Secondary assessment
1. The secondary assessment is a more in-depth assessment of body systems.

2. Only proceed with secondary assessment if life threats have been addressed and treated.

3. Physical examinations
   a. Look for signs of COPD. Patients with COPD:
      i. Are usually older than 50 years of age
      ii. Always have a history of lung problems
      iii. Are almost always long-term cigarette smokers
      iv. Complain of tightness in the chest and constant fatigue
      v. Often use accessory muscles to breathe
      vi. Exhibit abnormal breath sounds

4. Vital signs
   a. Check and compare distal pulses, reassess the skin condition, and be alert for tachycardia and bradycardia.
   b. Check the patient's mental status.
   c. Use appropriate monitoring devices such as pulse oximetry.
      i. Pulse oximeters measure the percentage of hemoglobin that is saturated by oxygen.

E. Reassessment

1. Repeat the primary assessment.
   a. Determine if there have been changes in the patient's condition.
   b. Confirm the adequacy of interventions and patient status.
   c. If the patient's condition is stable and no life threats exist, vital signs should be obtained at least every 15 minutes.

2. Interventions for respiratory problems may include:
   a. Providing oxygen via nonrebreathing mask at 15 L/min
   b. Providing positive-pressure ventilations with a bag-mask device, pocket mask, or flow-restricted, oxygen-powered device
   c. Using airway management techniques such as an oropharyngeal airway, nasopharyngeal airway, suctioning, airway positioning
   d. Positioning the patient in a high Fowler’s position or position of choice
   e. Assisting the patient with respiratory medications

3. Communication and documentation
   a. Communicate all relevant information to the staff at the receiving hospital.

VII. Emergency Medical Care

A. Management of respiratory distress

1. If a patient complains of difficulty breathing, you should administer supplemental oxygen immediately.
   a. Take great care in monitoring respirations.
   b. Reevaluate respirations every 5 minutes.
   c. Do not withhold oxygen in patients with COPD.

2. The patient may have a metered-dose inhaler (MDI) or small-volume nebulizer.
a. Help the patient administer the MDI (See Skill Drill 13-I) or small-volume nebulizer (See Skill Drill 13-2) if possible.

b. Consult medical control and make sure the medication is indicated.

c. Ensure that there are no contraindications to the patient’s condition:
   i. The patient is unable to help coordinate inhalation.
   ii. The MDI or small-volume nebulizer is not prescribed to this patient.
   iii. You did not obtain permission from medical control.
   iv. The medication is not permissible by local protocol.
   v. The patient has already met the maximum prescribed dose.
   vi. The medication is expired.
   vii. There are other contraindications specific to the medication.

d. Common side effects of inhalers:
   i. Increased pulse rate
   ii. Nervousness
   iii. Muscle tremors

VIII. Treatment of Specific Conditions

A. Upper or lower airway infection
   1. Provide humidified oxygen (if available).
   2. Position comfortably.
   3. Transport promptly.

B. Acute pulmonary edema
   1. Provide 100% oxygen.
   2. Suction, if necessary
   3. Position comfortably.
   4. Transport promptly.

C. COPD
   1. Assist with prescribed inhaler.
      a. Watch for side effects due to overuse.
   2. Position comfortably.
   3. Transport promptly.

D. Asthma, hay fever, and anaphylaxis
   1. Asthma
      a. Determine if asthma is really the problem.
      b. Assist the asthma patient with prescribed inhaler.
      c. Provide aggressive airway management, oxygen, prompt transport.
   2. Hay fever
      a. Hay fever is unlikely to need emergency treatment.
      b. Manage the airway and give oxygen according to the level of distress.
3. Anaphylaxis
   a. Remove the offending agent.
   b. Maintain the airway.
   c. Transport rapidly.
   d. Administer epinephrine if allowed by local protocol.

