Workshop Respiratory Emergencies Competencies:
Dypsnea, Hyperventilation, Obstructed, Pediatric/Tracheostomy
Dyspnea: COPD, asthma, anaphylaxis

Equipment Required:

- EpiPen, Auvi-Q
- Metered dose inhaler

Competencies:

Preparatory competencies

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Medical, Behavioral, and OB/GYN competencies

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Proctor guidelines:

1. Have a discussion with the students about respiratory emergencies using the scenarios below and the teaching points.

Scenarios:

1. You arrive on scene of a 60-year-old male. The scene is safe and your gloves are on. The patient is complaining of shortness of breath. He is sitting in a chair on his front porch.

As you approach a patient complaining of shortness of breath what signs and symptoms do you look for? *Skin color, rate and effort of breathing, if you can hear any sounds when they breathe, coughing, patient position, if they look like they are in distress, LOC, if they are using anything to help them with their breathing (oxygen, inhaler, nebulizer treatment)*

As you approach this patient you note that he is using accessory muscles when he breathes, his respiratory rate is rapid, his skin color is normal, you hear wheezing, he is sitting up but leaning forward on his arms with his palms on the chair, he appears to have a normal LOC, and he is wearing a nasal cannula hooked up to an oxygen bottle.

Based on this assessment what do you think is causing his breathing difficulty and why? *Emphysema; because of his increased breathing rate and effort, he is wheezing, his skin*
color is normal, he is using home oxygen, he is sitting up but leaning forward on his arms with his palms on the chair

What is the position called where the patient is sitting up but leaning forward? The tripod position

What other signs and symptoms can a person with emphysema present with? A barrel chest, pursed lip breathing (puffing), thin appearance, breathlessness with activity in the early stages and continuously in the late stages, difficulty exhaling

What is the leading cause of emphysema? Smoking

What is the pathophysiology of emphysema? Lung tissue around the bronchioles is damaged causing them to collapse and trapping air in the alveoli, this causes airflow on exhalation to be slowed or stopped because the alveoli are overinflated, this does not allow gas exchange when a person breathes and also limits the amount of air a person can inhale, also the lungs lose elasticity, and the blood vessels of the lungs are damaged making it difficult for the blood to receive oxygen

What are the effects of decreased airflow on exhalation? Buildup of CO2, inability to bring in enough oxygen on inhalation, possible development of dependency on the hypoxic drive

What is the hypoxic drive and what are the negative affects of it? A respiratory drive in which the body uses oxygen level receptors instead of carbon dioxide level receptors to stimulate the respiratory cycle, this is due to chronically high levels of carbon dioxide in the blood causing the body to rely more on the oxygen receptors; negative affects are if the patient receives too much oxygen over a long period of time the body will decrease the rate of respiration

How would you treat and transport this patient? Oxygen 15 LPM non-rebreather mask, callALS, rapid transport, reassess every 5 min., in a seated position

Why would you place this patient on oxygen at 15 LPM with a non-rebreather mask if there is a concern that emphysema patients could have a dependency on the hypoxic drive? Do not withhold oxygen from a patient who is having obvious difficulty breathing and/or hypoxic, most emphysema patients do not have the hypoxic drive, complications of the hypoxic drive with high flow oxygen take a long period of time to develop and our transport times are not that long, if respirations slow lower the LPM and consider nasal cannula

2. You arrive on scene of a 65-year-old female. The scene is safe and your gloves are on. She is complaining of severe breathing difficulty and tells you that she has chronic bronchitis.

What signs and symptoms can a patient with chronic bronchitis present with? Chronic cough, excessive mucus possibly thick, wheezing, use of accessory muscles for breathing, shortness of breath usually upon exertion, cyanosis in advanced stages, possible altered LOC
What causes chronic bronchitis? *Inflammation of the trachea and bronchial tubes causing excessive secretions into the tubes that can narrow or close off the bronchial tubes, excess mucus is constantly produced, and protective cells and lung mechanisms that remove foreign particles are destroyed, all of this results in a significant decrease in the airflow to and from the lungs, this is a progressive disease that worsens over time, it can lead to right-sided heart failure and pneumonia*

When you conduct your primary assessment of the patient you hear wheezing in all four quadrants and she has a productive cough. Her respiratory rate is slightly rapid and she has some accessory muscle use. Her pulse is slightly rapid. She is not cyanotic and her LOC is normal.

What types of questions should you ask this patient or any patient about her breathing difficulty?

**SAMPLE:**

- **Signs and symptoms**—How do you feel? Can you describe your breathing difficulty? What symptoms are you feeling?, allergies—Do you have any allergies?, medications—Do you take any medications? What do you take the medications for?, pertinent medical history—Do you have a history of breathing difficulty? Have you been diagnosed with a condition that contributes to your breathing difficulty and what is it? How long have you had this condition?, last oral intake—When was the last time you ate or drank anything?, events leading up to the incident—What were you doing when this breathing difficulty started?

- **OPQRST:**
  - **Onset**—What were you doing when the breathing difficulty began? Was the onset sudden or gradual? Is this a chronic condition and if so when were you first diagnosed with this condition?, 
  - **Provocation**—Does anything make the breathing difficulty better or worse?, 
  - **Quality**—How does the breathing difficulty feel?, 
  - **Radiation**—Do you feel discomfort anywhere else?, 
  - **Severity**—On a scale of 1 to 10 how would you describe this breathing difficulty? 1 being the least breathing difficulty you’ve ever felt and 10 being the worst breathing difficulty you’ve ever felt, 
  - **Time**—How long has this particular incident been going on? Has it gotten better or worse since it began? Has it changed since it began?

Other important questions:

- Have you ever been hospitalized for this condition before? If so, how did they treat the breathing difficulty? How does this breathing difficulty incident compare to that one? What is your normal breathing like? Have you done anything prior to our arrival to help with your breathing difficulty and if so, what? Did it help? Do you have any other conditions that could contribute to this breathing difficulty? What made this incident bad enough for you to call 911?

How would you treat and transport this patient? Oxygen 15 LPM non-rebreather mask, call ALS, rapid transport, reassess every 5 min., in a seated position or position of comfort

3. You arrive on scene of a 32-year-old male. The scene is safe and you have your gloves on. The patient is sitting on a couch in his living room and his wife tells you that he's having an asthma attack.
What signs and symptoms can a patient with asthma present with? **Wheezing, shortness of breath, coughing, difficulty speaking, rapid breathing, use of accessory muscles, cyanosis, chest tightness, feeling anxious, no lung sounds due to no air movement, rapid pulse**

What is the pathophysiology of asthma? **The bronchi are chronically inflamed narrowing the airway passages, during an asthma attack the bronchi spasm (constrict) further narrowing the airways and excess mucus is also produced obstructing airways**

What can trigger an asthma attack? **Allergens, irritants, cold temperatures, exercise, respiratory infections, sudden stress**

You approach the patient and begin your primary assessment. You hear wheezing without using a stethoscope and can see that the patient is breathing rapidly and using accessory muscles. He is short of breath and his pulse is also rapid. When you ask him what is wrong he can only answer you one word at a time.

What does it mean that the patient can only answer you one word at a time? **He is having such a difficult time breathing that he does not have enough breath to speak more than one word at a time, it indicates his airways are severely constricted**

What medication can you assist the patient with, if he has it? **Metered dose inhaler**

What must you obtain before assisting the patient with his metered dose inhaler? **A set of vital signs, approval from medical control, the 6 rights of medication administration**

What are the 6 rights of medication administration? **Right medication- make sure the patient has the condition that the medication is prescribed for and that it is the correct medication, right route-make sure you administer the medication properly, right dose-make sure you do not administer more than the prescription calls for, right date-make sure that the medication has not expired, right patient-make sure that the medication is prescribed to the patient, right documentation-make sure you document all pertinent information pertaining to medication administration**

Assist the patient with the administration of his metered dose inhaler.

What should you do after administering the metered dose inhaler? **Reassess vital signs, reassess patient's breathing difficulty/condition**

When you reassess the patient's vital signs and breathing difficulty/condition what do you expect to find? **Increased pulse rate, decreased wheezing, decreased accessory muscle use, less rapid breathing, speaking more than one word at a time, and less shortness of breath**

How else would you treat and transport this patient? **Oxygen 15 LPM non-rebreather mask, call ALS, rapid transport, reassess every 5 min., in a seated position or position of comfort**
4. You arrive on scene of a 22-year-old female. Your gloves are on and the scene is safe. She's complaining of breathing difficulty and says it feels like her throat is closing up. She also states that she is allergic to nuts and she just ate a cookie that she was told afterwards contained nuts.

