



Partners in Quality Care



Objectives:

*Overview of the respiratory system

*Review of respiratory diseases

*Ways to assist clients with a respiratory disease

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References:

<https://www.nhlbi.nih.gov/health/lungs/respiratory-system>

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Respiratory Disease

The lungs located on each side of the heart inside the chest cavity are the main organs of the respiratory system. The right lung is divided into three lobes (sections), and the left lung is divided into two lobes. The left lung is slightly smaller than the right lung, since the heart takes up some space on the left side. When a person breathes in, air enters the airways and travels down into the air sacs, or alveoli, in the lungs. This is where gas exchange takes place. The circulatory system, which is made up of the heart and blood vessels, supports the respiratory system by bringing blood to and from the lungs. The circulatory system helps deliver nutrients and oxygen from the lungs to tissues and organs throughout the body. It also helps remove carbon dioxide and waste products.

The Parts of the Respiratory System and How They Work

- **SINUSES** are hollow spaces in the bones of your head above and below your eyes that are connected to your nose by small openings. Sinuses help regulate the temperature and humidity of inhaled air.
- The **NOSE** is the preferred entrance for outside air into the respiratory system. The hairs lining the nose's wall are part of the air-cleaning system.
- Air also enters through the **MOUTH**, especially for those who have a mouth-breathing habit, whose nasal passages may be temporarily blocked by a cold, or during heavy exercise.
- The **THROAT (pharynx)** collects incoming air from your nose and mouth then passes it downward to the windpipe (trachea).
- The **WINDPIPE** (trachea) is the passage leading from your throat to your lungs.
- The right lung is divided into three *lobes*, or sections. Each lobe is like a balloon filled with sponge-like tissue. Air moves in and out through one opening- a branch of the bronchial tube. The left lung is divided into two lobes.
- The windpipe divides into the two main **BRONCHIAL TUBES**, one for each lung, which divides again into each lobe of your lungs. These, in turn, split further into bronchioles.

Breathing is only one of the activities of the respiratory system. The body cells need a continuous supply of oxygen for the metabolic processes that are necessary to maintain life. The respiratory system works with the *circulatory system (heart, blood)* to provide this oxygen and to remove the waste products of metabolism. It also helps to regulate pH of the blood.

In addition to gas exchange, the respiratory system performs other roles important to breathing. These include bringing air to the proper body temperature and moisturizing it to the right humidity level and protecting the body from harmful substances which is done by coughing, sneezing, filtering or swallowing them. The entire respiratory system is lined with delicate mucous membrane. Mucous membranes are the body's natural defense against germs. Another function is to support the sense of smell.

Respiratory Disease

Chronic Obstructive Pulmonary Disease (COPD) is a group of lung diseases or problems that includes conditions such as emphysema, asthma, and chronic bronchitis and other illnesses characterized by breathing problems, respiratory distress, and sometimes the use of oxygen and nebulizer therapies (a nebulizer is a small machine that turns liquid medicine into a mist that can be easily inhaled). COPD affects the airways and alveoli (tiny air sacs in the lungs). People with COPD are at increased risk for getting respiratory infections. There is no cure for COPD. A person with COPD will need to follow their prescribed treatment regimen which can include nebulizer treatments, inhalers (an inhaler is a small, handheld device that delivers medication directly to the lungs), oxygen therapy, medications, exercise programs, and stopping smoking if applicable. It is also important for a person with COPD to avoid respiratory infections. A person with COPD may need to pace their activities to avoid being short of breath. Observing the client for changes such as a change in increased shortness of breath, or increased cough, fever, increased fatigue or other changes from a client's usual status will be important to report per the plan of care to help the client obtain early treatment and potentially avoid a worsening condition or hospitalization. Assisting a client with activities of daily living such as bathing, and dressing, mobility, and meals will be the types of care provided by an In-home aide. The client may need to pace these activities to avoid worsening shortness of breath and due to fatigue. Report if the client has an increase in the level of care required as the disease progresses and if the client is having issues with obtaining or using medication or oxygen therapy (follow oxygen safety). Helping to maintain a clean home with decreased dust is another way to assist a client with COPD.

Chronic Bronchitis- bronchitis means inflammation of the bronchi. With chronic bronchitis, airways are narrowed from inflammation and mucus. The main symptom is an on-going cough or a cough that produces a lot of mucus along with difficulty breathing and tiring easily. The body cannot get enough oxygen, wheezing and chest tightness can occur. Oxygen therapy and breathing exercises are common. Medications are given to open the airways. Preventing respiratory tract infections is important and if one occurs, quick treatment is needed. Report according to the plan of care if the client is having a worsening of bronchitis symptoms to help the client obtain access to quick treatment.

