Pulmonary Rehabilitation Program
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Talk to your doctor or health care team if you have any questions about your care.
For more health information, contact the Library for Health Information at 614-293-3707 or e-mail health-info@osu.edu.
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Welcome to Pulmonary Rehab

Pulmonary rehabilitation can help improve your well-being as a patient with lung disease. It can also benefit people who need lung surgery, both before and after surgery. Pulmonary rehab is tailored to your needs and goals and includes:

• Education on your lung disease and how to manage it
• Medicine use
• Breathing retraining
• Saving energy techniques
• Benefits of exercise
• Nutrition counseling
• Coping skill techniques
• Group support, one on one counseling and support from a team of health care providers

Classes are offered at:

- **Martha Morehouse Outpatient Care, Pavilion, Center for Wellness and Prevention**
  2050 Kenny Road, Suite 1010
  Columbus, OH 43221
  **Phone: 614-293-2820**
  **Fax: 614-293-2821**
  **A maintenance program is available.**
  Classes are Mondays, Wednesdays and Fridays:
  My start date: _______________
  My class time: _______________

- **Outpatient Care East**
  543 Taylor Avenue, Room 3068
  Columbus, OH 43203
  **Phone: 614-688-6307**
  **Fax: 614-688-6305**
  Located north of The Ohio State University Wexner Medical Center East Hospital, close to I-670
  Classes are Mondays, Tuesdays and Thursdays
  My start date: _______________
  My class time: _______________
**Program goals**

1. Attend all group education classes and one on one counseling with staff to learn about your lung disease, symptom relief, safe medicine use and how to create a daily routine to improve your quality of life.

2. Improve your strength, endurance and shortness of breath symptoms through regular monitored exercise.

3. Work towards independence in the management of your lung disease to improve your efforts to stay out of the hospital.

**Attendance**

After orientation, you will **attend class 3 days a week for 8 weeks** (20 to 24 classes total, depending on holidays and missed classes). To get the most out of the program, we recommend that you attend all classes. If you need to miss a class for any reason, please let us know before the missed class occurs. If a week has passed and you have not called us about your absence, you will be discharged from the program.

**Program rules**

1. Please do not wear strong perfume, lotions, cologne or powders to class. They can affect the breathing of those sensitive to these smells.

2. Wear comfortable clothing and closed-toed shoes for exercise.

3. Family and friends are not allowed to use the exercise equipment, but may come to the group education classes. The Center for Wellness and Prevention offers a maintenance program. Ask your case manager for more information.

4. **If you are ill, do not come to class.** Call us to let us know that you will miss class. Call your doctor if your symptoms cannot be controlled with your prescribed medicines.

5. Let staff know if you have any changes in your medicines since your last class or if you have any joint or muscle discomfort with exercise.

6. **If you have diabetes,** share your most recent blood sugar reading with staff, bring your glucose meter to class and bring a snack, if needed, to keep your blood sugar in a normal range.
How Your Lungs Work

The respiratory system is made up of large airways (bronchi), small airways (bronchioles), lung tissue, blood vessels (capillaries) and muscles.

The lungs are organs that take in oxygen molecules from the air when you inhale and circulate them in your bloodstream to meet your body’s energy needs. When you exhale, the lungs remove a waste gas, called carbon dioxide. The right lung has three lobes and the left lung has two lobes to make room for your heart. Together, they hold a total of 4 to 6 liters of air.

The air (oxygen) you breathe in travels down through your:
- Nose and mouth
- Trachea (windpipe)
- Right and left main bronchus (major airways)
- Bronchi (large airways)
- Bronchioles (small airways)
- Alveoli: these small “grape-like” sacs are where oxygen and carbon dioxide molecules are exchanged during breathing. Alveoli sacs are surrounded by capillary blood vessels. Both lungs are made up of millions of these thin tissue air sacs.

The diaphragm muscle helps the lungs expand in the chest cavity when you inhale (breathe in) by contracting and pulling down. When you exhale (breathe out), the muscle relaxes to allow air flow out of the lungs.
Mucus production by goblet cells, and small hairs, called cilia, line the respiratory system. They filter out debris and small particles, and decrease the risk of infection.

**Obstructive lung disease** occurs with airway inflammation, increased mucus production or air-trapping due to over-inflation of the air sacs. With air-trapping, the air sacs are not able to get air out when you exhale.

**Oxygen and carbon dioxide exchange**

When you inhale, oxygen molecules transfer through thin lung tissue to enter capillary blood vessels. They attach to hemoglobin, a protein in red blood cells, and travel around the body in the bloodstream to be used as energy by your cells, muscles and organs.

Hemoglobin carry carbon dioxide molecules, a waste product, back to the lungs. There they transfer through thin lung tissue to be exhaled out of the lungs.

**Restrictive lung disease** occurs when oxygen and carbon dioxide is inhibited due to lung tissue scarring or thickening. Other restrictive lung diseases may be due to body shape and increased weight.
Lung disease prevents the lungs from working well. To find out what type of lung disease you have, your doctor may have done breathing tests, chest x-rays or a CT (computed tomography) scan. Place a mark next to the lung disease(s) that you have. If you are not sure, ask a staff member for help.

### Obstructive lung disease

Obstructive lung disease, also called COPD or chronic obstructive pulmonary disease, **affects the airways and air sacs (alveoli) of the lungs**. The airways narrow or become blocked, **decreasing the amount of air exhaled out of the lungs**. People with obstructive lung disease may feel like they are trying to breathe out through a straw. Over time, the lungs may get bigger because the air gets trapped.

Symptoms of COPD include shortness of breath, chest tightness, increased mucus, wheezing and coughing.

Treatments may include medicines, inhalers, oxygen use, breathing retraining, exercise, surgery or lung transplant.

**Obstructive lung diseases include:**

- **Alpha-1 antitrypsin deficiency** - an air sac disease passed down through families that may cause lung and liver disease. People with this disease can develop emphysema.

- **Asthma** - lung irritants and allergens cause the airways to swell, narrow and tighten.

- **Bronchiectasis** - damage, scarring and widening of the large airways caused by recurring swelling or infection of the airways. People with this disease are at risk for frequent lung infections.

- **Bronchiolitis obliterans syndrome** - damaged and inflamed airways from chemical particles, lung infections or inflammation in lung transplant patients. This leads to scarring that blocks the airways in the lungs.
Restrictive lung disease, also called interstitial lung disease, may affect lung tissue by causing scarring, inflammation (swelling) or thickening of lung tissue. This makes the lungs unable to expand fully. It becomes hard for the lungs to take in oxygen and release carbon monoxide. Oxygen and carbon dioxide molecules have a hard time passing through the lung tissue to enter or exit the blood stream.

Other conditions, such as obesity and scoliosis or side curve to the spine, may also prevent the lungs from expanding fully and be considered a restrictive lung disease.

Symptoms of restrictive lung disease include shortness of breath, fatigue especially with activity, chest tightening and increased mucus.

Treatments may include medicines to decrease swelling or the progression of the disease, breathing retraining, exercise, oxygen use, surgery or lung transplant.

Restrictive lung diseases include:

- **Chronic bronchitis** - frequent infections that cause inflamed airways, increased mucus, shortness of breath, wheezing and chest tightness. Treatment may include antibiotics, steroids and oxygen use. Chronic bronchitis means that you have had these episodes a few times a year for 2 years or more. The main cause of chronic bronchitis is smoking.
- **Cystic fibrosis** - a disease passed down through families that causes thick, sticky mucus to build up in the lungs, digestive tract and other areas of the body.
- **Emphysema** - the air sacs lose their elasticity and become overinflated. This causes air trapping, shortness of breath and a decrease in gas exchange. The main cause of emphysema is smoking.

- **Autoimmune connective tissue disorders** may affect the connective tissue in the body and the lungs, causing inflammation, swelling, hardening and scarring.
  - **Rheumatoid arthritis** - a disorder that causes inflammation of the body’s joints because of increased immune cell production. About 1 in 10 people with rheumatoid arthritis develop restrictive lung disease. Scarring of the lungs occurs from the body’s over-active immune system attacking the lungs.
  - **Scleroderma** - immune cells produce more collagen, causing the body’s skin to harden or scar. One type of scleroderma, called systemic sclerosis, can cause hardening or scarring in many parts of the body, including the lungs.
  - **Sjögren’s syndrome** - autoimmune disease of unknown cause that causes dryness of the eyes, mouth and other body parts. Pulmonary symptoms act like interstitial lung disease, causing swelling and inflammation.

- **Bronchiolitis obliterans with organizing pneumonia (BOOP) / Cryptogenic organizing pneumonia (COP)** - a rare condition where the small airways (bronchioles) and air sacs (alveoli) become inflamed and blocked with connective tissue.
- **Hypersensitivity pneumonitis** - a disease that causes inflammation of the alveoli in the lungs due to an allergic reaction to dust, fungus, molds or chemicals. Exposure comes most often from the person’s occupation or hobbies. The disease causes symptoms that are similar to the flu.

- **Bird fancier’s lung / pigeon breeder’s disease** - from inhaling bird feathers or droppings.

- **Farmer’s lung** - from inhaling mold that grows on hay, straw or grain.

- **Pneumoconiosis** - a disease caused by inhaling workplace dust. The disease causes coughing and shortness of breath. It may lead to pulmonary fibrosis.

- **Asbestosis** - from inhaling asbestos fibers.

- **Black lung disease** - from inhaling coal dust (coal miners).

- **Siderosis** - from inhaling iron from mines or welding fumes.

- **Silicosis** - from inhaling silica dust.

- **Pulmonary fibrosis** - lung tissue becomes scarred overtime, making it hard to breathe. Scarring may occur from the environment, chemotherapy, radiation, certain medicines, autoimmune disease or unknown cause.

- **Sarcoidosis** - disease of unknown cause where abnormal growths, called granulomas, grow in the tissue of the lungs, skin or lymph nodes, causing inflammation. The disease may progress into pulmonary fibrosis or bronchiectasis.

**Other lung conditions**

- **Recovery from lung transplant** - after a single or double lung transplant, pulmonary rehab is done to improve your physical strength and endurance. Preventing Infection and watching for symptoms of rejection are key during your recovery.

- **Pulmonary hypertension** - the blood vessels (pulmonary arteries) that carry blood from the heart to the lungs become hard and narrow. This causes pressure within the heart, leading to a decrease in gas exchange in the lungs. The heart has to work harder and over time weakens. Chest pain, shortness of breath, abnormal heart rhythm and heart failure can occur. Treatment may include medicines to open the pulmonary arteries and oxygen use. High pressure in these arteries is not shown with an arm blood pressure reading. It is diagnosed based on medical history, physical exam and results from tests and procedures.

- **Diaphragm disorders** - half or all of the diaphragm muscle does not work well due to nerve damage or unknown causes. You may hear this called diaphragm paralysis or eventration (thinning of the diaphragm muscle). Treatment may include chest wall muscle strengthening with breathing exercises (inspiratory muscle training), breathing retraining, surgery or phrenic nerve pacing where electrical impulses are applied to the diaphragm.

- **Chest wall restriction** - conditions, such as morbid obesity and scoliosis or side curve to the spine may prevent the lungs from fully expanding, causing shortness of breath.
About Lung Medicines

Questions to ask your doctor

When you are prescribed a new medicine, it is always good to ask your doctor questions about it before you leave the clinic office.

• What is the new medicine for and what results can I expect?
• How long do I need to be on this medicine? Some medicines may only be prescribed for a few days or weeks.
• How do I use this medicine? There may be new inhalers and devices to learn how to use.
• Does this medicine interact with my other medicines or are there any side effects I should watch for?

Things to know about your medicines

• Learn the generic and brand names of your medicines and what they are used for.
• Tell all of your doctors what prescription medicines, over the counter medicines, supplements, vitamins and herbal products you are taking. Keep a current medicine list with you.
• Do not stop taking a medicine without first talking to your doctor, even if you feel better. This includes sample medicines given to you as they need to be taken for the full time to show if they are working.
• Do not share or give your medicine to family or friends.