What do you think is happening to this patient? *She is having an anaphylactic reaction (anaphylactic shock)*

What are the signs and symptoms of an anaphylactic reaction? *Hives, itchiness, angioedema (swelling of tissues), difficulty breathing, airway swelling, dilation of blood vessels, low blood pressure, wheezing, stridor, difficulty swallowing, difficulty speaking, altered LOC*

What is anaphylaxis? *A severe allergic reaction with rapid onset that affects many body systems especially breathing*

How would you treat and transport this patient? *Oxygen 15 LPM non-rebreather mask, call ALS, reassess every 5 min., rapid transport, in a position of comfort, patient assisted EpiPen*

You place the patient on a non-rebreather mask at 15 LPM, call ALS, and start your history taking while your partner begins to get the patient's vital signs. You complete your history taking and your partner completes the patient's vital signs. Your patient has an EpiPen, you complete the six rights of medication administration, and medical control gives you permission to assist the patient with the EpiPen.

Assist the patient with the administration of her EpiPen.
Hyperventilation: prolonged seizures, hyperventilation, lower airway infection, industrial/chemical exposure, CHF

Equipment Required:

Adult airway manikin
Nasal airway
Adult non-rebreather mask with tubing
Oxygen tank

Competencies:

Preparatory competencies

| 4 | Must demonstrate the ability to assess a patient for breathing difficulty |

Airway competencies

| 2 | Must demonstrate ability to perform a jaw thrust during an airway scenario |
| 10 | Demonstrate how to insert NP airway during an airway scenario |
| 11 | Correctly operate O2 tanks and regulator |
| 12 | Demonstrate use of non-rebreather and adjust O2 flow requirements needed for use during airway scenario |

Medical, Behavioral and OB/GYN competencies

| 3 | Demonstrate emergency medical care for breathing difficulty in scenario |

Proctor guidelines:

1. Have a discussion with the students about respiratory emergencies using the scenarios below and the teaching points.

Scenarios:

1. You arrive on scene of a 28-year-old male having a seizure. Your gloves are on and the scene is safe. His friend tells you that the patient has a history of seizures.

What are important questions to ask about this seizure? *How long has this seizure been going on? Have there been multiple seizures without the patient regaining consciousness between them? If so, how many and for how long? Did the patient fall?*

The friend tells you that the patient has been in a continuous seizure for about 5 min. and that he did fall when the seizure began.

What is this type of seizure activity called? *Status epilepticus*
What is the definition of status epilepticus? A continuous seizure lasting more than 5 min. or multiple seizures without the patient regaining consciousness between them for more than 5 min.

Why is this condition considered life-threatening? The patient cannot control their airway when unconscious, blood and saliva can be aspirated, the tongue can block the airway, constant muscle contractions can interfere with the chest's ability to expand, the patient may not breathe properly or can become apneic during a seizure.

How would you treat this patient? Make sure that the area around the patient is free of any objects that could cause the patient further harm, obtain and maintain an open airway with an adjunct if necessary, suction if necessary, provide high flow oxygen with non-rebreather mask or bag valve mask if necessary, call ALS.

The patient is in a safe location and there are no objects around him that could cause further harm. He is not able to maintain an open airway.

What method would you use to open this patient's airway and why? Jaw thrust, because he fell.

Perform a jaw thrust on this patient.

You attempt a jaw thrust on the patient but due to the seizure activity you're unsuccessful.

What should you use to open the patient's airway? Oral airway.

You attempt an oral airway but due to the patient seizure activity his jaw is clenched shut.

What should you use to open the patient's airway? Nasal airway.

Insert a nasal airway.

He does not need suctioning but does require high flow oxygen.

Place the patient on oxygen at 15 LPM non-rebreather mask.

2. You arrive on scene of a 36-year-old male who is complaining of breathing difficulty. Your gloves are on and the scene is safe. He also states that he is dizzy and his feet and hands are tingling.

What do you think is causing his breathing difficulty? Hyperventilation syndrome (panic attack).

What are some other signs and symptoms of hyperventilation syndrome? Anxiety, numbness, rapid breathing, fainting, headache, contractions of the hands and feet, weakness.

The patient states that he has just been promoted at work and he is feeling very stressed about proving that he deserved the promotion. He appears to be breathing very rapidly.
How would you treat this patient? *Instruct the patient to slow his breathing down, speak to him in a very calm and reassuring voice, place him on oxygen if you cannot slow down his breathing with talking*

Is hyperventilation the same as hyperventilation syndrome? *No*

What is hyperventilation? *The level of arterial carbon dioxide falls below normal causing alkalosis (arise in pH levels)*

What is hyperventilation syndrome? *Hyperventilation caused by stress or anxiety resulting in a panic attack*

What are some other causes of hyperventilation? *Lung disease, head injury, stroke, reduced air pressure at high altitudes, pulmonary embolism, anemia, adverse reactions to drugs*

3. You arrive on scene of a 55-year-old female complaining of breathing difficulty. Your gloves are on and the scene is safe. She states that she hasn't been feeling well the past several days, is feeling very tired, has a productive cough, and has a fever.

What do you think is causing this patient's breathing difficulty? *Lower airway infection, possibly pneumonia*

What are the structures of the lower airway? *Trachea, bronchi, bronchioles, alveoli, lungs*

What structures of the respiratory system could be affected if this were an upper airway infection? *Nose, mouth, jaw, pharynx, larynx, epiglottis*

When you assess the patient you find her breathing rate is a little rapid and she is wheezing.

How would you treat and transport this patient? *Oxygen 15 LPM non-rebreather mask, call ALS, reassess every 5 min., rapid transport, in position of comfort*

**Proctor: reference page 3 of teaching points.**

4. You arrive on scene of a 45-year-old male complaining of breathing difficulty. Your gloves are on and the scene is safe. He works at a community pool and was gathering the chemicals to put in the pool when he started having trouble breathing. He states that he opened a container and a big cloud of the chemical came out of the container and got on his skin and he inhaled some.

What must be done with this patient before you can assess and treat him? *Decontamination*

What are some types of substances that people can be exposed to that can cause breathing difficulties? *Pesticides, chlorine, smoke from fires, smog, asbestos, mold, paint fumes, ammonia, pepper spray, certain forms of dust, turpentine, formaldehyde, bleach, etc.*
What is one area of the airway and breathing assessment that you should pay special attention to when assessing a patient that's been exposed to a toxic substance? Lung sounds

What are signs and symptoms of a person who has been exposed to a toxic substance that has caused an inhalation injury? Breathing difficulty, runny nose, throat irritation, coughing, excessive secretions, altered LOC, chest tightness, esophagus swelling, trachea swelling, lightheadedness, wheezing, rales, cyanosis

How would you treat and transport this patient after he was decontaminated? High flow oxygen 15 LPM non-rebreather mask, call ALS, reassess every 5 min., rapid transport

5. You arrive on scene of a 53-year-old female complaining of breathing difficulty. The scene is safe and you have your gloves on. She is sitting on a chair in her kitchen. You can visibly see she's having trouble breathing.

How would you assess her breathing difficulty? Listen to lung sounds, assess her airway, assess her breathing rate, assess her breathing effort, assess her breathing quality, look for signs of cyanosis, ask for any pertinent medical history, assess her LOC

When you assess the patient you find she has wet lung sounds (rales), rapid breathing, increased breathing effort, cyanosis around her lips, a history of breathing difficulty, rapid pulse, and a normal LOC. She does not remember the name of the type of breathing difficulty that she has. She does take medication for it and she says that the medication is supposed to help get rid of extra fluid.

Based on this assessment what do you think is causing her breathing difficulty and why? Congestive heart failure; because wet lung sounds (rales), rapid breathing and increased breathing effort, rapid pulse, cyanosis, history and medication information

What other signs and symptoms can a patient with congestive heart failure present with? Pedal edema, JVD, pink frothy sputum, high blood pressure, fatigue, altered LOC due to lack of oxygen

What is the cause of congestive heart failure? The heart is not pumping adequately so fluid builds up in the lungs and/or the body; left-sided heart failure fluid builds up in the lungs, right-sided heart failure fluid builds up in the peripheral

How would you treat and transport this patient? Oxygen 15 LPM on a non-rebreather, call ALS, rapid transport, reassess every 5 min., in a seated position

Why would you transport this patient in a seated position? Patients with wet lung sounds have fluid in their lungs and can breathe easier when seated. This is because when they lay down the fluid coats their entire lungs but when they are seated upright the fluid only covers the bottom of their lungs giving them more surface area to breathe.
**Obstructed: pneumothorax, pleural effusion, obstructed airway, pulmonary embolism, carbon monoxide**

**Equipment Required:**

- Non-rebreather mask with tubing
- Bag valve mask with tubing
- Oxygen tank
- Suction unit with suction tubing
- Nasal cannula
- Oral airway
- Adult airway manikin

**Competencies:**

**Preparatory competencies**

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**Medical, Behavioral and OB/GYN competencies**

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Scenarios:

1. You arrive on scene of an 18-year-old male. Your gloves are on and the scene is safe. He is complaining of breathing difficulty and has a sharp, stabbing pain localized on the right side of his chest. When you listen to his breath sounds you notice that they are decreased on his right side.