Emphysema- with emphysema, the alveoli (air sacs) are damaged by losing their shape and becoming less elastic and do not expand and shrink normally. As a result, air is trapped and not exhaled and over time more alveoli are involved. Oxygen and carbon dioxide exchange cannot occur in affected alveoli. A person with emphysema will have shortness of breath and a cough. At first, shortness of breath occurs with exertion but over time it occurs at rest. Fatigue is common, the body does not get enough oxygen. Breathing is easier when sitting upright and slightly forward. The person must stop smoking and treatments include respiratory therapy, breathing exercises, oxygen, and drug therapy. Do not adjust a client's prescribed oxygen level, report to your supervisor per the plan of care if the client has increased shortness of breath, a healthcare provider will determine if a client's oxygen level needs adjusting.

Asthma- asthma comes from the Greek word for panting. Asthma is a chronic lung disease that makes it harder to move air in and out of the lungs. With asthma, the airway becomes inflamed and narrow, and extra mucus is produced. Coughing, wheezing, chest tightness, and shortness of breath can occur. Asthma is usually triggered by allergies. Other triggers include air pollutants and irritants, smoking and secondhand smoke, respiratory infections, and exertion. Asthma is treated with medications. Sudden asthma attacks can be mild or severe. Severe attacks may require emergency care. If a client has asthma, be aware of triggers that may cause an asthma attack and help minimize the triggers such as maintaining a clean environment. Help the client to know where their inhaler is located for quick treatment.

Pneumonia- pneumonia is an infection in one or both lungs. Many germs, such as bacteria, viruses, and fungi, can cause pneumonia. Pneumonia is not a single disease. When the germs that cause pneumonia reach your lungs, the lungs' air sacs (alveoli) become inflamed and fill up with fluid. This causes the symptoms of pneumonia, such as a cough, fever, chills, and trouble breathing.

Respiratory Disease:

Respiratory System – variation of normal:

- Shallow breathing or breathing through pursed lips
- Coughing or wheezing
- Nasal congestion or discharge, or productive cough
- Noisy respirations
- Gasping for breaths
- Cyanosis – changes in skin color, pale or bluish color of lips and extremities
- Dyspnea – difficulty breathing
- Changes in rate and rhythm of breathing
- Need to sit after mild exertion
- Pain in the chest

Tell your supervisor right away if a client:

- Coughs or sneezes a lot and more than usual
- Coughs up fluid and sputum and more than usual
- Feels dizzy or lightheaded
- Is very hot or cold or has a fever
- Makes a whistling sound when they breathe and/or short of breath
- Report as directed on the plan of care and talk to your supervisor regarding when to contact 911 emergency services such as when a client has:
- Bluish skin, lips, or nail beds
- Increased shortness of breath and difficulty breathing especially more than usual
- Chest pain

Oxygen Therapy:

- A person who has difficulty breathing and not receiving enough oxygen through the air may need additional amounts of oxygen
- Oxygen is a drug and may be a part of the client's treatment according to a health care provider's order. Follow the plan of care in working with a client who uses oxygen
- Follow Oxygen safety guidelines when working with a client that uses Oxygen

Other tips in assisting clients (follow the client's plan of care):

- Follow infection control guidelines (wash your hands; follow your agency policy regarding when you should not work with a client if you are sick with a cold, fever, COVID-19, or other illness, and when to use personal protective equipment such as a mask and using gloves)
- Help client walk and perform activities at a slow and comfortable pace
- Help client rest; build in time for breaks during care and to get comfortable in bed as applicable
- Encourage the client to eat a healthy diet
- Encourage the client to perform breathing exercises as prescribed and to take medication as prescribed. Report any issues with clients taking their medication such as forgetting to take medications, not understanding how to use medications such as with nebulizers or inhalers, refusing to take medications, unable to afford to purchase medications, or other issues.

Respiratory System – Changes Due to Aging:

- Respiratory muscles weaken
- Lung tissue gradually becomes less elastic
- Shortness of breath upon exertion
- Lung capacity decreases
- Oxygen in the blood decreases
- Muscles of the diaphragm become weaker
- Limited expansion of the chest due to changes in posture

A decrease in lung function is a normal part of the aging process but there are steps a person can take to stay as healthy as possible. Staying active, avoiding tobacco smoke, avoiding air pollution, and staying up to date on vaccinations are just a few ways a person can protect and even strengthen their lungs.

There are several natural body changes that happen as a person gets older that may cause a decline in lung capacity. Muscles like the diaphragm can get weaker. Lung tissue that helps keep the airways open can lose elasticity, which means the airways can get a little smaller. The rib cage bones can change and get smaller which leaves less room for the lungs to expand.