• Store your medicines away from heat, direct sunlight and moisture. The bathroom is the worst place to store your medicines.
• Keep all medicines out of the reach of children.
• If you have heartburn (GERD) and are not currently taking medicine for it, talk to your doctor. Gastric juices can travel up the esophagus and down into the windpipe (trachea), causing erosion of lung tissue. This can lead to interstitial lung disease.
• If you have any questions about your medicines, call your doctor’s office or talk to your pharmacist.

Types of lung medicine

• **Inhalers** - Inhalers allow medicine to reach deep into the lungs. There are different types of inhalers, including dry powder inhalers (DPI), metered dose inhalers (MDI) and soft mist inhalers (SMI). Ask a member of your care team for a handout on how to use your inhaler.

• **Nebulizer treatments** - A nebulizer changes liquid medicine into a fine mist to let you breathe it into your airways. The machine is called a compressor and may be electric or battery powered. Ask a member of your care team for the handout, **Nebulizer Treatments**, to learn how to take a treatment.

• **Pills and liquid medicines** - Lung medicines taken by mouth include antibiotics, steroids, cough suppressants and allergy medicines.
Obstructive Lung Disease Medicines

There are many medicines used to treat obstructive lung diseases or COPD like asthma, chronic bronchitis, bronchiectasis and emphysema. Some medicines are **short acting**, taken to prevent or quickly ease bronchospasms of the airways. Others are **long acting**, taken on a set schedule to prevent bronchospasms.

**Place a mark next to the medicines you are taking.** If you need help, ask a member of your care team. Please ask if you would like more written information about your medicines or if you have questions about any medicine you are taking or its side effects.

**Short acting medicines**

- These medicines come as inhalers and may be called “rescue” inhalers. Use these inhalers when you are having increased shortness of breath for no reason or chest tightness due to shortness of breath. The medicine acts quickly to decrease swelling and open airways caused by bronchospasms. Relief comes in 5 to 10 minutes.
- Some of these medicines come as nebulizer treatments where you inhale the medicine as a fine mist.
- **Keep your short acting medicine with you at all times in case of an emergency.**

**Dosage**

- Read the dose instructions that come with your medicine. If they call for 2 puffs, inhale 1 puff at a time, holding the medicine in your lungs for 5 to 10 seconds before exhaling. Then inhale the second puff.
- If you have the medicine in the form of an inhaler AND a nebulizer treatment, use one or the other during the 4 to 6 hour time frame. **Never** use both forms together!

**Timing**

- Use this medicine every 4 to 6 hours as needed.
- Use your inhaler or nebulizer treatment to open your airways:
  - When you have shortness of breath
  - Before exercise or increased activity
- Remember: use it, don’t abuse it! If you just walked far or up a flight of steps and have shortness of breath, don’t go right to the rescue inhaler. Do pursed lip breathing and think about how long it has been since your last dose of short acting medicine.
Long acting medicines
These medicines are used to keep your airways open and to prevent shortness of breath and inflammation. They do not stop an active bronchospasm.

Dosage
• Read the dosing instructions that come with your medicine. If it calls for 2 puffs, inhale 1 puff at a time, holding the medicine in your lungs for 5 to 10 seconds before exhaling and repeating the dose.

Timing
• Use this medicine as directed, often 1 or 2 times a day.

Medicines
- Beta-agonists: These medicines relax and open the small airways in the lungs.
  - salmeterol (Serevent) - inhaler to be used 2 times a day
  - indacaterol (Arcapta Neohaler) - inhaler to be used 1 time a day
  - arformoterol (Brovana) - nebulizer treatment to be used 2 times a day
  - formoterol (Perforomist) - nebulizer treatment to be used 2 times a day

- Anti-cholinergics: These medicines relax and open the large airways in the lungs.
  - umeclidinium (Incruse Ellipta) - inhaler to be used 1 time a day
  - tiotropium (Spiriva) - inhaler to be used 1 time a day
  - aclidinium bromide (Tudorza Pressair) - inhaler to be used 2 times a day

- Combination beta-agonist and anti-cholinergic: These medicines relax and open the large and small airways in the lungs.
  - vilanterol-umeclidinium (Anoro Ellipta) - inhaler to be used 1 time a day
  - olodaterol-tiotropium (Stiolto Respimat) - inhaler to be used 1 time a day
• **Inhaled corticosteroids:** These medicines contain a steroid to decrease inflammation in the lungs. Brush your teeth and tongue or rinse your mouth after use to prevent thrush, a fungal infection, which causes white sores in the mouth and throat.
  - mometasone (Asmanex) - inhaler to be used 1 to 2 times a day
  - fluticasone furoate (Arnuity Ellipta) - inhaler to be used 1 time a day
  - fluticasone (Flovent) - inhaler to be used 2 times a day
  - budesonide (Pulmicort) - inhaler to be used 2 times a day
  - beclomethasone (Qvar) - inhaler to be used 2 times a day

• **Combination beta-agonist and corticosteroid:** These medicines decrease inflammation in the lungs and also contain a steroid. Brush your teeth and tongue or rinse your mouth after use to prevent thrush, a fungal infection, which causes white sores in the mouth and throat.
  - formoterol-budesonide (Symbicort) to be used 2 times a day with an inhaler
  - salmeterol-fluticasone (Advair) to be used 2 times a day with an inhaler
  - formoterol-mometasone (Dulera) to be used 2 times a day with an inhaler
  - vilanterol-fluticasone (Breo Ellipta) to be used 1 time a day with an inhaler

• **Other medicines:**
  - roflumilast (Daliresp) - this pill is to be taken by mouth 1 time a day for severe COPD or asthma.
  - prednisone - this pill or liquid medicine is a corticosteroid that decreases inflammation in the lung tissue. It is different from inhaler medicines that decrease inflammation. It may be used short term or long term at a low dose to ease shortness of breath. Take the medicine as directed. **Do NOT stop taking this medicine suddenly.** Your doctor will instruct you how to slowly decrease your dose before stopping it completely.
  - guaifenesin (Mucinex, Vicks 44E, Robitussin and others) - this pill or liquid medicine is a cough suppressant or expectorant that thins mucus, so you can clear it from your lungs. Take the medicine as directed or follow the instructions on the medicine label for dosage.
Restrictive Lung Disease Medicines

Medicines used to treat restrictive lung diseases ease shortness of breath and other symptoms. Inhalers may not give you relief from shortness of breath as the inflammation and thickening of your lung tissue is different from the inflammation that occurs with obstructive lung disease.

**Place a mark next to the medicines you are taking.** If you need help, ask a member of your care team. Please ask if you would like more written information about your medicines or if you have questions about any medicine you are taking or its side effects.

**Restrictive lung disease medicines**

Based on your type of restrictive lung disease, these medicines may be ordered. Talk with your doctor about your symptoms of lung disease and if you find relief from your medicines. Take your medicines as directed.

- prednisone - this pill or liquid medicine is a corticosteroid that decreases inflammation in the lung tissue. It may be used short term or long term at a low dose to ease shortness of breath. **Do NOT stop taking this medicine suddenly.** Your doctor will instruct you how to slowly decrease your dose before stopping it completely.
- methotrexate - this pill decreases inflammation.
- immunosuppressive drugs - these medicines suppress the immune system to decrease inflammation.
  - mycophenolate (Cellcept) - pills or liquid
  - cyclophosphamide (Cytoxan) - pills
  - azathioprine (Imuran) - pills

**Pulmonary fibrosis medicines**

Medicines for pulmonary fibrosis slow the progression of fibroblast cell production in the lung tissue that cause scarring (fibrosis). Take as directed.

- pirfenidone (Esbriet) - pills are taken 3 times a day. Your doctor will work with you to increase your dose slowly to an amount that treats your symptoms while limiting side effects.
- nintedanib (Ofev) - pills are taken 2 times a day.
- prednisone - this pill or liquid medicine is a corticosteroid that decreases inflammation in the lung tissue. It may be used short term or long term at a low dose to ease shortness of breath. Take the medicine as directed. **Do NOT stop taking this medicine suddenly.** Your doctor will instruct you how to slowly decrease your dose before stopping it completely.
Medicines for Other Lung Conditions

Your doctor will work with you to manage your condition. Your treatment may include medicines to ease your symptoms. Please ask if you would like more written information about your medicines or if you have questions about any medicine you are taking or its side effects.

Place a mark next to the medicines you are taking. If you need help, ask a member of your care team.

**Lung transplant medicines**

Medicines for lung transplant protect the new lungs from rejection and prevent infection. Take your lung transplant medicines each day as ordered, have your labs drawn as ordered and keep your follow up appointments to prevent rejection.

- Immunosuppressive drugs - these medicines suppress the immune system to prevent rejection of the new lungs. Examples include:
  - tacrolimus - pills
  - azathioprine (Azasan, Imuran) - pills
  - cyclosporine - pills or liquid
- Anti-infection drugs - Because you take medicines to suppress the immune system, you are at increased risk for infections. These medicines treat viral, bacterial and fungal infections. Examples include:
  - sulfamethoxazole/trimethoprim (Bactrim) - pills or liquid
  - azithromycin (Zithromax) - pills or liquid
  - valacyclovir (Valtrex) - pills
  - voriconazole (Vfend) - pills or liquid
  - amoxicillin - pills or liquid
- prednisone - this pill or liquid medicine is a corticosteroid that decreases inflammation in the lung tissue. It may be used short term or long term at a low dose. **Do NOT stop taking this medicine suddenly.** Your doctor will instruct you how to slowly decrease your dose before stopping it completely.
- Other medicines - due to side effects of transplant medicines, you may be started on other medicines to help manage high blood pressure, upset stomach, heartburn (GERD), mineral deficiency like calcium and magnesium, and other problems. Talk to your doctor or any member of your care team if you notice side effects from the medicines you take.

**Pulmonary hypertension medicines**

Medicines for pulmonary hypertension open up (dilate) the pulmonary arteries that carry blood from your heart to your lungs to pick up oxygen.

- ambrisentan (Letairis) - pills
- bosentan (Tracleer) - pills
- iloprost (Ventavis) - liquid
- sildenafil (Revatio) - pills or liquid
- tadalafil (Adcirca, Cialis) - pills
- treprostinil (Tyvaso) - liquid
- macitentan (Opsumit) - pills
Pulmonary Tests

Your doctor or pulmonologist will order tests to check your lung disease. These tests can help your doctor understand what type of lung disease you have, how your lung disease is progressing and how well treatments, such as medicine and oxygen, are improving your breathing. Follow any pre-test instructions given to you and give your best effort during tests, so your doctor can use your test results to help you manage your lung disease and breathing.

Pulmonary function tests

- **Spirometry** - This test measures how well and how fast air moves in and out of your lungs. During the test, you sit with a clip on your nose and breathe into a mouthpiece. You take deep breaths and then as fast as you can, blow out all of the air. You will repeat the test several times. You may be given a short acting inhaler to use during the test to see if the medicine opens your airways and air sacs to make breathing easier.

- **Forced expiratory volume in the 1st second of expiration (FEV1)** - This measurement on your pulmonary function test report shows how much air is breathed out in the first second of your total breath. It is expressed as a percentage. A decrease in the number may show COPD, emphysema, asthma, bronchitis or other obstructive lung disease. Your FEV1 number is often the number your doctor tells you about your lung function. Normal lung function is greater than 80%.

- **Lung volume measurement** - This test measures the total volume of air your lungs can hold after taking a breath in. It then measures the volume of air left over after you breathe out. The residual or left over air shows air trapping. Air trapping can cause decreased oxygen levels and shortness of breath. During the test, you sit in a sealed, clear box that looks like a telephone booth. You breathe in and out into a mouthpiece. Changes in pressure inside the box are also measured.
  - Obstructive lung diseases, like emphysema, may show increased lung volumes.
  - Restrictive lung diseases, like pulmonary fibrosis, may show decreased lung volumes.
• **Diffusion capacity** - This test looks at how well oxygen and carbon dioxide molecules transfer through lung tissue. During the test, you take in a short breath of a harmless gas, called tracer gas. The difference in the amount of gas breathed in and gas breathed out shows how well the gas moves from your lungs and into your blood.