What do you think is causing this patient's breathing difficulty? Pneumothorax

What is a pneumothorax? Air in the pleural space around the lung caused by a disruption to the lung, this causes the vacuum in the pleural space that keeps the lung inflated to be lost

When you ask this patient his SAMPLE history he tells you he was watching TV when he started having a little chest pain on his right side. After about an hour the chest pain on his right side became worse and he started having trouble breathing. He has not had any trauma to the chest.

What type of pneumothorax is this and why? Spontaneous pneumothorax, because there is no trauma involved

What are risk factors for spontaneous pneumothoraces? People with asthma, lung infections, COPD, young people with weak areas of the lungs, tall thin males

How would you treat and transport this patient? Oxygen 15 LPM non-rebreather mask, call ALS, reassess every 5 min., rapid transport, in position of comfort

Place this patient a non-rebreather mask at 15 LPM.

2. You arrive on scene of a 47-year-old female having breathing difficulty. Your gloves are on and the scene is safe. She states she has a history of congestive heart failure and has been having trouble breathing today. She decided to call 911 when the breathing difficulty became worse. She thinks she might have a pleural effusion. She has had this in the past and recognizes the symptoms.

What is a pleural effusion? A buildup of fluid outside the lung in the pleural space usually caused by an underlying medical problem

Why can this cause a breathing difficulty? The fluid takes up space that the lung requires to inflate fully

What are the signs and symptoms of a pleural effusion? Difficulty breathing, sharp chest pain usually worse when taking a deep breath, pain can be referred to the abdomen or shoulder, dry nonproductive cough

How would you treat and transport this patient? Oxygen 15 LPM non-rebreather mask, call ALS, reassess every 5 min., rapid transport, in a seated position
When you attempt to place the patient on a non-rebreather at 15 LPM she states that she does not want the mask because it makes her feel claustrophobic. You still need to place her on oxygen.

What would you use to place this patient on oxygen had what would you set the LPM's at? *Nasal cannula at 2-6 LPM's*

Place the patient on a nasal cannula at 2-6 LPM's.

3. You arrived on scene of an unconscious 21-year-old female. Your gloves are on and the scene is safe. She is laying on the floor of a college dorm room. Her roommate states that last night was the patient's 21st birthday and a large group of friends took her out drinking. The patient was very drunk when they got back to the room and she fell asleep on the floor. When the roommate woke up this morning she was unable to wake up the patient so she called 911.

After establishing that the patient is unconscious what should be your next assessment steps? *Check the airway, assess the rate and quality of respirations, listen to breath sounds, assess the adequacy of the breathing effort*

While assessing the patient's airway and breathing you discover that the patient cannot maintain her airway, there is a large amount of vomit in her mouth and airway, she's making snoring sounds when breathing, and her breathing is inadequate.

What should you do to establish a patent airway and adequate breathing? *Open her airway with a head tilt chin lift, insert an oral airway, suction the vomit, and place her on oxygen 15 LPM non-rebreather mask*

Open the airway with the head tilt chin lift, insert an oral airway, suction the patient's airway, and place the patient on oxygen 15 LPM non-rebreather mask.

If, after opening the patient's airway, inserting the oral airway, and suctioning the patient, the patient was breathing slowly and shallow what would you do? *Assist the patient with ventilations using the bag valve mask*

If you encounter a conscious patient who is has a foreign body airway obstruction what should you do? *The Heimlich maneuver (abdominal thrusts)*

If you encounter an unconscious patient who has a foreign body airway obstruction what should you do? *CPR, before giving breaths check in the mouth for the object, never do a blind finger sweep*

4. You arrive on scene of a 40-year-old male having breathing difficulty. Your gloves are on and the scene is safe. The patient states he was walking back into his house after checking his mail when he suddenly started having trouble breathing and chest pain that is worse when he inhales. He is sitting on a chair in his living room. You begin your assessment and asked him SAMPLE questions. He tells you he has no other symptoms, is not allergic to anything, is on no medication, broke his leg four days ago and no other medical history, ate breakfast about two hours ago, and was walking into his house when
he suddenly started having trouble breathing and chest pain. You notice he's breathing rapidly and his lips are becoming cyanotic.

What do you think is causing this patient's breathing difficulty and why? Pulmonary embolism, because it had a sudden onset, he has no medical history of respiratory disorders, he broke his leg four days ago, the breathing difficulty is combined with chest pain that is worse when he inhales, also the rapid breathing and cyanosis

What is a pulmonary embolism? Blockage of a blood vessel in the lung by a blood clot or other substance that has traveled from somewhere else in the body through the bloodstream

What are risk factors for a pulmonary embolism? Deep vein thrombosis, cancer, prolonged bed rest, surgery, smoking, certain forms of birth control, pregnancy, poor circulation

What are some signs and symptoms of a pulmonary embolism? Difficulty breathing, chest pain usually worse an inspiration, coughing up blood, cyanosis, rapid breathing, hypoxia, sudden onset of symptoms, sudden death

You place the patient on oxygen at 15 LPM non-rebreather mask and begin to transport him. You are going to meet ALS in route to the hospital. As you are transporting the patient he goes unconscious and stops breathing.

What should you do next? Establish that the patient is unconscious, check to see if he has a pulse, open his airway, insert an oral airway, assist the patient with ventilations using the bag valve mask

The patient is unconscious and does have a pulse.

Open the patient's airway with the head tilt chin lift, insert an oral airway, and ventilate the patient with a bag valve mask.

5. You arrive on scene of a 27-year-old female who is currently sitting in the front seat of a car in the parking lot of her apartment complex. Your gloves are on and the scene is safe. The fire department tells you that the patient has been using a portable heater to heat her small apartment for the past several days and has not been out much due to the cold and that they found high levels of carbon monoxide in her apartment.

What is carbon monoxide? Odorless, colorless, tasteless, highly toxic gas

What are the signs and symptoms of carbon monoxide poisoning? Headache, dizziness, lightheadedness, flu-like symptoms, confusion, nausea, fatigue, hallucinations, unsteady gait, seizures, altered LOC, cardiac issues, unconsciousness, respiratory arrest, death

Why is exposure to too much carbon monoxide dangerous? The carbon monoxide combines with the hemoglobin of your red blood cells instead of oxygen keeping the oxygen from reaching tissues and organs
What are some common sources of carbon monoxide poisoning? *House fires, automobile exhaust, gas heaters, furnaces, wood or charcoal stoves, kerosene heaters, gasoline powered tools, generators, typically exposure occurs in enclosed or poorly ventilated spaces.*

How do you treat and transport carbon monoxide poisoning patients? *Remove patient from location of high carbon monoxide levels, high flow oxygen 15 LPM non-rebreather mask, call ALS, reassess every 5 min. rapid transport.*

Can you rely on the pulse oximeter reading of a patient with carbon monoxide poisoning? Why? *No, because they pulse oximeter will read the hemoglobin with carbon monoxide the same as hemoglobin with oxygen.*
Pediatric/Tracheostomy

Equipment Required:

- Child airway manikin
- Pediatric bag valve mask with tubing
- Pediatric non-rebreather mask with tubing
- Pediatric nasal cannula
- Oxygen tank
- Infant CPR manikin
- Pediatric oral airway
- Suction unit with tubing
- Tracheostomy airway manikin
- Adult bag valve mask with tubing

Competencies:

Preparatory competencies

| 4 | Must demonstrate the ability to assess a patient for breathing difficulty |

Airway competencies

| 1 | Must demonstrate ability to perform a chin-lift during an airway scenario |
| 3 | Must demonstrate ability to perform suctioning during an airway scenario using soft/rigid suction devices |
| 5 | Must demonstrate ability to assemble, connect to O2 and ventilate during airway scenario using BVM |
| 6 | Must demonstrate ability to ventilate using a BVM for 1 min each demonstration |
| 8 | Demonstrate how to artificially ventilate patient w/stoma |
| 9 | Demonstrate how to insert OP airway during an airway scenario |
| 11 | Correctly operate O2 tanks and regulator |
| 12 | Demonstrate use of non-rebreather and adjust O2 flow requirements needed for use during airway scenario |
| 13 | Demonstrate use of nasal cannula and adjust O2 flow requirements needed for use during airway scenario |
| 14 | Demonstrate how to artificially ventilate an infant and child during scenario |
| 15 | Demonstrate O2 administration to infants and children |

Medical, Behavioral and OB/GYN competencies

| 3 | Demonstrate emergency medical care for breathing difficulty in scenario |
Infants and Children and Operations competencies

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Proctor guidelines:

1. Have a discussion with the students about respiratory emergencies using the scenarios below and the teaching points.

Scenarios:

1. You arrive on scene of a two-year-old boy having breathing difficulty. Your gloves are on and the scene is safe. The mother tells you that her son has been sick for the past 4 days. Yesterday he started having this strange cough and hoarseness. She also says that it seems to get worse at night. It is 9:30 PM.