E. Spontaneous pneumothorax
   1. Provide supplemental oxygen.
   2. Transport promptly.

F. Pleural effusion
   1. Fluid removal must be done in hospital.
   2. Provide oxygen.
   3. Transport promptly.

G. Prolonged seizures
   1. The patient needs to reach the hospital quickly, or an ALS unit needs to reach you quickly.
   2. When the seizure stops, provide aggressive airway management.
   3. Transport rapidly to emergency department.

H. Obstruction of airway
   1. Partial obstruction: Provide supplemental oxygen and transport.
   2. Complete obstruction: Clear the obstruction and administer oxygen.
   3. Transport rapidly to emergency department.

I. Pulmonary embolism
   1. Supplemental oxygen is mandatory.
   2. Position comfortably.
   3. If hemoptysis is present, clear the airway immediately.
   4. Transport promptly.

J. Hyperventilation
   1. Complete primary assessment and gather history.
   2. Do not have patient breathe into paper bag.
   3. Provide supplemental oxygen.
   4. Transport promptly.

K. Environmental/industrial exposure
   1. Ensure patients are decontaminated.
   2. Treat with oxygen, adjuncts, and suction based on presentation.

IX. Epidemic and Pandemic Considerations
A. **Epidemic: substantial new cases of a disease occur**

B. **Pandemic: outbreak that occurs on global scale**
   1. Pandemic example: H1N1 influenza type A
      a. Infection transmitted by direct contact with nasal secretions and aerosolized droplets from coughing and sneezing by infected people.
      b. Be compliant in wearing PPE.
      c. Wash hands frequently.
      d. Maintain vaccinations.

X. **Age-Related Assessment and Management**

A. **Foreign body aspiration**
   1. Very common in young children who are putting everything in their mouths
      a. Most deaths from foreign body aspiration are in patients under 5 years old.
      b. Provide oxygen.
      c. Transport rapidly.
   2. Elderly patients may have weakened airway musculature and decreased cough and gag reflexes.

B. **Tracheostomy dysfunction**
   1. Tubes can be obstructed by secretions, mucus, or foreign bodies.
   2. Bleeding, leaking, dislodgement, and infection can also be issues.
   3. Position comfortably.
   4. Provide suctioning to clear the obstruction.
   5. Once the obstruction is clear, oxygenate the patient.

C. **Croup**
   1. Inflammation and swelling of the pharynx, larynx, and trachea
   2. Typically seen in children between 6 months and 3 years of age
      a. Easily passed between children
   3. Croup often responds well to the administration of humidified oxygen.

D. **Epiglottitis**
   1. Inflammation of the epiglottis as the result of a bacterial infection.
   2. More predominant in children but can also occur in elderly patients.
   3. Treat children gently and try not to make them cry.
   4. Position comfortably.
   5. Provide high-flow oxygen.
   6. Do not put anything in their mouths.

E. **Asthma**
   1. Common childhood illness
   2. Keep in mind that a cough is not always a symptom of a cold; it could signal pneumonia or asthma.
3. Provide blow-by oxygen by holding the mask in front of the child’s face.
4. Use MDIs as you would with older patients.
5. As with any chronic disease, asthma may be life threatening in an older person.

F. Bronchiolitis
1. Viral illness that usually affects newborns and toddlers
2. It is often caused by respiratory syncytial virus (RSV).
3. Bronchioles become inflamed, swell, and fill with mucus.

G. Pneumonia
1. Worldwide, the leading cause of death in children
2. Often a secondary infection
   a. It begins after an upper respiratory tract infection.
3. Bacterial pneumonia will come on quickly and result in high fevers.
4. Viral pneumonia presents more gradually and is less severe.
5. Pneumonia especially affects people who are chronically and terminally ill.
6. Signs and symptoms of pneumonia include:
   a. Exertional dyspnea
   b. Productive cough
   c. Chest discomfort and pain
   d. Wheezing
   e. Headache
   f. Nausea and vomiting
   g. Musculoskeletal pain
   h. Weight loss
   i. Confusion
   j. Cyanosis and pallor
   k. Dry skin
   l. Possible fever
   m. Decreased skin turgor
   n. Pale, dry mucosa
7. Obtain a core temperature to determine presence of fever.
8. Treat with airway, ventilatory, and circulatory support.