  - Some restrictive lung diseases show a decrease in this value because the scarred and thickened lung tissue inhibits gas exchange. The lack of oxygen in the blood stream leads to more shortness of breath.

**Chest x-rays**

This test creates pictures of the structures inside your chest, such as your heart, lungs and blood vessels. The test is done to find the cause of problems, like:

- Problems with the diaphragm muscle
- Scarring of lung tissue, called fibrosis
- Lung infections, like pneumonia
- Fluid around the lungs, called pleural effusion
- Fluid in the lungs, called pulmonary edema
- A collapsed lung
- A lung mass or abnormal spot in the lungs

**CT (computed tomography) scan**

A CT scan creates precise pictures of the structures of your body, such as your lungs. It shows more detail than a standard chest x-ray. The CT scanning machine takes many pictures up and down the body and processes these pictures, which can be viewed on a screen. Sometimes contrast dye is injected into a vein in your arm for the CT scan. This medicine highlights areas in your body to create clearer images.

This test helps your doctor diagnose your type of lung disease (obstructive or restrictive), check how your lung disease is progressing and check if you have any lung masses.

**6-minute walk test**

This is a timed walking test that measures your physical function. Your total distance in feet, oxygen level, heart rate, and perceive shortness of breath and exertion are measured. A total distance less than your predicted “normal” values may show problems with muscle conditioning or a chronic condition that limits your physical function.

You will have a 6-minute walk test at the start and at the end of your pulmonary rehab program to look for a change in your physical function and check your need for home oxygen. Our goal is to help you improve your distance by 10% or more.

**Oxygen titration test**

This test is like the 6-minute walk test, but it is not timed and your total distance is not measured. For this test, you walk for a short time and your oxygen level is measured using a pulse oximeter. If you oxygen drops below 88%, you may need home oxygen. This would be ordered by your doctor.
Shortness of Breath

Shortness of breath, also called dyspnea, is difficult, labored or uncomfortable breathing. There are both conditions and environmental factors, which can affect your breathing. There are tips and treatments to help.

Causes

These conditions affect shortness of breath:

- Obstructive lung disease, also called airway or air sac disease
- Restrictive lung disease, also called interstitial lung disease
- Low oxygen level, also called hypoxia
- Lung infections
- Increased mucus
- Exacerbation or worsening of your lung disease
- Eating a large meal, which pushes up the diaphragm and lungs
- Muscle deconditioning due to lack of activity or exercise

These environmental factors affect shortness of breath:

- Pollution
- Dust
- Smoking
- High humidity
- Extreme hot or cold weather
- Aerosol sprays
- Fumes
- Perfumes
- Powders
- Deodorants
- Barometric weather changes
Suggestions to help

• Find a position that is comfortable for you.
  ‣ Sit leaning forward with your arms and upper body supported on a table.
  ‣ Stand upright and brace yourself against a wall while leaning forward a bit.
  ‣ Lay on your back with your head propped up.

• Focus on your breathing pattern. For more information, read “Breathing Retraining” in this book.

• Do relaxation exercises, such as guided imagery and progressive muscle relaxation. See Coping with Lung Disease section for more information.

• You may use a fan to blow air on your face.

• Plan your activities.
  ‣ Rest before, during and between activities as needed.
  ‣ Do outside activities in the early morning or evening on hot, humid days.

• Cover mouth and nose with a cotton scarf in cold weather.

• Stay out of areas with high pollution. View air quality index (AQI) forecasts on television or the Internet at www.epa.ohio.gov/dapc/airohio/forecast.aspx.

• Eat smaller, more frequent meals to prevent abdominal fullness.

• Take your medicines as ordered by your doctor:
  ‣ Use your short acting inhaler or nebulizer treatment every 4 to 6 hours as needed to open your airways when you have shortness of breath and before exercise or increased activity.
  ‣ Use oxygen as ordered by your doctor. If you have a pulse oximeter and your oxygen level is consistently less than 88% at rest or with activity, call your doctor.

Call your doctor if your shortness of breath worsens or is not helped with your medicines or home oxygen.
Environmental Tips

There are irritants in the environment that may make breathing more difficult. Some can be avoided and some cannot. Become aware of irritants and avoid or limit your exposure.

**Smoking**
Smoke from tobacco products irritates the lining in your lungs. Mucus is produced, which may plug your lungs. In time, this leads to infection and may cause permanent lung damage. Avoid secondhand smoke and if you smoke, stop. Emphysema and bronchitis are largely diseases of smokers. No matter how long you have smoked, coughing and sputum may decrease when you quit.

**Pollution**
Watch for **air quality alerts**. These alerts are issued when there is potential for high pollution levels. People with lung disease need to stay inside to limit exposure to unhealthy air. Smoke from tobacco products is another form of pollution. Ask your family and friends not to smoke around you.

**Aerosol sprays**
Aerosol sprays, such as room fresheners, deodorants and oven cleaners, pollute the air in your home. Breathing in these products is irritating to your lungs. These products linger in the air making them hard to avoid. Substitute aerosol spray in your home for products that can be poured or rubbed.

**Fumes**
Avoid fumes that may irritate your lungs. Ventilate your cooking stove by turning on the exhaust fan or opening a nearby window to draw the cooking fumes out of the house.

**Humidity**
If you live in a humid area and have mildew or mold in the house, you may want to dehumidify your home. Air conditioning will do this, or you can use a dehumidifier. If your house is too dry, it can dry out the mucus linings of your airways. Use a humidifier to add moisture to the air.

**Dust**
Avoid activities that raise dust, such as sweeping, dusting, driving on dirt roads and mowing grass. If you must get involved in a dusty job, wear a scarf or handkerchief over your nose and mouth or buy a surgical mask to wear. This helps to filter the air that you inhale. Also, regularly clean filters in air conditioners and furnaces.

**Extremely cold weather**
Cold air can irritate the bronchial tubes and cause coughing. When you go outdoors in very cold weather (less than 40 degrees Fahrenheit), breathe through a scarf or handkerchief held over your nose. This will help warm the air as it enters your lungs.
Breathing Retraining

Breathing retraining can help reduce feeling short of breath and tired, and help you use less energy in your daily tasks. **Practice this breathing for 10 to 15 minutes each day.** Rest as needed between breaths.

**Pursed lip breathing**

This type of breathing helps during exercise or any activity that may cause you to feel short of breath. It keeps your airways open longer as you exhale to release trapped air in your lungs. **Practice this when you are resting,** so you can use it when you feel short of breath.

**Follow these steps:**

1. Breathe in through your nose and feel your lungs fill with air.
2. Purse your lips together as if you were going to whistle or blow out a candle.
3. Breathe out slowly through your pursed lips. **It should take 2 to 3 times longer to breathe out than it take to breathe in.**
4. You may need to adjust your breathing rate and how much you purse your lips to help your comfort.

**Diaphragmatic breathing**

This type of breathing strengthens your diaphragm and stomach muscles to clear trapped air in your lungs.

**Follow these steps:**

1. Lie or sit down in a comfortable position, relaxing your neck and shoulder muscles.
2. **Place one hand on your chest and the other hand at the bottom of your ribs** just above your waistline. Use your hands to feel the movements as you breathe.
3. **Take a breath in through your nose and feel your hand on your stomach move outward. Do NOT let your shoulders move up. Do NOT expand your chest.** Think about expanding your lungs in all directions.
4. **Breathe out slowly through your mouth with pursed lips** as if you were going to whistle or blow out a candle. The hand on your stomach moves in as you breathe out. You may need to pull your stomach muscles in at first to help move your diaphragm up. Exhale or breathe out at least twice as long as you take to inhale or breathe in.

**Patterned breathing**

This type of breathing moves the air in a pattern in and out of the lungs. It controls your shortness of breath during a burst of strenuous activity, like:

- Lifting or pushing objects
- Climbing a step or two
- Standing up from a seated position
- During strength training with upper and lower body exercises

With patterned breathing, you breathe out during the hardest part of the activity, such as lifting a weight. Remember to never hold your breath during activity.

**Example 1: Standing up from a seated position.**

1. Inhale while you are seated.
2. Exhale as you stand up.

**Example 2: Lifting a laundry basket.**

1. Inhale when bending down to grab the basket.
2. Exhale as you stand up, holding the basket.
People with lung disease often have extra amounts of thick, sticky mucus. Having too much mucus makes breathing more difficult and increases your risk of getting a lung infection. You cannot stop your body from producing extra mucus, but there are techniques to help you get rid of the mucus easier.

First, drink plenty of fluids to help thin the mucus and make it easy to cough up. Six to eight glasses of water a day is often how much is recommended. Ask your doctor or rehabilitation specialist how much fluid you should drink.

Once the mucus is thin, you can get rid of it through controlled coughing, postural drainage and chest percussion. A respiratory therapist will work with you to teach you breathing and coughing techniques.

**Controlled coughing**

Controlled coughing is a special technique that helps you bring up mucus more easily. Controlling the way you cough forces mucus up and out of your lungs without causing tiredness, shortness of breath, or increased pain, if you have had chest surgery.

1. Sit upright in a chair and bend forward slightly. Take a deep breath in through your nose, and hold it for 2 seconds.
2. Instead of exhaling, through your nose, cough 2 or 3 times with your mouth slightly open. This loosens the mucus with the first cough and moves it upward with the second and third cough. Be careful to not just clear your throat. Use your stomach muscles to help with light coughing.

3. Wait a few seconds then breathe in normally and gently through your nose. Breathing in deeply after you have coughed may force mucus back into your lungs. Repeat these steps again.
Tips to Control Panic Breathing

Panic breathing can occur at any time and for a number of reasons. With shortness of breath, worry and anxious thoughts can start to enter your mind, causing more shortness of breath and tense muscles. Panic breathing increases your breathing rate and does not allow you to take full breaths. Your body needs more oxygen when you are anxious, and your muscles are tense.

The vicious cycle of shortness of breath and panic breathing

1. Increased shortness of breath due to infection, inflammation, worsening of lung disease, forgotten medicines, anxiety, stress or environmental factors.
2. Increased demand for oxygen when anxious and tense. Decreased gas exchange due to shortness of breath.
3. Increased anxiety and panic. Muscles become more tense and heart rate, blood pressure and breathing rate increase.
4. Thoughts... Why am I getting so short of breath? Am I going to be okay? I don’t want to go to the hospital!
**Tips to help**

- **Start pursed lip breathing right away.** This will help slow your breathing down, allow your lungs to empty fully and allow more oxygen in with your next breath. **Breathe out twice as long as you breathe in through pursed lips.**

- **When you can, sit down.** Lean slightly forward and place your hands on your lap, **palms up**. This will help relax your shoulders and decrease your upper body tension.

- As you do your pursed lip breathing, think of reasons for your shortness of breath. What can you do to prevent this from happening again and what actions can you take now?
  - Did you forget to take your lung medicines? Do you need your short acting inhaler or nebulizer treatment?
  - Are you coming down with an illness? Do you have signs of fever, cough, increased mucus or labored breathing with normal activity?
  - What is the weather like outside? Is it very hot or humid? What is the air quality?
  - Do you feel anxious or stressed? Why? Read “Coping with Lung Disease” in this book to learn skills to manage your stress.

**Seek medical help** if your shortness of breath does not ease with pursed lip breathing and your short acting inhaler or nebulizer treatment.

**Talk to your doctor** or any member of your care team if your medicines and home oxygen are not managing your lung disease symptoms.
General tips

1. Sit when doing a task. Standing takes more energy.
2. Do work with your arms instead of your legs. Working with your legs takes more energy.
3. Wait 30 minutes after eating before doing a task. Work done after a meal causes more demand for oxygen to your heart.
4. Avoid doing activities in temperatures above 80 degrees F with humidity and below 20 degrees F. Extremes of heat and cold have a dangerous effect on the heart.