What do you think is causing this breathing difficulty? *Croup*

What is croup? *Inflammation and swelling of the pharynx, larynx, and trachea, usually caused by a viral infection*

What typical age group is croup seen in? *Children between six months and three years of age*

What are the signs and symptoms of croup? *Barking cough, stridor, hoarseness, difficulty breathing, fever, illness, stuffy or runny nose, breathing symptoms usually worse at night*

When you assess the child you find he's breathing rapidly, has mild retractions, and he has a barking cough.

How would you treat and transport this patient? *Try not to upset the child, oxygen 15 LPM non-rebreather mask, call ALS, reassess every 5 min., rapid transport, in position of comfort*

What type of oxygen is recommended for croup if possible? *Humidified*

Place the child on oxygen with a non-rebreather mask at 15 LPM.

If the child becomes too agitated or will not accept a non-rebreather mask on his or her face how do you administer oxygen? *Blow by, hold the mask as close to the child's face as the child will allow*

2. You arrive on scene of a five-year-old girl having breathing difficulty. Your gloves are on and the scene is safe. The father tells you that his daughter not feeling well a couple of hours ago and her condition has progressively gotten worse. He decided to call 911 when
she started having trouble breathing and making a high-pitched noise when she breaths. He also tells you that his daughter is not acting right. She's normally very active and talkative but currently she is not talking and is sitting very still on the couch.

What do you think is causing this child's breathing difficulty? *Epiglottitis*

What are the signs and symptoms of epiglottitis? *High fever, stridor, breathing difficulty, hoarseness, sore throat, anxiety, retractions, refusal to eat, drooling, tripoding, wide open mouth with tongue sticking out, cyanosis, respiratory arrest, symptoms progress rapidly*

What is epiglottitis? *Inflammation of the epiglottis usually as a result of a bacterial infection*

What is the epiglottis? *A flap that opens during breathing allowing air into the trachea and closes during swallowing directing food to the esophagus*

Why is epiglottitis considered a life-threatening condition? *As the epiglottis swells it begins to obstruct the trachea, blocking the flow of air into the lungs, and if nothing is done to stop the swelling or keep the airway open with an advanced airway it will eventually completely obstruct the airway*

How would you treat and transport this child? *Keep the child very calm and try not to make them cry, oxygen at 15 LPM non-rebreather mask, call ALS, rapid transport, reassess every 5 min., in position of comfort, do not look in the child's mouth or do any hands-on assessment of the airway*

If the child stops breathing what should you do? *Perform head tilt chin lift, ventilate using a bag valve mask at 15 LPM*

Why might ventilating using a bag valve mask be ineffective? *If the swollen epiglottis completely covers the trachea no air will be able to enter the lungs*

Perform a head tilt chin lift and ventilate the child with a bag valve mask at 15 LPM.

3. You arrive on scene of a three-year-old boy having breathing difficulty. Your gloves are on and the scene is safe. The father tells you his son has been diagnosed with pertussis.

What is pertussis also called? *Whooping cough*

What are the signs and symptoms of pertussis (whooping cough)? *Coughing, forceful coughing fits, a whooping sound on inspiration after coughing fits, fainting after coughing, vomiting after coughing, exhaustion, difficulty breathing, cyanosis, apnea especially in infants*

What are some complications of pertussis? *developing pneumonia, dehydration, weight loss, due to coughing fits- fractured ribs, pneumothorax, loss of bladder control*
Why must you as a provider take extra BSI precautions when treating and transporting a patient with pertussis? *Pertussis is highly contagious and is an airborne disease*

Why is there an increased number of cases of pertussis? *Increased awareness, better diagnostic tests and reporting, more circulation of the bacteria, and waning immunity because vaccines do not provide lifelong protection*

When you assess the child you witness a coughing fit. After the coughing fit the child takes several deep breaths, which make a whooping sound. He also appears exhausted. You ask the father why he called 911 and he states that the coughing fits are getting worse and sometimes his son becomes a little blue around the lips during the coughing fits.

How would you treat and transport this child? *Oxygen at 15 LPM non-rebreather mask, suction if necessary, call ALS, reassess every 5 min., rapid transport, in position of comfort*

If the child refuses to wear the non-rebreather mask what other oxygen delivery device can you use? *Nasal cannula at 2-6 LPM*

Place the child on oxygen with a nasal cannula at 2-6 LPM.

4. You arrive on scene of a 10-year-old girl having breathing difficulty. Your gloves are on and the scene is safe. Her mother tells you she has cystic fibrosis.

What is cystic fibrosis? *A genetic disorder that affects the lungs and digestive system, causes the body to produce thick sticky secretions that obstruct the lungs, pancreas, liver, and intestines*

What are the signs and symptoms of cystic fibrosis? *Breathing difficulty, thick sticky mucus, coughing, sinus infections, poor growth and weight gain, bowel obstruction, frequent chest infections, pancreatitis, heartburn, liver disease, clubbing of fingers and toes, cystic fibrosis related diabetes, coagulation problems, difficulty absorbing nutrients, infertility*

When you assess the patient you find she is breathing rapidly, is coughing up thick mucus, has retractions, and cannot speak more than a couple words at a time. Her mother tells you that the daughter has a lung infection.

How would you treat and transport this patient? *Oxygen at 15 LPM non-rebreather mask, suction as necessary, call ALS, reassess every 5 min., rapid transport, in position of comfort*

You determine that she needs suctioned.

Suction the patient's airway.

As you are transporting the child, meeting ALS in route, she suddenly becomes limp. When you reassess her you find she is not breathing but does have a pulse.
How would you treat this patient now? *Perform head tilt chin lift, insert oral airway, ventilate with a bag valve mask at 15 LPM*

Perform a head tilt chin lift, insert an oral airway, and ventilate the child with a bag valve mask at 15 LPM.

5. You arrive on scene of a 10-month-old infant girl choking on a Lego. Your gloves are on and the scene is safe. The mother says that the infant was crawling and she saw her pick up the Lego and put it in her mouth before the mother could reach her. The mother called 911 as soon as she noticed that the infant was choking. When you assess the infant you can see she is conscious, blue around the lips, is not making any sounds, and is attempting to breathe but is unable to.

What should you do? *Do five back blows, five chest thrusts, and repeat until the object comes out or the infant goes unconscious*

Perform five back blows and five chest thrusts.

**Proctor:** have the student perform two sets of back blows and chest thrusts. Make sure the student does not cover the infant mouth when performing the back blows. Also, make sure the student keeps the infant’s body angled towards the floor.

The infant goes unconscious.

What should you do? *CPR, look in the infant’s mouth before delivering breaths, if you see the object remove it, never do a blind finger sweep*

6. You arrive on scene of a five-month-old infant boy having breathing difficulty. Your gloves are on and the scene is safe. The father states that his son has been diagnosed with RSV.

What is RSV? *respiratory syncytial virus, usually affects young children, causes infections of the respiratory tract*

What are the two most common illnesses RSV can lead to? *Bronchiolitis and pneumonia*

What is bronchiolitis? *Bronchioles become inflamed, swell, and fill with mucus*

What are the signs and symptoms of bronchiolitis? *Coughing, wheezing, shortness of breath, rapid breathing, lethargy, poor feeding, retractions, cyanosis, fever*

How could you differentiate between bronchiolitis and pneumonia? *Bronchiolitis usually starts similar to a common cold, pneumonia has symptoms closely resembling the flu and usually a higher fever sometimes with chills and muscle pain, it is very difficult to distinguish between the two and might require a chest x-ray, treatment for both is the same*
When you assess the infant you find his breathing rapidly, you hear audible wheezing, he is coughing, and he has some retractions.

How would you treat and transport this infant? *Blow by oxygen 15 LPM non-rebreather mask, call ALS, reassess every 5 min., rapid transport, in position of comfort*

Deliver blow by oxygen at 15 LPM with a non-rebreather mask.

7. You arrived on scene at a 37-year-old female having breathing difficulty. Your gloves are on and the scene is safe. As you approach the patient you see that she has a tracheostomy tube.