H. Pertussis (whooping cough)
1. An airborne bacterial infection that most affects children younger than 6 years
2. Highly contagious and is passed through droplet infection
3. Watch for signs of dehydration.
4. Suction may be necessary.

I. Cystic fibrosis
1. Genetic disorder that affects the lungs and digestive system
2. Often causes death in childhood
3. Suction and oxygenate as needed

J. Congestive heart failure
1. Risk factors include hypertension and history of coronary artery disease and/or atrial fibrillation.
2. In most cases, patients have a long history of chronic congestive heart failure.
3. Signs and symptoms include:
   a. Difficulty breathing
   b. Respiratory distress
   c. Coughing
   d. Suffocated feeling
   e. Cold sweats
   f. Tachycardia
4. Treatment should consist of airway, ventilatory, and circulatory support.
   a. Provide oxygen.
5. Continuous positive airway pressure (CPAP) is a noninvasive means of providing ventilatory support.

XI. Summary

A. Dyspnea is a common complaint that may be caused by numerous medical problems.
B. Causes of dyspnea include upper and lower airway infections, acute pulmonary edema, COPD, spontaneous pneumothorax, asthma, allergic reactions, pleural effusion, mechanical airway obstruction, pulmonary embolism, and hyperventilation.
C. Lung disorders can interfere with the exchange of oxygen and carbon dioxide that takes place during respiration.
D. Damage to the alveoli, separation of the alveoli from the pulmonary vessels by fluid or infection, obstruction of the air passages, or air or excess fluid in the pleural space can all cause interferences during respiration.
E. Giving too much oxygen to patients with long-standing lung diseases may depress or stop respirations.
F. Judicious use of oxygen is always an important priority in patients with dyspnea.
G. Patients often develop breathing difficulty and/or hypoxia with upper or lower airway infection.
H. Infectious diseases associated with dyspnea include epiglottitis, bronchitis, tuberculosis, pneumonia, and pertussis.
I. Lung and breath sounds are some of the most important vital signs you should assess when treating a patient in respiratory distress.
J. Signs and symptoms of breathing difficulty include wheezing, stridor, rales, and rhonchi; nasal flaring; pursed-lip breathing; cyanosis; inability to talk; use of accessory muscles to breathe; and sitting in tripod position.
K. Interventions for respiratory problems:
1. Providing oxygen via nonrebreathing mask at 15 L/min, positive-pressure ventilations using bag-mask device, pocket mask, or a flow-restricted, oxygen-powered ventilation device

2. Providing airway management techniques such as use of an oropharyngeal airway, nasopharyngeal airway, suctioning, or airway positioning

3. Positioning in a high Fowler’s position or a position of comfort to facilitate breathing

4. Assisting with respiratory medications found in a prescribed MDI or a small-volume nebulizer

**L. Rapid breathing may be a sign of poor oxygen flow as a result of respiratory distress.**

**M. In every case, prompt recognition of the problem, administration of oxygen, and prompt transport are essential.**

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**Post-Lecture**

**Unit Assessment**

1. What is the principal function of the lungs?

2. List five signs or symptoms of inadequate breathing.

3. What does SARS stand for, and how does this disease relate to a respiratory emergency in the prehospital setting for the EMT?

4. What condition is caused by fluid buildup in the space between the alveoli and pulmonary capillaries?

5. Describe the differences in assessment findings in patients with "wet lungs" versus patients with "dry lungs."

6. List three medical conditions in which a patient may experience dyspnea.

7. What is the term for low-pitched breath sounds that are caused by mucus in the airways?

8. What are the contraindications for using a metered-dose inhaler?

9. In what position should you transport COPD patients?

10. What is the difference between croup and epiglottitis in the pediatric population?