Pace yourself to save energy

1. Get at least 6 to 8 hours of sleep each night.
2. Rest for 20 to 30 minutes at least twice a day. If you get tired, stop and rest for 15 minutes whether you have finished the task or not.
3. Alternate easy tasks with hard tasks or spread a task out over the day.
4. Focus your energy on the things you can do.
5. Ask for help if the demands on your energy are too much. Hire help as needed.
6. Avoid stress.
Use labor-saving methods and devices to save energy

1. **Sit to work as much as possible.** Avoid crossing your legs. This interferes with blood returning to the heart.
   - Sit at a counter or table to prepare food.
   - Use a riding lawn mower.
   - Sit in a stool at a work bench.
   - Sit to dress, shave, do hair, put on make-up and dry off after a shower.
   - Sit to iron.
   - Use a shower bench to sit and a hand-held shower head in the shower.

2. **Organize work areas:**
   - Keep cleaning materials on each floor.
   - Store garden tools in the garage.
   - Store shaving equipment and cosmetics near the sink and mirror.
   - Store seldom used equipment out of the way.
   - Store frequently used items in the kitchen at chest height to avoid bending and stretching.

3. **Get rid of unnecessary work:**
   - Use a dishwasher.
   - Let dishes soak instead of scrubbing.
   - Use commercial pre-wash instead of scrubbing.
   - Air dry dishes rather than hand dry.
   - Cut open sealed bags. Do not tear them.
   - Wear no-iron permanent press clothes.
   - Use long handled mops, dusters and dustpans.

4. **Use automatic or electric appliances:**
   - Use an electric can opener, mixer, clothes dryer, sander, riding mower, electric saw and dishwasher.
   - Use cruise control when driving.
   - Use a rubber mat or wet towel under your mixing bowls to help steady them while stirring or mixing.

5. **Use good lighting and ventilation.**
6. Use wheels to move things:
   - A shopping cart for groceries.
   - A garbage can on wheels.
   - A cart for cleaning or repair supplies or to move heavy bags or laundry.

7. Use both hands to:
   - Lift objects, such as from the oven or refrigerator.
   - Push objects.

8. Use proper body mechanics:
   - Slide rather than lift.
   - Relieve back strain by keeping one foot up on a low stool while standing.
   - Use good posture when driving.
   - Do not lean forward unsupported. Instead rest your elbows on counter tops.
   - Bend at the knees to lift.

9. Shopping tips:
   - Make a list first.
   - Organize list by store aisle.
   - Shop at less busy times.

10. Dressing and bathing tips:
    - Wear button up clothing.
    - Wear loose clothing for easier breathing.
    - Sit while putting on shoes and socks.
    - Wear slip on shoes. Use a long-handled shoe horn and sock aid.
    - Use a terry cloth robe instead of a towel to dry off.
    - Use a shower bench to sit and a hand-held shower or a long-handled sponge.
    - Wear low-heeled shoes with shock absorbers.
    - Use an elevated toilet seat.
Oxygen Use

The room air you breathe is 21 percent oxygen. Your body needs oxygen to work well. When you inhale, oxygen travels down your windpipe (trachea) and into your airways and air sacs (alveoli). A mesh of tiny blood vessels, called capillaries, surrounds the air sacs. Oxygen molecules pass into the red blood cells of the capillaries and attach to red blood cell proteins, called hemoglobin. The oxygen-rich blood flows around the body to be used as energy (fuel).

With certain lung diseases, you may not be able to get enough oxygen into your blood stream by breathing the air around you. Extra (supplemental) oxygen may be needed to keep the oxygen in your body at the right level.

Measuring your oxygen level

A pulse oximeter measures the oxygen in your blood by reading the color of your blood through a light sensor. The hemoglobin in your blood turns bright red when it is full of oxygen. As oxygen is dropped off to your body’s cells, it turns a darker red or purple color. A small clip is put on over a finger to get a reading. A light flashes in the clip and shines a light through the tip of your finger.

Oxygen levels (SpO2) change or vary with rest and activity. Because you may not have any symptoms when your oxygen level is too low or too high, you may be told to check your oxygen level. You can purchase pulse oximeters at your local drug store or on the Internet.

Check your oxygen level when you feel shortness of breath. Do not keep it on all of the time, worrying about your oxygen level.

• Normal resting SpO2 = mid-90s to 100% (no one is 100% all of the time)
• Exercise or activity SpO2 = keep above 88%

If you have home oxygen, use it to keep your oxygen level above 88% during rest and activity per your doctor’s instructions.

Tips for accurate pulse oximeter readings:

• Make sure your fingers are warm.
• Use a finger without nail polish.
• When walking, you may need to bend your elbow, bringing your hand and pulse oximeter to your shoulder to check a reading. Arm motion can affect an accurate reading.
• Replace batteries as directed.
Low oxygen levels

Long term low oxygen levels, also called hypoxia, are not good for your body. Because all of your body’s cells need oxygen to work and live, low oxygen can affect almost every part of your body. Low oxygen is very hard on cells of your heart and brain, and other body cells that are always working and not able to repair themselves. Also, when your oxygen level is low, the right side of your heart has to work much harder to pump blood through your lungs.

If your body is not able to keep your oxygen level above 88% at rest, you may develop:
- Shortness of breath
- Fatigue
- Problems with thinking or concentrating
- Depression or anxiety
- Problems sleeping
- Heart arrhythmias
- Heart attacks
- Shorter life expectancy

Talk to your doctor if you have signs of low oxygen levels or have chronic low oxygen levels. You may need home oxygen or need to change the amount of oxygen you are using at rest and activity.

Home oxygen

Oxygen is considered a medicine that needs a doctor’s order to be prescribed or to have the amount of oxygen changed. Your oxygen company will work with you to find the type of oxygen and amount needed.

Supplemental oxygen has many benefits, which may include:
- Decrease shortness of breath.
- Improve energy levels.
- Improve thinking and memory.
- Improve quality of life.
- Extend life expectancy.

Oxygen flow is measured in liters per minute. Remember, room air is 21% oxygen.

1 liter = 25% oxygen
2 liters = 29% oxygen
3 liters = 33% oxygen
4 liters = 37% oxygen
5 liters = 41% oxygen
6 liters = 45% oxygen
7 liters = 49% oxygen
8 liters = 53% oxygen
...and so on

**Giving yourself more oxygen is not always better.** Too much oxygen can damage the cells of the lungs. For people with obstructive lung disease, it can cause the brain to not send out signals to breathe, causing them to take fewer or less deep breaths. This can cause confusion or lethargy. To prevent problems with too much oxygen, your oxygen flow level will be adjusted based on your pulse oximeter readings.
Oxygen sources

Extra oxygen can help your oxygen level stay in a good range. This means less damage to your heart and brain cells and lower blood pressure in your lungs. If your doctor prescribes oxygen, use it.

Oxygen is often given with a tube that has 2 prong openings that fit in your nose. This is called a nasal cannula (kan-u-la). A mask that fits over the nose and mouth or a tube connecting to a tracheostomy are other ways oxygen may be given for oxygen flow rates greater than 4 liters. “High flow” tubing may be used to decrease nose sensitivity.

There are several types of oxygen sources that may be used:

- **Compressed gas tanks** - These tanks, also called cylinders, can be large for use in the home or very small to be carried over the shoulder or wheeled around (portable tanks).
  - An **oxygen conserving regulator** may be attached to the tank. It senses when you take in a breath and only delivers the amount of oxygen needed. During activity, you may need to use the continuous flow setting to keep your pulse oximeter reading above 88%.
  - Oxygen flow ranges from 1 to 15 liters per minute.

- **Liquid oxygen systems** - Liquid oxygen is stored in a large refilling station that stays in your home. The oxygen company exchanges the unit when needed. Smaller portable units are filled at the top of the refilling station. This oxygen source is a good option if you need an oxygen flow of more than 10 liters per minute at home.
• **Concentrator** - These devices use electrical or battery power to draw in room air oxygen (21%), remove the nitrogen molecules and store it as a higher oxygen concentration in the unit. Some units have a “filling” station to fill up portable gas cylinders. Oxygen flow goes up to 10 liters per minute.

  › **Portable concentrator** - These devices run on batteries. They are limited to people who need 3 to 5 liters per minute of oxygen flow or less. Larger units are on rollers and go up to 6 liters per minute. These units are easy to use and just need to be plugged into an electrical outlet to recharge the battery.

Your oxygen company will determine the best source of oxygen for you, based on your needs and your doctor’s orders.

**Tips for oxygen use**

• **Call your oxygen company with any questions.** They can help you with:
  › Nasal cannulas or masks to meet your oxygen needs at rest and with activity.
  › An extra portable concentrator if you use more than 5 liters of oxygen flow per minute.
  › A humidifier for your concentrator. This is helpful if you have irritated or dry nostrils.

• When traveling:
  › Call your airline or cruise line to check their policies regarding oxygen use while traveling with them.
  › Ask your oxygen company to contact your place of destination to set up a home oxygen concentrator.
  › Make sure you have enough portable oxygen tanks or cords to recharge your battery powered portable concentrators.

• You may use saline-based products to ease dry or irritated nostrils, such as Ocean saline nasal spray or K-Y liquid lubricant. For your safety, **do NOT** use petroleum-based products, such as Vaseline, Blistex or Chapstick, which are highly flammable.
Oxygen Safety at Home

Oxygen itself does not burn. Oxygen can feed a spark and cause it to become a large fire in seconds. **To be safe at home, follow these fire safety guidelines.**

- **Do NOT smoke or allow anyone to smoke in the room where oxygen is being used.** E-cigarettes, matches, and lighters should not be used in the room either. A spark could ignite the oxygen, setting your face and oxygen tubing on fire! Your oxygen home care company will provide “No Smoking” signs to hang in your home.

- **Avoid open flames.** Do NOT store oxygen tanks within 10 feet of open flames, such as fireplaces, wood-burning stoves and gas stoves. When cooking, wear your tubing behind your head and down your back.

- **Use caution when using electrical equipment.** Do NOT use equipment with frayed cords or electrical shorts. They could cause a spark.
  - Use **battery powered** razors and hair dryers when using oxygen.
  - Hair dryers should be used on a **cool setting only.**
  - If you must use an electric razor or hair dryer, be sure to use it at least 5 to 10 feet away from the oxygen.
  - Do NOT use an appliance with a control box, such as a heating pad. Control boxes may throw sparks.

- **Avoid static electricity.**
  - Avoid nylon or woolen clothing that is more likely to cause static electricity.
  - Use a humidifier in winter to add moisture to dry air in your home.

- **Store and handle oxygen properly.** Store tank and liquid oxygen away from heat and direct sunlight. Secure tanks with chain as arranged by your home care therapist. Place tanks in a secure holder in an upright position.

- **Never apply any oily substance,** such as petroleum-based lip products, Vaseline, Blistex or Chapstick, to your nose, lips or the lower part of your face. They are highly flammable. You may use saline-based products to ease dry or irritated nostrils, such as Ocean saline nasal spray or K-Y liquid lubricant.
Exercising with Lung Disease

Your symptoms of lung disease will improve with regular exercise and increased activity. Exercise strengthens and conditions your muscles. Stronger muscles work better by using less oxygen at rest and with activity. This will help increase your energy level to do your daily activities and decrease your shortness of breath.

The best exercise to decrease shortness of breath and maintain independence is aerobic exercise. With this type of exercise, you keep your body in motion with exercises like walking, biking or swimming. **Do 30 to 45 minutes of aerobic exercise 5 days a week.** If you are having a bad breathing day, but still want to exercise, decrease the intensity and do the same amount of time. You may need to take more “breather breaks”. If you have a short-acting inhaler or nebulizer treatment, you may want to use it 15 to 30 minutes before exercise to decrease your shortness of breath.