What are some issues patients with tracheostomy tubes can have? *Bleeding, leaking, dislodgment, infection, obstruction*

If the tube is obstructed what should you do? *Suction to clear the obstruction, apply oxygen 15 LPM with mask over tracheostomy tube if necessary, ventilate with bag valve mask if necessary*

Ventilate a tracheostomy tube with a bag valve mask.
TEACHING POINTS FOR RESPIRATORY EMERGENCIES

Patient’s often complain of breathing difficulty. This is an impediment of the normal respiratory process and can lead to dyspnea which is feeling short of breath or having trouble breathing. It can be caused by many medical conditions for example: Asthma, Heart failure, pulmonary embolism, and the common cold.

ANATOMY RESPIRATORY SYSTEM

RESPIRATORY SYSTEM – consists of all structures of body that contribute to the breathing process. These are: 1) Diaphragm (muscles of chest wall); 2) chest wall muscles; 3) accessory muscles; 4) nerves to those muscles

Upper Airway: (all anatomic structures above vocal cords) includes: nose and mouth (air is filtered, warmed and humidified), jaw, oral cavity, pharynx, larynx. Upper airway ends at the larynx which is protected by the epiglottis (leaf shaped valve which diverts food/fluid into esophagus and air into the trachea and then into the lungs.

Lower Airway: Principal function of the lungs is respiration, the exchange of oxygen and carbon dioxide. Within the lungs the air travels through the bronchus (large airways) then into the bronchioles (smaller airways) and finally into the alveoli (microscopic thin walled air sacs) where the exchange of oxygen and carbon dioxide takes place.

PHYSIOLOGY OF RESPIRATION – Two processes occur during respiration. Inspiration is the inhaling or breathing in; Expiration is exhaling or breathing out. In healthy lungs the exchange of gases takes place at the level of the alveoli. Alveoli lie against the pulmonary capillary vessels, oxygen passes freely through tiny passages in the alveolar wall into the pulmonary capillaries. The carbon dioxide is diffused back into the alveoli, then travels up the bronchial tree and exits through the upper airways during exhalation. During this process of respiration, the brainstem constantly monitors the level of carbon dioxide in arterial blood. If the level drops too low, the person will breathe at a slower rate and less deeply. This results in less carbon dioxide being expired and the level in the blood returns to normal. If the carbon dioxide rises above normal the person will breathe more rapidly and more deeply which diffuses more carbon dioxide out of the blood, thus lowering the levels in the blood.

PATHOPHYSIOLOGY – this refers to conditions where the body processes are not working properly and interfere with normal respiration. The proper exchange of oxygen and carbon dioxide can be hindered by abnormal or pathologic conditions in the anatomy of the airway, disease processes, traumatic conditions, pulmonary vessels with abnormalities that interfere with blood flow. It is critical to immediately recognize the signs and symptoms of inadequate breathing and treat it.

Carbon Dioxide Retention and Hypoxic Drive – Some patients have an elevated level of carbon dioxide in their arterial blood. Potential causes: Lung disease
that impairs the exhalation process; the body naturally produces too much carbon dioxide. If the carbon dioxide levels stay high for a period of years, the respiratory center in the brain may not function properly. Failure of this center to have a normal response to the rise in carbon dioxide is caused by chronic carbon dioxide retention. When this condition is severe, respiration will stop unless there is a secondary drive. This drive is the hypoxic drive. It senses the low amount of oxygen in the blood which causes the respiratory center to respond and stimulate respiration. Patients with chronic lung disease can have high levels of carbon dioxide in their blood, since they use the hypoxic drive, giving them too much oxygen may depress or stop respiration. Administer low-flow oxygen and adjust higher until symptoms improve. DO NOT withhold oxygen for fear of depressing or stopping their breathing. Administer oxygen to a patient with dyspnea and monitor the patient. Be prepared to provide positive-pressure ventilation if needed. (See Table 13-2)

CAUSES OF DYSPNEA – can be caused by many medical conditions. A brain deprived of oxygen will cause an altered mental status (hypoxia of the brain). These patients may not be alert enough to complain about shortness of breath. Some medical conditions causing difficulty breathing are:

- Upper and lower airway infection
- Acute pulmonary edema
- Chronic obstructive pulmonary disease (COPD)
- Asthma
- Hay fever
- Anaphylaxis
- Spontaneous pneumothorax
- Pleural effusion
- Prolonged seizures
- Obstruction of the airway
- Pulmonary embolism
- Hyperventilation syndrome
- Environmental/industrial exposure
- Carbon monoxide poisoning
- Infectious diseases

When treating patients with disorders of the lungs, be aware one or more of the following might be present:

- Gas exchange between the alveoli and pulmonary circulation can be obstructed by fluid in the lung, infection or collapsed alveoli (atelectasis)
- Alveoli might be damaged and cannot transport gases efficiently across their own walls
- Air passages can be obstructed by muscle spasm, mucus, or weak floppy airway walls
- Blood flow to lungs is obstructed by blood clot
- Pleural space filled with air or excessive fluid, preventing proper lung expansion
All of the above prevent proper exchange of oxygen and carbon dioxide, also the pulmonary blood vessels may have abnormalities that interfere with blood flow thus the transfer of gases.

Patients with dyspnea, along with complaining of shortness of breath may also have the sensation of chest tightness and air hunger. Dyspnea is common complaint in patients with cardiopulmonary diseases. Congestive Heart Failure causes inefficient pumping of the heart which causes inadequate oxygen to the body/cells. Pulmonary edema (associated with CHF) – alveoli filled with fluid. Patients in severe pain may experience rapid, shallow breathing without any type of primary pulmonary problems. Some patients experience severe pain caused by expansion of the chest wall as they breathe.

*Upper or Lower Airway Infection* - infectious disease causing dyspnea may affect all parts of the airway. Some cause mild discomfort, some obstruct the airway. Problems that impair the flow of air through airways are problems of respiration. Difficulty providing adequate oxygen to tissues due to lack of oxygen in the air is a problem of oxygenation. Problem causing dyspnea is always a form of obstruction either to the flow of air through major passages (cold, diphtheria, epiglottitis, croup) or to the exchange of gases between alveoli and capillaries. (pneumonia). (See table 13-4)

Treatment: provide humidified oxygen, position of comfort, transport promptly.

*Acute Pulmonary Edema* – Sometimes heart muscle injured from heart attack or illness and cannot circulate blood properly. Left side of the heart cannot remove blood from the lung as fast as the right side delivers it. Thus fluid builds up within the alveoli and in lung tissue leading to pulmonary edema. This condition is usually a result of congestive heart failure. The edema interferes with gas exchange since it causes the alveoli to separate from the pulmonary capillary vessels. There is not enough space in the lung to allow for slow deep breaths so the patient will experience dyspnea with rapid, shallow respirations. In severe cases a pink frothy sputum will be seen at the nose and mouth. Pulmonary Edema is one of the most common causes of hospital admission in the US. It is common for these patients to have repeat bouts. Not all causes of pulmonary edema are heart related, it can also be caused by inhaling large amounts of smoke or toxic chemical fumes, traumatic chest injury and exposure to high altitudes.

Treatment: provide 100% oxygen, suction if necessary, position of comfort, prompt transport.

*Chronic Obstructive Pulmonary Disease* - (COPD) slow process of dilation and disruption of the airways and alveoli caused by chronic bronchial obstruction. Reported to affect 12.1 million adults over 25 years of age. It is the fourth (4th) leading cause of death.

Tobacco smoke is a bronchial irritant and can create chronic bronchitis which is an ongoing irritation of the trachea and bronchi. With Bronchitis, excessive
Mucus is constantly produced obstructing small airways and alveoli, lung mechanism and protective cells that remove foreign particles are destroyed, airways are further weakened. Oxygenation problems becomes chronic and can lead to right heart failure, fluid retention and the obstructed air passages lead to pneumonia. As these episodes repeat the lungs become scarred and the obstructed alveoli dilate which leads to COPD.

Emphysema is loss of the elastic material around the air spaces caused by the chronic stretching of the alveoli. Smoking can directly destroy the elasticity of the lung tissue. Normal lungs are a spongy balloon able to inflate. When inflated they naturally recoil which expels the air. When constantly obstructed and elasticity is diminished, the air can no longer be expelled rapidly thus the alveoli fall apart and leave holes in the lungs resembling air pockets or cavities. This is called emphysema.

Most patients with COPD have elements of both chronic bronchitis and emphysema. Some exhibit more elements of one condition than the other, few will have only emphysema or bronchitis. Most patients with COPD will chronically produce sputum, have chronic cough, and difficulty expelling air from lungs, long expiration phases and wheezing. These patients may present with abnormal breath sounds, (rales, crackles, rhonchi and wheezes).

