



# Oxygen Therapy



## INTRODUCTION

As Alpha-1 lung damage progresses, your lungs can't exchange oxygen well. This results in [hypoxemia](#) — low levels of oxygen in your blood. The long-term effects of hypoxemia are severe and life-threatening. To prevent them, your doctor may recommend adding oxygen therapy to your Alpha-1 COPD treatment plan.



**KEY LEARNING:** Under normal circumstances, the body's drive to breathe is in response to the carbon dioxide levels in the blood. The brain cannot detect low oxygen levels.

### Effects of low oxygen

Low oxygen levels affect your body in different ways.

**Lungs & heart:** When your blood oxygen levels drop, the vessels in your lungs constrict, or narrow. This causes pulmonary hypertension or high blood pressure in the arteries feeding your lungs.

Now, your heart has to work much harder to pump blood through your lungs. Over time, this strain can cause the heart to dilate, weaken, and eventually fail. Known as Cor Pulmonale, this right-sided heart failure can be directly caused by lung disease.

**Blood cells:** Red blood cells, especially hemoglobin, carry oxygen through your body. When your blood oxygen levels fall, the number of those red blood cells increases (polycythemia). That's your body's way of trying to get more oxygen to your tissues and cells. An increase in red blood cells can cause blood clots, headaches, and high blood pressure.

**Brain:** Low blood oxygen has negative effects on your brain, lowering your ability to:

- Concentrate
- Remember things
- Use abstract reasoning and solve problems
- Speak clearly
- Perform tasks that require gross or fine motor skills, like driving or typing



**BURNING ISSUE:** Severe hypoxemia is life-threatening, and can ultimately lead to delirium, coma, and death.

## Overall benefits of oxygen therapy

**A longer life:** Oxygen therapy can reverse the negative effects of low blood oxygen and improve survival rates. Research studies on people with severe COPD show that more daily hours of oxygen therapy result in more positive health effects. In one study, long-term oxygen therapy increased life span by as much as 6–7 years.

**A better life:** You don't just want to live longer. You want to live as well as you can, for as long as you can. Oxygen therapy helps you do that, by letting you stay active with less shortness of breath. People who use supplemental oxygen can [exercise longer and harder](#), which leads to greater overall fitness.

Oxygen therapy has many other positive effects that make life more pleasant. It boosts:

- Your ability to think and remember
- Mental alertness
- Physical stamina
- Mood
- Restful sleep

The benefits of oxygen therapy are numerous and profound!



**GOOD NEWS:** For COPD patients with hypoxemia and Cor Pulmonale, studies have shown treatment with long-term oxygen therapy increased the life span of these individuals by as much as six to seven years.

## ASSESSING OXYGEN NEEDS: NOW AND IN THE FUTURE

Over the long term, low blood-oxygen levels (hypoxemia) can lower your quality of life severely — and lead to death. Diagnosing hypoxemia, assessing oxygen needs, and starting oxygen therapy is key to living a better life with Alpha-1 lung disease.

### Do you have hypoxemia?

The most accurate way to determine the presence of hypoxemia is to test your “[arterial blood gases](#),” also called ABGs. This test also gives levels for oxygen, carbon dioxide, and other elements, such as blood pH and bicarbonate. Your healthcare practitioner can use an ABG test to establish your “baseline” condition. Declining oxygen levels may lead them to recommend oxygen therapy.

Your healthcare practitioner may also use [pulse oximetry](#) to test your blood oxygen levels. A pulse oximeter is a small device that clips onto your finger or ear lobe. It “reads” your oxygen level through your skin. Since the device is easy to use, you can test your own blood oxygen levels. This is helpful for ongoing testing once you have your baseline. However, pulse oximetry doesn’t provide levels for carbon dioxide or other blood gases.

### Assessing oxygen needs under different conditions

Pulse oximetry is easy to perform and provides instant results. It doesn’t require lab analysis, and it can be done in a range of settings. For example, if you have symptoms of hypoxemia while you’re exercising, you can test your oxygen level while

you’re on a treadmill or stationary bike. You can even test blood oxygen while you’re sleeping!

### Assessing oxygen needs over time

If you have an acute infection or your symptoms get worse suddenly, your healthcare practitioner may order oxygen therapy. In these instances, it’s good to reassess your need after 1–3 months. You may no longer need oxygen therapy.

Once you start regular, long-term oxygen therapy, you can use pulse oximetry to reassess your oxygen needs if your health changes.

### Official criteria for supplemental oxygen therapy

Medicare and other third-party payers use specific blood test criteria to decide when oxygen therapy should be prescribed. They also have criteria for deciding how much they’ll reimburse for the cost.

Medical experts set these criteria, which state the blood oxygen levels that call for the use of supplemental oxygen.

These guidelines describe three specific conditions that call for the use of oxygen therapy. This information may be helpful when you’re looking at your test results:

1. PaO<sub>2</sub> is less than or equal to 55 mmHg or hemoglobin oxygen saturation (SaO<sub>2</sub>) is less than or equal to 88% when breathing room air while at rest.
2. PaO<sub>2</sub> of 56–59 mmHg or if SaO<sub>2</sub> is equal to or less than 89% when associated with specific clinical situations (such as [Cor Pulmonale](#), congestive heart failure, or [polycythemia](#) with a hematocrit of greater than 56 percent).