Another routine to add to your aerobic exercise is strength training and balance training. **Do strength training and balance training 2 to 3 times per week.** Strength training can include free weights, machines, resistance bands and your body weight.

**Rating your shortness of breath and exertion during exercise**

We want you to exercise safely. Use these scales to measure how hard the exercise feels to you:

*Borg Rating of Perceived Dyspnea:*

This scale rates shortness of breath, also called dyspnea. **If your rating is greater than 6, slow down.** If your rating is under 6, you can safely increase your speed or exercise longer.

<table>
<thead>
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<th>No shortness of breath</th>
<th>Slight shortness of breath</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0.5</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
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<td>3</td>
<td>4</td>
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<tr>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Severe shortness of breath</td>
<td>Strong or hard breathing</td>
</tr>
<tr>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>9</td>
<td>10</td>
</tr>
</tbody>
</table>

*Borg Rating of Perceived Exertion (RPE):*

This scale rates your effort in response to an activity. **A rating of a 4 to 6 is a safe level of exertion.** This means you are comfortably tired after an activity. If your rating is less than 3, it is safe for you to increase your speed or exercise longer. If your rating is greater than a 4, slow down.

<table>
<thead>
<tr>
<th>No effort</th>
<th>Noticeable effort</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0.5</td>
</tr>
<tr>
<td>1</td>
<td>Very light effort</td>
</tr>
<tr>
<td>2</td>
<td>Light effort</td>
</tr>
<tr>
<td>3</td>
<td>Moderate effort</td>
</tr>
<tr>
<td>4</td>
<td>Somewhat strong effort</td>
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<tr>
<td>5</td>
<td>Strong effort</td>
</tr>
<tr>
<td>6</td>
<td>Very strong effort</td>
</tr>
<tr>
<td>7</td>
<td>Very, very strong effort</td>
</tr>
<tr>
<td>8</td>
<td>Maximum effort</td>
</tr>
</tbody>
</table>

Upper Body Strengthening Exercises

Do all upper body exercises slowly. **Do not hold your breath** and remember to exhale as you do the “work” part of each exercise. **If you feel any unusual pain in your joints or muscles while you exercise, stop the exercise.** You will need a firm chair and hand held weights or wrist weights for these exercises. You may also do these exercises standing. **Do 2 sets of 12 repetitions, 3 times a week.**

**Chest press**

Sit in a chair with your back straight. Hold a weight in each hand at chest level, elbows bent.

As you exhale, slowly push the weights straight out in front of you until your arms are straight. Keep a slight bend in your elbows.

As you inhale, slowly return to starting position.

Repeat.

**Front raises**

Sit in a chair with your back straight. Hold a weight in each hand at your sides.

As you exhale, slowly raise your arms, palms down, to shoulder height. Keep a slight bend in your elbows.

As you inhale, slowly return to starting position.

Repeat.
Biceps curls

Sit in a chair with your elbows tucked in at your sides. Hold a weight in one hand, palm facing forward.

As you exhale, slowly bend your elbow, bringing the weight up to your shoulder.

As you inhale, slowly return to starting position.
Repeat on the other side.

Chest pulls

Sit in a chair with your back straight. Hold a weight in each hand, at the center of your chest, at shoulder height and with your elbows bent.

As you exhale, slowly pull your elbows back to shoulder height until you feel a pinch between your shoulder blades.

As you inhale, slowly return to starting position.
Repeat.
**Upright row**

Sit in a chair with your arms in front of you, a weight in each hand and resting on your knees.

As you exhale, slowly lift the weights by pulling your elbows up and out at shoulder height. Keep your elbows higher than your wrists. Hold.

As you inhale, slowly return to starting position. Repeat.

**Triceps extension**

Sit in a chair and lean forward. Hold a weight in your hand and at your side. Bend your elbow to bring it up toward your back.

As you exhale, slowly raise the weight behind you, keeping your upper arm and elbow still and pinned to your side.

As you inhale, slowly return to starting position. Repeat.
Lower Body Strengthening Exercises

Do all lower body exercises slowly, do not hold your breath and remember to exhale as you do the “work” part of each exercise. **If you feel any unusual pain in your joints or muscles while you exercise, stop the exercise.** You will need a firm chair to help you do some of these exercises. **Do 1 set of 15 repetitions, 3 times a week.**

**Mini squats**

1. Stand behind a chair and rest your arms on the chair for support.
2. Move feet about shoulder width apart.
3. Slowly bend your knees and hold.
4. Slowly straighten back up, keeping both feet on the floor.

**Hamstring curls**

1. Stand behind a chair with your toes forward. Hold onto the back of the chair for support. Stand up straight and steady.
2. Stand with your weight on one foot and have the other leg back slightly, toes on the ground.
3. Lift the foot by bending the knee back toward your buttocks and hold.
4. Lower the foot by straightening the knee.
5. Change to the other leg.
**Hip abduction**

Stand holding onto a chair for balance.
As you exhale, slowly move your leg out to the side.
As you inhale, slowly return to starting position.
Repeat with your other leg.

**Calf raises**

Stand with feet hip width apart. You may hold onto the back of a chair for balance.
As you exhale, slowly lift your heels as high as you can, shifting your weight onto the balls or front part of your feet.
As you inhale, slowly return to starting position.
Repeat.

**Variation:** You may hold a 1 to 5 pound dumbbell in each hand with palms facing toward your body and arms hanging at your sides.

**Glute kickbacks**

Stand holding onto a chair for balance, keeping your legs hip width apart and your toes pointed forward.
As you exhale, slowly extend one leg back with a straight knee until you feel a squeeze in your backside.
As you inhale, slowly return to starting position.
Repeat with your other leg.
Balance Exercises

Balance exercises improve coordination and decrease your risk for falls. **As you do each exercise, use a chair for support until your balance improves.**

Do these exercises 3 times, 3 days a week. Hold each pose for 15 to 20 seconds.

**Standing with feet together**

1. Find a stationary object to stare at as you hold each pose: arms out to your sides, arms down at your sides and arms crossed on your chest.

2. **Close your eyes** and picture yourself in an upright position as you hold each pose: arms out to your sides, arms down at your sides and arms crossed on your chest.

![Arms out to your sides](image1)

![Arms down at your sides](image2)

![Arms crossed on your chest](image3)
Standing with one foot in front of the other

1. Find a stationary object to stare at as you hold each pose: arms out at your sides and arms crossed on your chest. Repeat with your other foot in front.

2. **Close your eyes** and picture yourself in an upright position as you hold each pose: arms out at your sides and arms crossed on your chest. Repeat with your other foot in front.

Standing one foot balance

1. Find a stationary object to stare at as you balance on one foot. Switch sides.

2. **Close your eyes** and picture yourself in an upright position as you balance on one foot. Switch sides.
Healthy Eating for People with Lung Disease

Oxygen plays a central role in helping your body turn the carbohydrates, proteins and fats in the foods you eat into energy. Carbon dioxide is a by product of that process. Carbohydrates produce the most carbon dioxide and fats produce the least.

Tips for healthy eating

Since what you eat can affect your breathing, your doctor or dietitian may recommend that you:

• Eat 3 small meals and 1 or 2 snacks a day.
  › Women: 300 to 500 calories/meal
  › Men: 400 to 600 calories/meal
  › Snacks: 100 to 250 calories

  Eating smaller meals and snacks will allow your lungs room to expand when you breathe and help you to maintain a healthy weight.

• Eat a variety of healthy foods like vegetables, fruits, whole grains, low-fat dairy products and lean protein foods.

• Servings sizes are listed on a food product’s Nutrition Facts food label. Similar foods have the same serving size. This allows the consumer to compare foods more easily. Is your serving size the same as the one on the label? All nutrition information on the label is based on 1 serving. Be aware that many packaged foods have more than one serving in them!

• Eat two servings of protein like milk, meats, fish, poultry, eggs, beans and nuts each day to support respiratory muscle strength.

• Eat less carbohydrates to help you breathe easier.

• Limit foods high in added sugars like candy, cake, cookies and soft drinks.

• Eat less foods that cause gas if you feel bloated or short of breath. This includes raw apples, asparagus, beans, broccoli, cabbage, carbonated drinks, cauliflower, corn, cucumbers, melons, raw onions, peas and peppers.

• If you are working to lose or maintain your weight, choose mono- and polyunsaturated fats, like canola, olive and safflower oils, over saturated fats like butter and animal fat.

Nutrients to look for: fiber

Dietary fiber is found in plant products. It adds bulk to your diet and makes you feel full faster, helping you to control your weight. It helps digestion and helps prevent constipation. Increase your fiber intake slowly to 25 to 35 grams a day to avoid abdominal discomfort. Good sources of fiber include whole grains, nuts and seeds, and fruits and vegetables.
Nutrients to look for: calcium

If you are taking a steroid or have osteopenia or osteoporosis, eat 4 servings of calcium-rich foods a day. Good sources of calcium include:

<table>
<thead>
<tr>
<th>Food</th>
<th>Serving size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk</td>
<td>1 cup</td>
</tr>
<tr>
<td>Yogurt, fruit flavored</td>
<td>1 cup</td>
</tr>
<tr>
<td>Frozen yogurt</td>
<td>1/2 cup</td>
</tr>
<tr>
<td>Cottage cheese</td>
<td>1/2 cup</td>
</tr>
<tr>
<td>Colby, cheddar and jack cheeses</td>
<td>1 ounce</td>
</tr>
<tr>
<td>American cheese</td>
<td>1 ounce</td>
</tr>
<tr>
<td>Swiss cheese</td>
<td>1 ounce</td>
</tr>
<tr>
<td>Non-fat dry milk powder</td>
<td>1 Tbsp</td>
</tr>
<tr>
<td>Clams</td>
<td>3.5 ounces</td>
</tr>
<tr>
<td>Sardines, canned with bones</td>
<td>1/2 cup</td>
</tr>
<tr>
<td>Shrimp</td>
<td>3.5 ounces</td>
</tr>
<tr>
<td>Orange</td>
<td>1 medium</td>
</tr>
<tr>
<td>Calcium-fortified orange juice</td>
<td>6 ounces</td>
</tr>
</tbody>
</table>

Nutrients to limit: sodium

Avoid eating foods high in sodium if you have high blood pressure, heart disease or heart failure. Too much sodium increases blood pressure. Eat a very low sodium diet or less than 2,000 milligrams of sodium a day. Read food labels to help you plan low sodium meals and snacks, and cook at home. Always check with your doctor before drastically changing your diet.

- **Limit use of table salt.** Table salt is the most common source of sodium in the diet. One teaspoon of salt has 2,300 mg of sodium.
- **Avoid packaged, processed foods,** which are high in sodium. These include condiments, frozen meals, lunch meats, canned foods, and ready-to-eat cereals, breads and baked goods.
- Sodium occurs naturally in foods. Fresh fruits, vegetables, meats and rice often have low sodium content. **Most foods in your diet should come from these food groups.**
- **Use herbs and spices to flavor your foods** instead of salt.
- **Avoid fast food meals,** which are high in sodium.
Maintain a healthy weight

Maintaining a healthy weight is important for your overall health. It can help you control your breathing problems, help you feel good about yourself and give your body energy.

What should my weight be?

Body mass index (BMI) estimates what your weight should be for your height. It does not take into consideration that muscle mass is heavier than fat and may skew the result, such as for people with a lot of body muscle (body builders). Ask your doctor what is a healthy weight for you.

Pulmonary rehab staff can help you calculate your BMI:

\[
\text{Weight in pounds} \times 703 = \text{____________ (BMI)}
\]

\[
\frac{\text{Height in inches}^2}{703}
\]

Underweight = less than 18.5

**Normal = 18.5 - 24.9**

Overweight = 25.0 - 29.9

Obese = 30.0 or more

If you need to lose weight:

Weight gain can be a problem for people with lung disease due to lack of physical activity, poor diet and certain medicines. Tips for weight loss:

- Follow guidelines at [www.choosemyplate.gov](http://www.choosemyplate.gov) and ask for the handout, *Healthy Weight, Healthy Living*.
- Eat a diet low in saturated fat and sugar.
- Avoid fried and fast food meals, which contain a lot of sodium, fat and sugar.
- Be physically active. Choose activities you like and do what you can, at least 10 minutes at a time.