*Wet cardiac lungs, versus dry lungs, and asthma – Don’t assume all COPD patients have wheezing and all CHF patients have rales. Treat the patients, not the lung sounds.*

Lung sounds can be confusing in making a diagnosis. A patient with CHF would be expected to present with pedal edema, JVD, or rales but instead of rales you might hear wheezing. This is because the alveoli are so full of fluid, the bubbles that create the sound of rales cannot form and the bronchi have constricted which produces wheezing. This is “Cardiac Asthma”

Patients with COPD may wheeze because of bronchial constriction and have shortness of breath. The breathing will get worse over time and exertion makes it worse. It is possible that their air passages are so constricted you won’t hear anything. They will also have chronic coughing and thick sputum. They usually have been long term smokers and have a thin barrel chest appearance. Medications these patients have are home oxygen, bronchodilators, and corticosteroids. COPD patients have a slower onset of symptoms because their disease has been made worse by infection and stressors. Patients with CHF will experience fluid overload in the lungs which can develop quickly from the failing pump.

Your questioning regarding symptoms, medical history and current medications should thorough as your physical assessment of lung sounds and or symptoms may not fit completely into what you expect to see with COPD or CHF.

Treatment: Assist with prescribed inhaler (watch for side effects), position of comfort, prompt transport
**Asthma, Hay Fever and Anaphylaxis** – all result of an allergic reaction to an inhaled, ingested or injected substance. The substance (allergen) is not the cause of the allergic reaction rather it is an exaggerated response by the body’s immune system to the substance.

**Asthma** – acute spasm of the smaller air passages (bronchioles), associated with excessive mucus production and swelling of the mucous lining of the respiratory passages. Affects all ages, most prevalent in children 5 to 17 years of age.

Asthma produces characteristic wheezing as patient exhales (caused by partially obstructed airways). Wheezing indicative of partial lower airway obstruction, same airways open during inhalation and may be so loud that you can hear it without a stethoscope. In some cases the airways are so blocked that no air movement is heard. Exhaling becomes difficult and tires the patient, if not corrected the patient will be cyanotic or respiratory arrest may rapidly develop. Acute asthma attack can be caused by allergic response, other causes can be severe emotional stress, exercise, respiratory infection. In its most severe form the allergic reaction will cause anaphylactic shock, which may lead to respiratory distress severe enough to result in coma and death. Most patients with asthma are knowledgeable about their symptoms and know when an attack is coming, normally they have their medication with them. Listen to the needs of the patient, they know exactly what they need. These patients can be treated with a patient assisted medication – inhaler or nebulizer.

**Status Asthmaticus** is a prolonged asthma attack unrelieved. These patients will be frightened, frantically trying to breathe using all accessory muscles. This is a true emergency.

Treatment: determine is asthma is the problem, assist with prescribed inhaler, provide aggressive airway management, Oxygen, if assisting with ventilations use slow, gentle breaths, suction if necessary, call ALS and prompt transport

**Hay Fever (Allergic Rhinitis)** – causes cold like symptoms – runny nose, sneezing, congestion and sinus pressure. These symptoms are caused by allergic reaction, usually to outdoor or indoor airborne allergens (pollen, dust mites and pet dander). Usually worse during spring and summer, but some have symptoms year round. Generally these people do not call 911. They may also be atopic (more likely to have other allergies) and may have higher incidence of severe reactions including anaphylaxis.

Treatment: unlikely to need emergency treatment, manage airway and give oxygen according to level of distress

**Anaphylactic Reactions** - anaphylaxis is severe allergic reaction, can produce severe airway swelling, dilation of blood vessels all over the body which can lower blood pressure – this is referred to as anaphylactic shock. Anaphylaxis is associated with widespread itching, (hives), and signs similar to asthma, the airway may swell so much that it becomes total obstructed in just a matter of minutes. Most anaphylactic reactions occur within 30 minutes of exposure.
Some patients may or may not be aware they have the sensitivity to a specific substance so may have no idea what caused it. Other patients know what they have a reaction to. An anaphylactic reaction is a life threatening emergency.

In severe cases epinephrine is treatment of choice, patients may carry their own prescribed EpiPen auto-injector

Treatment: remove offending agent, maintain airway, oxygen, be prepared to assist breathing as needed, ALS, rapid transport and assist patient with his or her EPIPen, and antihistamines can also be administered.

*Spontaneous Pneumothorax* - Pneumothorax is partial or total accumulation of air in the pleural space, often caused by trauma; but can also be caused by some medical conditions – when caused by a medical condition it is labeled as a “spontaneous” pneumothorax. Normally a vacuum pressure in pleural space keeps lungs inflated. If the surface of the lung is disrupted air is allowed to escape into the pleural cavity and the negative vacuum pressure is lost. Thus the natural elasticity of the lung tissue causes the lung to collapse. The accumulation of air can be mild or severe.

A spontaneous pneumothorax can occur in patients with certain lung infections or in young people born with weak areas of the lung. Patients with emphysema and asthma are at higher risk, also tall, thin males are at higher risk especially is performing strenuous activity.

These patients become short of breath (dyspneic), might complain of pleuritic chest pain (sharp stabbing pain on one side worse during inspiration and expiration or with certain movement of the chest wall). Listening to the chest with stethoscope you may be able to notice breath sounds are absent or decreased on the affected side. If the spontaneous pneumothorax occurs in someone with emphysema - the altered breath sounds may be difficult to detect. The spontaneous pneumothorax has potential to become life-threatening. Continually reassess the patient for anxiety, increased dyspnea, hypotension, absent or severely decreased breath sounds on one side, JVD and cyanosis.

Treatment: supplemental oxygen, prompt transport, position of comfort, monitor carefully

*Pleural Effusion* – collection of fluid outside the lung on one or both sides of chest. Compresses the lung(s) and causes dyspnea. Fluid is response to an irritant, infection, CHF, or cancer. Fluid itself gradually builds up (over days or weeks) but patient may report the dyspnea come on suddenly. When auscultating the chest you will hear decreased breath sounds over the area of the chest where the fluid has moved the lung away from the chest wall. Patients feel better is they are sitting upright. Only definitive treatment is removal of fluid done by physician.

Treatment: fluid removal done at hospital, oxygen, prompt transport
**Prolonged Seizures:** Seizures caused by disruption in electrical activity in brain. Tonic-clonic seizure – patient will have sudden loss of consciousness, tonic-clonic movement of the body and is often incontinent. Typically this seizure lasts a few minutes and the patient regains consciousness. Occasionally the seizure will reoccur every few minutes without the patient regaining consciousness – this is status epilepticus and can be life threatening.

During the brief seizure (1 to 3 minutes) the patient may have some impaired breathing. In a prolonged seizure, there are a number of issues that arise 1) the patient has no control over their airway while unconscious, 2) the patient can aspirate blood or saliva into the airway, 3) if the patient is lying supine, their tongue may obstruct the airway, 4) the constant muscle contractions caused by the seizure interfere with chest expansion so the patient may hyperventilate and become hypoxic, 5) the patient may become apneic. Other issues with prolonged seizure activity are: hyperthermia, dehydration, and hypoglycemia.

Treatment: ALS or hospital needed, when seizure stops provide aggressive airway management, rapid transport

**Obstruction of the airway** – Always be aware of possibility that dyspnea may be the result of a mechanical obstruction which must be treated quickly. If semiconscious or unconscious the obstruction may be caused by aspiration of vomit or a foreign object, improper positioning of the head. If the patient was eating before the dyspnea began consider foreign body obstruction.

Treatment: partial obstruction provide oxygen and transport; Complete obstruction – clear obstruction and oxygen, rapid transport

**Pulmonary Embolism** - Embolus is anything in the circulatory system that moves from its point of origin to a distant site and lodges there, obstructing the blood flow in that area. Beyond the obstructed point, circulation can be completely stopped or markedly decreased. Emboli can result in a serious, life-threatening condition. The emboli itself can be fragments of blood clots that have broken away and are now traveling thru the bloodstream, or they can be foreign bodies that enter the circulatory system such as an air bubble.

Pulmonary embolism is the passage of a blood clot formed in a vein that breaks off and circulates through the venous system. The clot moves through the right side of the heart and into the pulmonary artery and becomes lodged which significantly decreases or blocks blood flow to the lung. The lung itself is working correctly but due to the block or decrease blood flow the exchange of gases stops or is significantly decreased. Thus the levels of arterial carbon dioxide rise and oxygen levels drop causing cyanosis. Severity is directly related to the size of the embolism and amount of tissue involved. A pulmonary emboli may occur as result of damage to lining of vessels, tendency for blood to clot rapidly, or most often slow blood flow in a lower extremity (long term bed rest, long travel time with legs in a dependent position). It is rare for this to occur in an active, healthy individual.
The pulmonary embolism is fairly common but difficult to diagnose. Signs and Symptoms are: dyspnea, acute chest pain, hemoptysis (coughing up blood), cyanosis, tachypnea, varying degrees of hypoxia. If the embolus is large enough and causes complete sudden obstruction of the blood from the right side of the heart it can result in sudden death.

Treatment: supplemental oxygen, position of comfort, if hemoptysis clear airway immediately, prompt transport

*Hyperventilation* – defined as over breathing to the point that the level of arterial carbon dioxide falls below normal. This can be an indicator of a life-threatening illness. Examples are: a patient who is diabetic with high blood glucose levels, patient who has taken an overdose of aspirin, or a patient with a severe infection. In these cases the body tries to compensate for acidosis (buildup of excess acid in the blood or body tissue resulting from the primary illness). Lowering the level of carbon dioxide helps compensate for the other acids.

In a healthy person the blood acidity can be lowered by excessive breathing because it “blows off” too much carbon dioxide. This results in a lack of acids and results in alkalosis (buildup of excess base (lack of acids) in body fluids).

Alkalosis is cause of many symptoms of hyperventilation syndrome (panic attack). Symptoms are: anxiety, dizziness, numbness, tingling of the hands and feet and even sense of dyspnea, despite rapid breathing. Hyperventilation syndrome occurs in the absence of other physical problems, commonly when person experiences psychological stress. Respirations may be as high as 40 shallow breaths/min or as low as 20 very deep breaths/min.

Determination whether hyperventilation is caused by a life-threatening illness or panic attack is not made pre-hospital. Treatment is to initially tell the patient to slow his or her breathing, if that does not work give supplemental oxygen and transport.

Treatment: complete primary assessment, gather history, provide supplemental oxygen, prompt transport. (Do not have patient breath into paper bag)

*Environmental/Industrial Exposure* - Pesticides, cleaning solutions, chemicals, chlorine and other gases can accidently be released at industrial sites. Carbon monoxide is odorless, highly poisonous gas resulting from incomplete oxidation of carbon in combustion and is produced in industrial settings by vehicles, gasoline-powered tools and heaters. The mixing of ammonia and chlorine bleach creates a hazardous by-product. This can happen at an industrial site or in homes. Generally industrial sites have their own hazmat teams or stations for decontamination. The onsite teams are trained to treat exposure to chemicals used at the site. Any exposed patient must be decontaminated, and then gather information related to the substance and the cause of the dyspnea. Assess the patient paying special attention to lung sounds. Inhalation injuries can cause aspiration
pneumonia eventually resulting in pulmonary edema and can also cause serious damage to lung tissue.

*Carbon Monoxide Poisoning* is leading cause of accidental poisoning deaths in the United States. People who survive can have permanent brain damage. Common causes are use of use of heaters in winter, smoke from fires, and vehicle exhaust. Some use this method for suicide. People exposed may think they have the flu, complaining of headache, dizziness, fatigue, nausea and vomiting. May also complain of dyspnea on exertion and chest pain, and display nervous system symptoms like impaired judgment, confusion, or even hallucinations. Severe exposure may result in syncope or seizure and eventually death. When assessing the scene make sure you do not become contaminated or put at risk for exposure. Consider toxic gas exposure if more than one patient in the same area is experiencing the same signs and symptoms. Symptoms of a patient with carbon monoxide poisoning will begin to be relieved as soon as they are removed from the toxic environment. Treat with high flow oxygen via nonrebreather mask for conscious patients. If patient is unconscious or has an altered level of consciousness you may need to use full airway control. If the poisoning is severe these patients may be treated in hyperbaric chambers.

Treatment: patient decontamination, treat with oxygen, adjuncts and suction based on patient presentation

*Bacterial and Viral Respiratory Infections* - Methicillin-resistant *Staphylococcus aureus* (MRSA) is bacterium that causes infections in different parts of the body and is transmitted by different routes, including respiratory. It is very difficult to treat because it is resistant to many commonly used antibiotics, especially methicillin. Sometimes it will cause serious problems like infected wounds or pneumonia. MRSA often affects people with weak immune systems in hospitals and nursing homes.

*Tuberculosis (TB)* - infection caused by bacterium called mycobacterium tuberculosis. Commonly affects the lungs but can also affect other organs, particularly the kidneys, bones, and lining of the brain and spinal cord. TB can remain inactive for years causing no symptoms or be infectious to others, so patients may not know they have the disease. Patients with active TB complain of fever, coughing, fatigue, night sweats, and weight loss. As the lung infection becomes more severe they will experience shortness of breath, coughing, productive sputum, bloody sputum and chest pain. Prevalence of TB is higher in dense populations such as homeless people, prison inmates and nursing home residents. It is also found in people who abuse intravenous drugs or alcohol and others who have compromised immune systems such as HIV. You can be at risk if you have close contact with individuals who have active TB or are in contact with people who come from an area with a higher prevalence of TB. If your patient tells you he or she has active TB or you suspect TB wear at minimum gloves, eye protection and HEPA respirator.
Patients complaining of difficulty breathing – administer supplemental oxygen immediately. Responsive patients breathing greater than 30 breaths/min or less than 8 breaths/min should receive high flow oxygen via bag valve mask. Monitor respirations and reevaluate every 5 minutes. Do not withhold oxygen in patients with COPD. Use pulse oximetry and End-tidal carbon dioxide detectors.

*Metered-Dose Inhaler and Small-volume nebulizer* – Patients may have a prescribed inhaler or small-volume nebulizer. If they do you are allowed to assist the patient with these devices. Medication used are inhaled beta-agonists which dilate breathing passages. Typical trade names are Proventil, Ventolin, Alupent, Metaprel and Brethine. The generic name for Proventil and Ventolin is albuterol; for Alupent and Metaprel it is metaprotenerol and for Brethine it is terbutaline. Medications administered via the small volume nebulizer may include albuterol, metaprotenerol and epinephrine. Consult medical control and make sure the medication is indicated. Report what the medication is, when the patient last used it, how many puffs or how much medication was used and what the label states is the dose. Check it is the correct patient, correct medication, not expired, correct dose, it is the correct route and document. Ensure there are no contraindications to the patient’s condition: the patient is unable to correctly administer the medication, the MDI or nebulizer is not prescribed to this patient, you did not get permission from medical control, EMT is not allowed to administer per local protocol, patient has already met the maximum prescribed dose, medication is expired, other contraindications specific to the medication.

Most medications used this way relax the muscles surrounding the air passages in the lungs allowing for dilation and easier movement of air. Common side effects are: increased pulse rate, nervousness, muscle tremors.

*Administration of MDI* – Contact Med Control, Check the 6 rights, make sure patient is alert enough to use the inhaler, check has patient already used inhaler, is the inhaler at room temp or warmer, Shake the inhaler vigorously several times, remove any supplemental oxygen, ask patient to exhale deeply and then place lips around the opening of the inhaler, have the patient depress the hand held inhaler as they begin to inhale deeply. Instruct patient to hold breath for as long as comfortable for medication absorption then reapply supplemental oxygen. Allow patient to breath a few times and then repeat second dose as directed by medical control.

**EPIDEMIC AND PANDEMIC CONSIDERATIONS** - Epidemic occurs when new cases of a disease occur and substantially exceed what is expected based on recent experience. Pandemic is an outbreak on a global scale. Example of pandemic is H1N1 influenza type A, which occurred in 2009. All strains of influenza type A are transmitted via direct contact with nasal secretions and aerosolized droplets. Many serious diseases can be passed via the respiratory route, so be aware when illness are widespread. Be compliant wearing PPE,
wash hands frequently, maintain vaccinations, put surgical mask on patient suspected or confirmed having respiratory disease.

AGE RELATED ASSESSMENT AND MANAGEMENT

**Foreign Body Aspiration** – upper airway obstruction very common in young children who put everything in their mouth. Most deaths from foreign body aspiration are in patients under 5 years of age. Perform appropriate airway clearing technique specific to age of child. One sign of aspiration in a child may be an abnormality in their voice. Provide oxygen and transport any child suspected of aspirating. An elderly patient may have weakened airway musculature and decreased cough and gag reflexes, which decrease their ability to clear secretions.

**Tracheostomy dysfunction** – children may have a tracheostomy tube in place due to chronic, pulmonary medical condition. The tube can be obstructed by secretions, mucus or foreign bodies. Bleeding, leaking, dislodgement and infection can also create issues. Place patient in position of comfort, suction to clear the obstruction, if you cannot clear the obstruction call for ALS. Once the obstruction is clear, oxygenate the patient. Geriatric patients may also have a tracheostomy because of airway obstruction, laryngeal cancer, severe infection, trauma, or inability to manage secretions. Their trachs can also become obstructed or the stoma infected. Establishing airway patency is immediate goal.