If you need to gain weight:

Weight loss can be a problem for people with advanced lung disease. You may need more calories than someone without breathing problems. Tips to increase your weight:

- Eat 250 to 500 more calories a day.
- Eat calorie dense foods, such as those with a high fat content. Examples include high fat dairy products (ice cream, whole milk, butter), oils, nuts and peanut butter.
- Avoid drinking a lot of fluids before and during meals, which will fill you up.
- Use meal supplements, such as Ensure or Boost.
Making Sense Out of Food Labels

Claims on food packages can be confusing. Learn how to read Nutrition Facts and the ingredient list on food labels. Knowing what is in food may help you to make healthier choices.

Health experts recommend being at a healthy weight for your body size and type to prevent diseases like diabetes, cancer and heart disease. Eating a healthy diet is important for weight control. Reading food labels is the best way to get information about what is in your foods. This can help you make better choices and eat healthier overall.

The easiest way to lower fat, sodium and sugar in your diet is to eat fruits and vegetables each day. Eating the whole versions of these foods instead of drinking juices will give you more fiber and other nutrients.

**Nutrition Facts**

1. Look for the **Nutrition Facts** on a product's food label.
   Refer back to the illustration on this page as you learn what each item means.

2. **Serving Size**: Similar foods have the same serving size. This allows the consumer to compare foods more easily. Is your serving size the same as the one on the label? All nutrition information on the label is based on 1 serving.

3. **Total Fat**: Most people need to cut back on fat. Too much fat in your diet may lead to heart disease and cancer.
   **Guideline**: Aim for about 30% of calories from fat in your diet. Some health conditions are made better by lower fat diets. Your Doctor may want you to eat less fat. Make most of the fat in your diet from plant oils and seafood. Use less solid fats, like butter and shortening.

   If you divide the calories from fat by the total calories and multiply by 100, you get the percentage of fat found in 1 serving of a product. Using the food label on this page, 110 calories from fat / 250 calories = 0.44 x 100 = 44% fat.

4. **Saturated Fat**: Saturated fat has been shown to raise blood cholesterol levels and your risk of heart diseases. Saturated fats should be eaten in moderation. For good heart health, no more than 7% of your total calories should come from saturated fats.
These fats are usually solid at room temperature. Animal products like meat, full fat milk, eggs, cheese, butter, and palm and coconut oils are sources of saturated fats.

**Guideline:** Foods that have 2 grams (g) or less of saturated fat per serving are okay for a low saturated fat diet.

5. **Trans Fat:** Trans fats are mostly man-made or processed fats. These are created when vegetable oils are hydrogenated or have hydrogen added to them. These fats are listed in the ingredients as “partially hydrogenated” oils. Trans fats become solid at room temperature, like saturated fats. Trans fats increase your risk of heart disease by raising your LDL (bad) cholesterol level and decreasing your HDL (good) cholesterol.

Some foods have small amounts of trans fat naturally in them. These foods include beef, butter and high fat dairy products. Most trans fats, though, are added to foods as partially hydrogenated oil. Trans fats should be avoided or used in very small amounts to reduce your risk of heart disease.

**Guideline:** Limit naturally occurring trans fat to less than 1% of total calories. Partially hydrogenated oils should be avoided as much as possible. Read food ingredients labels to look for these fats.

6. **Cholesterol:** Dietary cholesterol can contribute to heart disease. Animal products such as meat, milk, cheese, eggs and butter contain cholesterol.

**Guideline:** 300 milligrams (mg) each day is the maximum recommended for a heart healthy diet. For people who are at risk for heart disease or type 2 diabetes, 200 mg is the maximum recommended amount.

7. **Sodium:** Sodium is a mineral. Table salt and processed foods have a lot of sodium. The recommended daily amount for healthy adults is no more than 2,300 mg sodium per day. Avoid eating foods high in sodium if you have high blood pressure, heart disease or heart failure. Too much sodium increases blood pressure. Eat a very low sodium diet or less than 2,000 milligrams of sodium a day.

**Guideline:** Look for foods that have less than 300 mg of sodium per serving. Watch the number of servings of any food you eat.

8. **Total Carbohydrate:** Carbohydrates are in foods like bread, pasta, potatoes, fruits and vegetables. Carbohydrates should make up about 45 to 60% of your total calories per day. The best choices are fruits, vegetables, beans and peas, and 100% whole grains. These foods are also called “complex carbohydrates.”

**Guideline:** Look for carbohydrate foods that have fiber in them such as: fresh fruits and vegetables, 100% whole grains, and dried beans and peas. These are some of the healthiest carbohydrate foods.

9. **Dietary Fiber:** Fiber is the bulk part of grains, beans and peas, and fruits and vegetables. The human body cannot fully digest fiber. Fiber helps the body’s digestive system work well and may help lower the risk of some cancers and heart disease. A high fiber diet contains 14 g of fiber for every 1,000 calories. This is about 25 to 35 g of dietary fiber per day for most adults.

**Guideline:** Foods that have at least 3 g of fiber per serving are considered good sources.

10. **Vitamins and Minerals:** Only two vitamins, A and C, and two minerals, calcium and iron, are required on the food label. Your goal is to reach 100% of each for the day. A food company can voluntarily list other vitamins and minerals in the food.
11. % Daily Value: Daily values are the percentage of nutrients the product provides based on a diet of 2,000 calories per day.

Daily values are the label reference amounts which show the minimum or maximum intake of certain nutrients. These numbers are based on current nutrition recommendations. Daily values are listed for people who eat 2,000 or 2,500 calories each day. Your nutrient needs may be less or more than the Daily Values on the label.

The % Daily Value on the right side of the food label shows about how much of your daily need for the listed nutrients are met. For example, the total fat in the example food label meets about 18% of your total fat needs. This is based on a 2,000 calorie diet. If you need fewer calories than this, the percentage daily value would meet more than 18% of your needs.”

How do I use food labels to figure out what I need?

The table below shows the daily nutrient recommendations based on a range of calorie levels. It shows diets based on calorie levels and gives about the amount of carbohydrates, protein, fat and saturated fat you might want to eat. It is important to consult with your doctor before starting a reduced calorie diet. You may have different needs than the ones listed below.

### Recommended Nutrients

<table>
<thead>
<tr>
<th>Calories</th>
<th>1200</th>
<th>1300</th>
<th>1400</th>
<th>1500</th>
<th>1600</th>
<th>1700</th>
<th>1800</th>
<th>1900</th>
<th>2000</th>
<th>2100</th>
<th>2200</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Carbohydrates (g):</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>About 50% of calories</td>
<td>150</td>
<td>163</td>
<td>175</td>
<td>188</td>
<td>200</td>
<td>212</td>
<td>225</td>
<td>238</td>
<td>250</td>
<td>263</td>
<td>275</td>
</tr>
<tr>
<td><strong>Protein (g):</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>About 20% of calories</td>
<td>60</td>
<td>65</td>
<td>70</td>
<td>75</td>
<td>80</td>
<td>85</td>
<td>90</td>
<td>95</td>
<td>100</td>
<td>105</td>
<td>110</td>
</tr>
<tr>
<td><strong>Fat (g):</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>About 30% of calories</td>
<td>40</td>
<td>43</td>
<td>47</td>
<td>50</td>
<td>53</td>
<td>57</td>
<td>60</td>
<td>63</td>
<td>66</td>
<td>70</td>
<td>73</td>
</tr>
<tr>
<td><strong>Saturated fat (g)*:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>About 7% of calories for good heart health</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>12</td>
<td>13</td>
<td>14</td>
<td>15</td>
<td>16</td>
<td>17</td>
<td>18</td>
</tr>
</tbody>
</table>

*Subtract the saturated fat grams you eat from the total fat grams allowed.

### Common food label terms

<table>
<thead>
<tr>
<th>Key Words</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Free</td>
<td>Contains under: 5 calories; 5 mg sodium; ½ g sugar, fat or saturated fat; 2 mg cholesterol; and 2 g or less of saturated fat per serving</td>
</tr>
<tr>
<td>Low</td>
<td>Contains no more than: 40 calories; 140 mg sodium; 3 g fat; 1 g and 15% total calories saturated fat; 20 MG cholesterol or less per serving</td>
</tr>
<tr>
<td>Reduced</td>
<td>An altered product that contains 25% less of a nutrient (fat, sugar, cholesterol, sodium) or 25% fewer calories than a reference food</td>
</tr>
<tr>
<td>Less</td>
<td>Contains 25% less of a nutrient or 25% fewer calories than a reference food</td>
</tr>
</tbody>
</table>
The ingredient list
In addition to the Nutrition Facts Label, look at a product’s ingredient list to help you make better food selections. The ingredient list tells you what is in the food. Manufacturers list ingredients by weight in order of greatest amount to least amount in the food. It is a valuable resource for people with food allergies. Use the table to help you identify ingredients that are high in a nutrient.

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Common Ingredients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium</td>
<td>• Baking powder</td>
</tr>
<tr>
<td></td>
<td>• Baking soda</td>
</tr>
<tr>
<td></td>
<td>• Monosodium glutamate</td>
</tr>
<tr>
<td></td>
<td>• Salt (regular or sea salt)</td>
</tr>
<tr>
<td></td>
<td>• Sodium</td>
</tr>
<tr>
<td>Cholesterol</td>
<td>• Any animal fats</td>
</tr>
<tr>
<td></td>
<td>• High fat products, such as whole milk and cheese</td>
</tr>
<tr>
<td>Saturated and Trans Fats</td>
<td>• Any animal fats except fish</td>
</tr>
<tr>
<td></td>
<td>• Coconut butter</td>
</tr>
<tr>
<td></td>
<td>• Coconut oil</td>
</tr>
<tr>
<td></td>
<td>• Palm oil</td>
</tr>
<tr>
<td></td>
<td>• Partially hydrogenated oils</td>
</tr>
<tr>
<td>Sugar</td>
<td>• Brown sugar</td>
</tr>
<tr>
<td></td>
<td>• Carob powder</td>
</tr>
<tr>
<td></td>
<td>• Corn syrup/solids</td>
</tr>
<tr>
<td></td>
<td>• Dextrin</td>
</tr>
<tr>
<td></td>
<td>• Dextrose</td>
</tr>
<tr>
<td></td>
<td>• Fructose</td>
</tr>
<tr>
<td></td>
<td>• Glucose</td>
</tr>
<tr>
<td></td>
<td>• High fructose corn syrup</td>
</tr>
<tr>
<td></td>
<td>• Honey</td>
</tr>
<tr>
<td></td>
<td>• Invert sugar</td>
</tr>
<tr>
<td></td>
<td>• Lactose</td>
</tr>
<tr>
<td></td>
<td>• Mannose</td>
</tr>
<tr>
<td></td>
<td>• Molasses</td>
</tr>
<tr>
<td></td>
<td>• Mannose</td>
</tr>
<tr>
<td></td>
<td>• Sucrose</td>
</tr>
</tbody>
</table>

Guideline on a low sugar diet: If the label lists a form of sugar as one of the first three ingredients, or if it lists several forms of sugar farther down in the ingredient list, avoid using large amounts of the food product.
Osteoporosis

Osteoporosis, or porous bone, is a disease from the loss of bone mass thickness and bone quality. People may not know that they have osteoporosis until their bones become so weak that a sudden strain, bump or fall causes a bone fracture. Fractures occur most often in bones of the hip, spine and wrist, but any area of the bone can be affected.

More than 53 million people in the United States have osteoporosis or are at high risk of developing it.

Risk factors

There are risk factors you cannot change, and others that you can or may be able to change.

Risk factors that you cannot change:
- **Gender:** Women are at higher risk than men.
- **Age:** The older you are, the greater your risk.
- **Body size:** Slender, thin-boned women and taller women are at higher risk.
- **Race:** Caucasian women are at higher risk.
- **Family history** of osteoporosis.

Risk factors that you can or may be able to change:
- **Poor diet.**
  
  What you can do: Eat a healthy, balanced diet that includes plenty of fruits and vegetables, enough calories, calcium, vitamin D and vitamin K. Dietary sources of calcium include low-fat dairy products (fat free skim milk and yogurt), dark green leafy vegetables, sardines and salmon with bones, soy products, and calcium-fortified foods, such as orange juice, cereals and breads.
  
  - Men and women up to age 50 need 1,000 mg of calcium a day.
  - Women after age 50 need 1,200 mg of calcium a day.
  - Men after age 70 need 1,200 of calcium a day.

  If you have trouble getting enough calcium in your diet, **talk to your doctor about taking calcium supplements**, like calcium carbonate, calcium phosphate or calcium citrate. Vitamin D is needed to help your body absorb calcium. Choose a calcium supplement with vitamin D to meet your body’s needs.

- **Certain medical conditions**, like a sex hormone problem, eating disorder, genetic disorder, endocrine disease, gastrointestinal disease, blood disease or rheumatic disorder.
  
  What you can do: Talk to your doctor about treatment for your condition and your overall bone health.
• **Certain medicines**, such as long term use of steroid medicines, anticoagulants (heparin), some anticonvulsants, cyclosporine, tacrolimus, glucocorticoids and methotrexate, increase your risk for fractures.
  
  What you can do: Talk to your doctor about your overall bone health. Your doctor may be able to reduce your medicine dose or switch you to another medicine that is not harmful to your bones.

• **Are inactive or on bedrest.**
  
  What you can do: Start an exercise program that includes strength training under the supervision of your doctor, physical therapist or exercise specialist. This will help increase your muscle strength and decrease your risk of falls.

• **Excessive use of alcohol.**
  
  What you can do: Limit alcohol use. Talk to your doctor if you need help.

• **Smoking and tobacco use.**
  
  What you can do: Talk to your doctor for resources and aids to quit.

### Tests

Your doctor will do a physical exam, take a medical history, and perform blood and urine tests to check for medical conditions that could lead to osteoporosis. An x-ray of your spine and hips may be done to look for fractures or malformations due to osteoporosis. If you have risk factors for the disease, a bone density test may be done.

Dual-energy x-ray absorptiometry (DXA) is the most common bone density test done. It uses low levels of x-rays to measure bone density, often of the hip and spine. Your T-score is compared to the average bone density of other people your age, gender and race.

If your bone density is very low and you have risk factors for fractures, your doctor will talk to you about options for treatment or prevention of osteoporosis.

### Treatment

Your treatment plan will include eating a healthy diet rich in calcium, exercise, strength training and preventing falls. Your doctor may also prescribe medicines to slow or stop bone loss, and increase bone density. The most commonly prescribed medicines for the prevention or treatment of osteoporosis are bisphosphonates.
Safety Tips to Prevent Falls at Home

Falls can happen at any time and at any age. However, falls greatly increase as we get older due to slower reaction and response times. Here are some tips to use in your home to help prevent falls.

Throughout the home

- Remove throw rugs, so you do not trip on them.
- Replace or remove carpet that is torn or has turned-up edges. Avoid thick carpet. Shoes may catch and cause you to stumble or fall.
- Move furniture or other things that block walking pathways.
- Have good lighting throughout your home.
- Use night lights or leave some lights on in the house to help you see at night or when you come home in the evening.
- Use switches that glow in the dark, so they can be seen more easily.
- Keep electrical cords and small things out of your path.
- Use your cane or walker rather than using furniture to give you support when walking.

Stairs

- Mount sturdy handrails that extend beyond the top and bottom stair to help with going up and down stairs.
- Improve the visibility on your stairs. Have good lighting on the stairs.
- Non-skid surfaces can be applied to wood stairs to prevent sliding.
- Paint a bright colored line on the edge of each step, so they are more easily seen, especially if you have poor vision.
- Do not store items on steps. Keep steps clutter free.

In the bathroom

- Place non-skid decals or a mat in the tub or shower.
- Install grab bars around the toilet and in the shower or bathtub. Towel bars are to hold towels, and they will break if you use them as grab bars.
- Use a tub seat and an elevated toilet seat.
- Leave the bathroom door unlocked, so it can be opened if you do fall.
In the bedroom

- Avoid wearing long nightgowns or robes. These can cause you to trip.
- Avoid wearing loose shoes that cause you to scuff or shuffle your feet as you walk. Wear shoes or slippers that fit well and stay securely on your feet.
- Do not leave clothes or other items on the floor.

In the kitchen

- Have commonly used items at counter level or within easy reach.
- Do not climb or reach to grab items from high shelves.
- If you use a step stool, use a stable step stool with a handrail.

Other tips

- Be careful that you do not trip over your pet. Be aware of where you pet is when you are moving around.
- Use caution when sitting down. Before sitting down on a chair, make sure the backs of your legs are touching the seat of the chair behind you.
- Keep a telephone close by or carry a wireless or mobile phone.
- Consider a medical alert device if you live alone or are at risk for falling.
- Take your time. Get in the habit of moving at speeds that are safe for your energy level and ability. Do not rush to answer the phone or door.
- Ask for help when getting up from bed, a chair or the toilet if you feel at all shaky, weak, dizzy or light-headed.
- Visit your local medical supply store or search the Internet, using the keywords “assistive devices”, to find mobility aids and other devices to help you perform tasks.
- Discuss a referral for an in-home assessment by a physical or occupational therapist with your doctor.
- Practice your balance exercises to strengthen your muscles.
Preventing Infections

Infections are the main reason people with lung disease are admitted to the hospital. Even common illnesses, like the cold and flu, can lead to a lung infection. Preventing infections and knowing the signs of illness will help you seek early treatment and keep you out of the hospital.

Causes of infection
Infections are caused by germs, such as bacteria and viruses. These germs are so small that millions of them can fit on the period at the end of this sentence. They cause common illnesses, such as colds and flu, and serious diseases, such as meningitis and tuberculosis.

How germs are spread
Most germs are spread through contact between people, often by unwashed hands. Some germs are airborne and travel on tiny particles in the air, entering the body as you breathe. Sometimes germs are passed through contaminated food or water.

Protecting yourself from illness
- Wash your hands often with soap and water for 20 seconds. Be sure to clean the backs of your hands, between your fingers and under your nails.
- When soap and water are not available, use an alcohol-based hand sanitizer that contains at least 60% alcohol. Rub the product over all surfaces of your hands and fingers until your hands are dry.
- Avoid touching your eyes, nose and mouth.
- Cover your mouth and nose with a tissue when you cough or sneeze to prevent spreading germs. If you do not have a tissue, cough or sneeze into your shoulder or bend of your arm.
- Clean surfaces, such as countertops, sinks, doorknobs, light switches, remote controls, computer keyboards, tablets and phones, with a disinfectant cleaner or cleaner with bleach.
- Limit your contact with those who are ill.
- Avoid shaking hands if you are ill or with others who are ill.
- Avoid large crowds.
- Stay away from others when you are sick. Stay home from work, school or running errands if you can.
- Get a full night’s rest, eat a healthy diet and drink at least 8 glasses of liquids each day.
- Maintain an active lifestyle.
- Get a flu shot every year, ideally in September or October, before peak flu season.
• Ask your doctor about getting pneumonia vaccines:
  ‣ Get the pneumococcal polysaccharide vaccine (PPSV23) every 5 years.
  ‣ Get the pneumococcal conjugate vaccine (PCV13) one time during your life.
• Keep your lungs clear from mucus, which can trap germs. Deep breathing and coughing exercises are a great way to clear out mucus.
• Use air quality index (AQI) forecasts to plan your day. Reduce your exposure to air pollution by staying indoors when air quality is unhealthy and rescheduling exercise to times of the day when air quality is expected to be better. Go to www.epa.ohio.gov/dapc/airohio/forecast.aspx for today’s AQI forecast and more information.
• Stay away from strong chemical fumes and smells.
• Avoid being outside in very hot, humid or cold temperatures.

**Signs of illness**

**Call your doctor at the first signs of illness.** The sooner you seek treatment, the more likely you are to prevent damage to your airways. Call your doctor if you have:
• Tightness in your chest that does not go away with your normal medicines or short acting inhalers
• Increased shortness of breath, trouble breathing or more wheezing
• Coughing more often or harder
• Chest pain with breathing or coughing
• Changes in mucus, including color, thickness or amount
• Fever, chills or muscle aches
• Fatigue
• Increased sinus drainage that does not go away with normal medicines
• Nasal congestion or pain along the cheekbones
• Fluid retention, such as swelling in your ankles or legs, or weight gain of 3 or more pounds overnight or within a few days
• Dehydration: less urine, dark urine or dry skin from less fluid
• Heart rate faster or more irregular than usual
• Dizziness, headaches or trouble thinking
• Changes in your vision
• Loss of appetite or nausea
• Confusion

**When you call your doctor, share with them:**
• How long you have had your symptoms.
• What medicines you are taking, how much and when.
• How your symptoms are changing (getting better or worse).
Obstructive Sleep Apnea

Obstructive sleep apnea occurs when a person stops breathing for a short time while sleeping. The muscles around the tongue and throat keep the airway open, so a person can breathe during sleep. If you have obstructive sleep apnea, these muscles relax during sleep causing the tongue or throat tissues to block or limit the flow of air to your lungs.

If you have signs of sleep apnea or do not feel rested when you sleep, your doctor may order a sleep study to check your breathing or when your oxygen level drops. If you stop breathing more than 5 times in an hour, it can have major effects on your health.

Who is at risk?
You are at increased risk for sleep apnea if you:
• Are a man
• Are older
• Are overweight
• Have a family history
• Snore
• Have daytime sleepiness
• Take sedating medicines
• Use alcohol
• Smoke
• Have certain health problems, like high blood pressure, stroke, heart failure or diabetes
How does sleep apnea affect me?
Sleep apnea does more than affect the quality of sleep. If not treated, it can cause:

- High blood pressure, also called hypertension
- Poor control of diabetes
- Daytime sleepiness and fatigue
- Irritability
- Problems concentrating or remembering facts
- Trouble losing weight
- Swelling in the legs
- Waking often at night to have to go to the bathroom
- Higher risk for stroke
- Higher risk of an irregular heart beat
- Increased risk for heart and blood vessel disease
- Less sexual drive
- Morning headaches
- Greater risk for accidents, especially when driving

How is sleep apnea treated?

- The most effective treatment is continuous positive airway pressure (CPAP). A mask or nasal cannula is worn while you sleep. Warm, humidified air is continuously pushed through the tube to keep your airway open and your oxygen level up while you sleep. Home oxygen can also be attached to the CPAP machine to give extra oxygen. Although it can take some time to get used to wearing the mask, most people feel more rested and alert. CPAP needs to be used every time you sleep to stop the apnea. If it is not used or not used correctly, apnea will return.
- Share with your doctor how well CPAP is working for you. The CPAP’s pressure settings and mask can be adjusted to improve your comfort and oxygen levels.
- If your apnea needs managed with two pressure settings, a bi-level positive airway pressure (BiPAP) may be an option. It has a setting for inhaling and a setting for exhaling.
- Remember to take your CPAP or BiPAP with you when you travel or if you are admitted to the hospital.
- Other treatment options include weight loss, sleeping on your side, dental devices and surgery.
Quit Tobacco Use

Smoking or any tobacco use is dangerous to your health. Quitting will reduce your risk of dying from heart disease, blood vessel disease, lung problems, cancer and stroke.

Benefits of quitting now

- In 3 months, your circulation and lung function improves.
- In 9 months, you will cough less and breathe easier.
- After 1 year, your risk of heart disease is cut in half.
- After 5 years, your stroke risk returns to normal.