**Croup** – inflammation and swelling of the pharynx, larynx and trachea, often secondary to an acute viral infection of upper respiratory tract and typically seen in children between 6 months and 3 years of age. It is easily passed between children. Usually starts with a cold, cough and low grade fever that develops over 2 days. Hallmark signs are seal-like bark cough, which signifies a narrowing of the air passage of the trachea and may progress to complete obstruction. Peak outbreaks occur in late fall and during winter. Croup is rarely seen in adults. Croup responds well to administration of humidified oxygen.

**Epiglottitis** – serious inflammation of the epiglottis, usually due to bacterial infection. Predominant in children but can also occur in elderly patients. The epiglottis can swell to two or three times its normal size so the airway is at risk of becoming completely blocked. Patients will look very sick and have had a sudden onset of symptoms. They will complain of a very sore throat, and have a high fever. They will usually be in the tripod position and drooling. They will also have stridor (high pitched inspiratory sound indicating partial airway obstruction). Treat the children gently and do make them cry. Keep them in a position of comfort and give high flow oxygen. All ALS and do not put anything in their mouth as it could create a complete airway obstruction.

As this is considered primarily a childhood illness, it is sometimes misdiagnosed in an elderly patient. Deterioration can occur quickly so consider in an elderly patient presenting with stridor and any other signs of anatomic airway obstruction. Maintain a patent airway.
**Asthma** – common in children. When assessing a pediatric patient look for retractions above the sternum and between the ribs. These are easier to see in children. Cyanosis is a late sign in children. Keep in mind that a cough is not always a symptom of a cold, it could signal pneumonia or asthma. For young children provide blow-by oxygen by holding the mask in front of the child’s face (can ask parent to hold). Use MDI as you would for an adult patient (many pediatric MDI’s will have spacers).

In an older patient asthma causes bronchospasm, swelling of the lining of the airways and accumulation of secretions. Attacks can be easily triggered and can become life threatening. Geriatric patients with asthma can have both inspiratory and expiratory wheezing.

**Bronchiolitis** – viral infection usually occurs in newborns and toddlers often caused by respiratory syncytial virus (RSV) that causes inflammation of the bronchioles. More common in boys, infections are most widespread in winter and early spring. Bronchiolitis is often a pre-cursor to asthma. Adults can get bronchiolitis obliterans, a rare and life-threatening form of nonreversible obstructive lung disease where the bronchioles are plugged with granulation tissue, inflammation can also affect surrounding lung tissue. A more accurate term would be pneumonitis or inflammation of the lung. A patient with this may have no signs or symptoms but in some cases shortness of breath and fever that present gradually over several weeks.

**Respiratory Syncytial Virus** – major cause of illness in young children creating infection in lungs and breathing passages. More serious infections are found in premature infants and children with depressed immune systems and can lead to more serious illnesses that affect the lungs or heart. RSV can cause bronchiolitis and pneumonia. This is highly contagious and spread by droplets when the patient coughs or sneezes. The virus can survive on surfaces, including hands, cloth so this infection can travel quickly thru schools and day care centers.

When assessing look for signs of dehydration. Treat airway and breathing problems as appropriate. Humidified oxygen is helpful.

**Pneumonia** – worldwide leading cause of death in children. It is often a secondary infection that started with an upper respiratory tract infection. Can also occur from aspiration or near drowning. Viral pneumonia presents more gradually and is less severe. Bacterial pneumonia will come on quickly and results in high fevers. Pneumonia especially affects people who are chronically and terminally ill and people with lowered resistance. Symptoms vary depending on the age of person and cause of the illness. Children usually present with rapid breathing or breathe with grunting or wheezing sounds, retractions, if severe lips and fingernails may be bluish or gray. If pneumonia is in the lower lungs there may be fever, abdominal pain and vomiting.

Signs and symptoms: exertional dyspnea, productive cough, chest discomfort and pain, wheezing, headache, nausea and vomiting, musculoskeletal pain, weight loss, confusion, cyanosis and pallor, dry skin, possible fever, decreased
skin turgor, pale dry mucosa. Patient may be tachycardic and when assessing lung sounds you may hear wheezing, rales or rhonchi. If possible obtain a core temperature and treat with airway, ventilatory and circulatory support.

**Pertussis (whooping cough)** – airborne bacterial infection mostly affects children younger than 6 years. Highly contagious and passed through droplet infection. Patient will be feverish, and exhibit a “whoop” sound on inspiration after a cough attack. Symptoms are generally similar to colds, but the coughing spells can last for more than a minute and the child may run red or purple. Infants and younger children are at greater risk for complications like pneumonia. Watch for signs of dehydration. Pertussis in an adult or geriatric patient does not cause the typical whooping illness like infants or children but instead causes a very severe upper respiratory infection which can lead to pneumonia. Coughing spells can last for weeks and be so severe that patients have a hard time breathing, eating or sleeping. Pertussis can be prevented with a vaccine.

**Cystic Fibrosis** – genetic disorder affects lungs and digestive system. Disrupts normal function of cells that make up sweat glands in skin and also line the lungs and digestive and reproductive systems. Predisposes the child to repeated lung infections. CF disrupts the essential balance of salt and water necessary to maintain a normal coating of fluid and mucus inside the lungs and other organs which results in thick, sticky mucus which holds germs. A child’s symptoms range from sinus congestion to wheezing and asthma-like complaints. The child may develop a chronic cough with thick, heavy, discolored mucus. As lung function decreases so does the ability to breath effectively, often causing dyspnea. Treat with suction and oxygen. Cystic fibrosis often causes death in childhood because of chronic pneumonia and can also cause malabsorption of nutrients in the intestines. Advances in treatment is advancing life expectancy each year.

**Congestive Heart Failure** – After a heart attack or other illness the heart muscle is injured and not able to circulate blood properly thus maintaining cardiac output. This means the pump is failing. The left side of the heart is unable to remove blood from the lungs as quickly as the right side delivers it resulting in fluid build up within the alveoli and in the lung tissue between the alveoli and pulmonary capillaries. This causes pulmonary edema.

Risk factors for CHF: hypertension and history of coronary artery disease and or atrial fibrillation. Most of the time these patients have a long history of chronic CHF. Can be kept under control with medication. Signs and symptoms: difficulty breathing, respiratory distress, coughing, suffocated feeling, cold sweats, tachycardia, breathing difficulty gets worse if they lay down. The patient may also be cool, diaphoretic, cyanotic and you may hear crackles, wheezing or rales when listening to lung sounds. Treatment should consist of airway, ventilatory and circulatory support, provide oxygen. Continuous positive airway pressure (CPAP) is a noninvasive means of providing ventilatory support. CPAP increases pressure in the lungs, opens collapsed alveoli, pushes more oxygen across the alveolar membrane and forces interstitial fluid back into the pulmonary circulation. It can be used for patients with moderate to severe respiratory
distress, are alert and able to follow commands, breathing at a rate of more than 26 breaths/min or have pulse oximetry reading of less than 90%. One potential contraindication for using CPAP is low blood pressure.

**ASSESSMENT KEY POINTS:**

Assess airway and breathing – airway patent and adequate, are breath sounds normal, assess rate, rhythm and quality of respirations, is air going in?, does the chest expand with each breath? Does the chest fall after each breath? Is the rate adequate for patients age? When you listen to lung sounds do it for a full respiratory cycle – do you hear vesicular breath sounds, bronchial breath sounds or decreased, absent or abnormal sounds? (adventitious breath sounds) Do you hear wheezing, rales, rhonchi and or stridor?

Rales or crackles are sounds of air trying to pass thru fluid in alveoli. It is crackling or bubbling sound typically heard on inspiration. Rhonchi are lower pitched sounds caused by secretions or mucus in the larger airway. The sound resembles rattling or is referred to as junky lung sounds. Stridor is high pitched sound heard on inspiration as air tries to pass through an obstruction in upper airway.

History – investigate the patients chief complaint, be sure to ask the following: what is the patients general state of health, has the patient had any diseases, any surgery or recent hospitalization, any traumatic injury. Use OPQRST: O – when did breathing problem begin, P – what makes the breathing difficulty worse Q - How does the breathing feel R- Does the discomfort move S – How much of a problem is the patient having T – is the problem continuous or intermittent? If intermittent how frequently does it occur and how long does it last.

Look for physical signs of respiratory issues such as COPD. Assess vitals. Repeat the primary assessment and monitor the airway and breathing. Check any interventions.