Before you try to stop smoking, commit to stopping. Smoking is a learned behavior that you must unlearn. It is not easy to stop, but it can be done if you are serious about quitting. Stopping will help you live a healthier and longer life.

Talk to your doctor about quitting. Ask about classes and support groups in your area. Get support and encouragement and learn how to deal with stress. Talk with your doctor about medicines and other aids to help you quit. If you would like more information on stopping tobacco use, contact:

Quit lines:

- Ohio Tobacco Quit Line, 1-800-QUIT-NOW (784-8669)
- Quit for Life program from the American Cancer Society at 1-800-227-2345
- American Lung Association, 1-800-586-4872
- BeTobaccoFree.gov Smoking Quit Line, 1-877-448-7848

Ohio State clinics:

- Ross Heart Hospital Smoking Cessation Clinic, 420 W. 10th Avenue, Columbus, OH 43210, 614-293-0932
- The Lung Center, Tobacco Dependence Clinic, 2050 Kenny Road, Suite 2200, Columbus, OH 43221, 614-293-4925

Quitting Tobacco Use Book:
Available from your health care provider or visit https://patienteducation.osumc.edu/Documents/QuittingTobaccoUse.pdf.

Mobile apps:
Search your mobile device’s app store for quit smoking apps, such as QuitGuide and QuitSTART.
Aging and chronic health problems, like lung disease, can affect you physically, mentally and emotionally. Dealing with these normal responses takes different ways of coping. You use coping skills every day to manage your symptoms of lung disease. For example:

- When you are short of breath, you do pursed lip breathing and use your inhaler or nebulizer medicine as prescribed.
- When it is cold outside, you cover mouth and nose with a cotton scarf.

There is no one way to cope, but here are some ways to help you.

Remember to work on the issues or situations you can control and learn to accept or change your response to the ones you cannot control.

What are some of your stressors?

**Physical symptoms:**
- Shortness of breath
- Coughing
- Increased mucus production
- Increased heart rate or palpitations
- Supplemental oxygen needs
- Chest tightness or soreness
- Fatigued or tired
- Muscle or joint pain
- Not sleeping well
- ___________________________

**Activities of daily living:**
- Self care, such as dressing, showering and bathing
- Housework, such as cleaning and laundry
- Cooking
- Driving
- Taking all of your medicines
- Getting to appointments, events, church, etc.
- ___________________________

**Family, friends and home life:**
- I feel isolated. My family or friends are not involved in my life.
- My family or friends are too overbearing or I don’t get along with them.
- I take care of young children or other family members.
- I fear or lack intimacy.
- I have money concerns, such as debt or how to pay my bills, utilities, medicines, food, etc.
- ___________________________
Ways to handle stress

- Pursed lip breathing
- Listening to favorite music
- Relaxation techniques, such as guided imagery or progressive muscle relaxation
- Positive self-talk
- Meditation
- Prayer
- Reading books and magazines
- Hobbies or crafting
- Talking with family or friends
- Asking for help from family or friends
- Exercise or increased activity
- Professional counseling
- Watching TV or movies
- Computer use
- Pet companionship
- Getting more sleep
- Puzzles or games
- Journaling
- Volunteering
- Join “clubs” of interest

Relaxation Techniques

The relaxation techniques listed below will help with stress, anxiety, and muscle tension. It is good to practice these techniques often even when you are not stressed or anxious. There are many books, CDs and Internet resources that promote optimal mental health and muscle relaxation techniques through guided exercises. Your Pulmonary Rehab staff can help you with these techniques and give you more information to help you practice correctly and safely.

- **Guided imagery:**
  This is a type of meditation (not hypnosis) that involves seeing yourself or your surroundings in a way that promotes relaxation, safety and comfort. It reduces stress and anxiety, and promotes positive thinking. The more you practice, the easier it will become.
  - Set aside 10 to 15 minutes for the exercise.
  - No matter your beliefs, values or preferences, you chose the visual information in the guided imagery exercise.
  - Setting: For optimal results, make sure you practice in a calm environment. Turn off the lights, phone, radio and television. Get into a comfortable position, such as sitting or lying down.
  - For more information, please visit Ohio State Center for Integrative Medicine’s website at https://wexnermedical.osu.edu/integrative-complementary-medicine or call 614-293-9777.
  - For free guided imagery recordings, please visit https://wexnermedical.osu.edu/integrative-complementary-medicine/guided-imagery.
• **Progressive muscle relaxation:**
  This is a two-step process that involves tensing certain muscle groups and then relaxing the muscles to promote stress and tension relief.
  
  ‣ Set aside 15 minutes for this exercise.
  
  ‣ Setting: Find a comfortable, calm place where you will not be disturbed. Sitting in a comfortable chair or lying down is preferred.
  
  ‣ Muscle groups: Feet, calves, thighs, hands, upper arm (biceps), buttocks, stomach, neck, shoulders, mouth, eyes and forehead.
  
  ‣ Follow these steps:
    1. **Tension:** Take a deep breath in and clench (tightly) one of the muscle groups. Hold your breath for 5 seconds.
    2. **Relaxation:** Breathe out through pursed lips and relax the muscle group. After 15 seconds of breathing and resting, repeat the same muscle group 2 to 3 times before moving on to the next muscle group.
Coping with Lung Disease
Mental Outlook and Emotions

Good mental health is just as important as physical health. Your physical symptoms have a huge impact on your emotions and thoughts, which in turn affect your behaviors and reactions. The more severe your physical symptoms, like breathing, shortness of breath and physical activity, influence your daily life, the stronger the effect on your emotions, thoughts and behaviors.

**Physical Symptoms**
- Shortness of breath
- Coughing
- Increased mucus production
- Increased heart rate or palpitations
- Supplemental oxygen needs
- Chest tightness or soreness
- Fatigued or tired
- Muscle or joint pain
- Not sleeping well

**Behaviors and Reactions**
- Isolate yourself.
- Refuse help.
- Stop seeing friends.
- Lose interest in things you enjoy.
- Fear of intimate relations.
- Deny health issues.
- Stop eating.
- Overeat.
- Stop taking medicines.
- Take too many medicines.
- Stop exercising.
- Lash out at family and friends.
- Drink too much alcohol.
- Use recreational drugs.

**Emotions and Thoughts**
- Feelings of anxiety, frustration, anger, sadness and helplessness lead to negative thoughts:
  - “I feel alone.”
  - “I can’t do anything like I used to.”
  - “I don’t want to get sick and go to the hospital.”
  - “No one understands how I feel.”
  - “I’m a burden to my family.”
  - “My responsibilities overwhelm me.”
  - “I don’t want anyone seeing me this way.”
  - “Why did this happen to me?”
Coping reminders

When you’re not feeling well physically, it can affect your emotions, leading to changes in your behaviors. It’s easy to focus on negative thinking. Negative thoughts are normal, but they will keep you from making positive changes and obtaining positive outcomes in your daily life.

- **Recognize your negative thinking.** Ask yourself, “Am I thinking this way because I’m not feeling well, or because I’m stressed and anxious, or because I just had a bad experience?” When you start thinking or reacting negatively, adjust your thinking and responses with positive reinforcement.

  Examples of positive reinforcement:
  - I was able to decrease my shortness of breath without getting anxious!
  - I found a parking spot and was able to see the doctor on time. He even answered all my questions!
  - I don’t like calling my insurance company, but I have given myself enough time for the call and have my questions written down.
  - I increased my time and level on the Nu-step today! Yeah for me!

- **Take control of your reactions.** Don’t let your reactions take control of you. Try not to lash out at people or situations because of your frustration. Also, try not to avoid those people or situations you don’t want to deal with.
  - Instead, pause and ask questions if you are frustrated or do not understand. Sometimes asking a question is one of the best ways to communicate with others. It increases your knowledge and control of your reactions for your health, medical treatments, home-life situations and social interactions.

- **Don’t be afraid to ask for help.** This includes:
  - Professional counseling: Ask you doctor for a referral if needed. Talking to someone outside of your current situation or family circle will give you insight or steps to handle your reactions, issues or conversations you struggle with.
  - Home-life: Ask for help with housework, house repairs, yard work, meal preparation, etc.
  - Travel: Ask for help to get to and from appointments, the grocery store, etc.
  - Social support: Social support is the single most important buffer against stress. Share problems and seek advice from people you trust and care about.

How to find a counselor

Consider these resources if you need help finding a counselor:

- Your health insurance company for a list of professionals or companies that are covered under your insurance plan
- Your doctor, nurse, social worker, clergy, family and friends
- A Community Mental Health Center
- The Employee Assistance Program at your work
Other mental health resources

- Ohio State Psychology Service Center, 614-292-2345 or [https://psychology.osu.edu/psc/services](https://psychology.osu.edu/psc/services)

- Ohio State Mental and Behavioral Health, mental and behavioral health services are available at OSU Harding Hospital and Talbot Hall, 614-293-9600 or [https://wexnermedical.osu.edu/mental-behavioral](https://wexnermedical.osu.edu/mental-behavioral)

- Ohio State Center for Integrative Medicine Clinic, 614-293-9777 or [https://wexnermedical.osu.edu/integrative-complementary-medicine](https://wexnermedical.osu.edu/integrative-complementary-medicine)

- American Psychiatric Association, [https://www.psychiatry.org/](https://www.psychiatry.org/)


- Toll-free, 24-hour National Suicide Prevention Lifeline, 1-800-273-TALK (1-800-273-8255). You can also find more information by visiting [https://www.mentalhealth.gov/](https://www.mentalhealth.gov/).
Sexuality and lung disease

Lung disease does not lessen sexual interest for most people. Men may have more problems with impotence as lung function declines. Having sex does not raise blood pressure, heart rate or breathing rates to dangerous levels. The effort or amount of work is about the same as climbing a flight of stairs at a normal pace. The physical work of having sex can cause some people with lung disease to have trouble breathing, coughing or wheezing.

Some lung disease medicines can have an affect on sexual function. Talk to your doctor if you think you are having side effects from the medicines you take.

Sexuality and Lung Disease

Sexuality is part of healthy living. It is more than being male or female. It includes your emotions, feelings and experiences. Each person expresses sexuality in different ways. Sexual expression includes touching, talking, hugging, fantasizing, kissing or just holding hands. It can also include sexual intercourse.

Emotional issues and lack of communication are the most common reasons for problems with sexual relationships. Talk with your partner about your feelings and fears. Do not expect your partner to read your mind.

Things you can do

- Talk to your doctor, nurse or therapist about your sexual concerns. You may want to seek counseling if the problems persist.
- Use the breathing strategies and exercises you’ve learned in pulmonary rehab to build your strength and endurance and to feel less shortness of breath.
- Use your short acting inhaler or nebulizer treatment 15 to 30 minutes before planned sexual activity.
- Use home oxygen during sex if prescribed.
- Keep the room cool. Be sure there is good airflow in the room.
- Slow down or take a break if your shortness of breath gets too severe.
- Use massage to reduce muscle tension.
- Plan sexual activity for your best breathing time in the day. Wait at least 30 minutes after eating a meal.
- Use other ways to express your romantic feelings. Holding someone close, hugging and kissing are very intimate.
• Allow extra time for foreplay to allow for gradual adjustments to oxygen demands.
• You may need extra time to adjust your breathing to a reclining position when you first get into bed.
• Do not over focus on reaching an orgasm. With long-term lung disease, it may be more difficult to reach orgasm. Do not let this stop the romantic and intimate behaviors between you and your partner.
• Avoid positions that put pressure on the chest and stomach or those that require support of the arms. Explore new positions with your partner, including:
  • Lying face to face on your side. This allows free and easy breathing for both partners.
  • Lying on your side, back to front, with the man behind.

• For women:
  • Kneel on the floor bent over with your chest resting on the bed, with the man on his knees behind. This reduces the weight of the man pressing down on you.
  • Sit on the edge of the bed, feet on the floor and your back resting on pillows. The man kneels on the floor in front. This may be the most comfortable position.

• For men:
  • Lie on your back with the woman sitting on top. This allows the woman to do most of the work.