3. Some individuals do not qualify for oxygen therapy while at rest but may require supplemental oxygen while walking, exercising, or sleeping. (Note: Some payers may ask for proof that oxygen therapy helps with hypoxemia.)



**CROSS REFERENCE:** To learn more about what your test results mean, visit the [Big Fat Reference Guide](https://www.alphanet.org) at <https://www.alphanet.org>.

### Understand your oxygen prescription

The oxygen prescription your healthcare practitioner writes tells you how much oxygen to use at rest, and during exercise or sleep. This prescription may include different flow rates for each of these activities.

Your prescription should list:

- A disease diagnosis, like Alpha-1 COPD
- Type of oxygen system
- Flow rate expressed in liters per minute
- Duration (number of hours per day)

## REFRAME YOUR THOUGHTS ABOUT OXYGEN THERAPY

Being told that [you need oxygen therapy](#) can make you feel uncertain, frustrated, scared, and sad. Some people choose not to use supplemental oxygen, even if their doctor suggests it. However, if you can reframe your thoughts about oxygen therapy, you may have an easier time accepting this life-saving treatment.



**CROSS REFERENCE:** We talk more about your feelings concerning oxygen therapy in *Managing Lung Disease* in the [Big Fat Reference Guide](#) at <https://www.alphanet.org>.

### How to reframe your thoughts about oxygen therapy

OLD THOUGHT	REFRAMED
People will see me as “sick” or “handicapped.”	Oxygen therapy will help me do more of the things I love to do.
I don’t want to be tied to an oxygen tank wherever I go.	I’ll ask my doctor for advice about small, portable oxygen options.
I don’t want to accept that I have a chronic condition.	Accepting my reality is the first step to finding ways to live as fully as I can.
I don’t want to get “addicted” to supplemental oxygen.	I need oxygen, just like a diabetic needs insulin. My doctor will prescribe exactly what I need.



**BURNING ISSUE:** By refusing to comply with prescribed supplemental oxygen therapy, individuals may bring about the events they are trying to avoid.

It's ironic, but refusing to use oxygen therapy may make your fears come true. And, if you're thinking about a lung transplant, oxygen therapy will be part of your pre-transplant regimen. It is also vital for countering the long-term effects of low blood oxygen levels (hypoxemia) and will help protect your heart.

### **Think positive!**

If your doctor prescribes oxygen therapy, it might help to learn about its many well-documented benefits. Compare the positive effects with the limitations of feeling sick, tired and out-of-breath. You may find that these benefits outweigh your concerns and fears.

## **CHOOSING AN OXYGEN DELIVERY SYSTEM & SERVICE PROVIDER**

Before you choose an oxygen delivery system, discuss your choices with your healthcare practitioner. Then explore companies in your area that provide service. Start by checking with your health insurance provider. They may have contracts with specific companies in your area.

If you're free to choose for yourself, shop around. Companies generally offer the same products and systems. You want to find the one with the best service.

Start by talking to people you know who get oxygen therapy. Then call some companies and compare services and prices before making your final decision. Don't be afraid to ask lots of questions.

### **Ask about the company**

- Are you a national company?
- How many branches do you have, and where are they located?
- Are you licensed by the state?
- Are you accredited by Medicare/Medicaid and by the Joint Commission on Accreditation of Health Organizations (JCAHO)?

### **Ask about their products and services**

- What systems can you provide? What influences your decision to provide one system over another? (Note: they may only offer systems that make them the most profit.)
- How often do you check or service your equipment?
- How often do you deliver?
- Will you help make arrangements for oxygen delivery when I'm traveling?
- What is your emergency response time?
- How long does it take to replace defective equipment?
- How often will the respiratory therapist come to my home?
- Do you have any customer testimonials?

### **Ask about costs**

- How much will this cost me? Most companies follow [Medicare coverage guidelines](#). However, it's good to have the facts about [costs and coverage](#) before you choose your system.
- What if I choose to buy the system? Will you still provide service?

## Choosing an oxygen delivery system

Thanks to advances in technology, you have a range of systems to choose from. And they all can help you maintain an active and healthy lifestyle.

Home oxygen equipment has two essential components:

- The container or [storage system](#) holds the oxygen. The oxygen may be compressed gas, liquid, or from a concentrator.
- The [delivery system](#) transports the oxygen from the container into your lungs.

When choosing a system, look for one that meets your specific needs for mobility and portability — and fits your budget. It helps to talk to your healthcare practitioner and home oxygen therapy provider. They can help you think about your specific needs and select the system or systems that are the best fit.

## OXYGEN STORAGE SYSTEMS

You can choose from two main types of oxygen storage systems: stationary and portable. Some storage systems may be used to fill portable systems, combining both types. Most people use a combination of storage systems to keep costs down while maintaining an active lifestyle.

We'll highlight the most common systems here.

### Stationary oxygen storage systems

Stationary systems hold a lot of oxygen, but you can't carry them around with you. Here are three types of stationary systems to choose from:

#### *Oxygen concentrators*

Oxygen concentrators are the most common and cost-effective in-home stationary systems. They remove nitrogen from room air to make 94–98% oxygen.

Concentrators are fairly small, weighing between 22–70 pounds. Most come with about 50–feet of supply tubing, which allows you to move around your home. They can achieve a liter flow rate of up to five to six liters per minute. They run on electricity and need an electrical source, so you'll need a backup oxygen supply in case a power failure occurs.

These units must be placed in a well-ventilated area and kept away from heat and flames. They also need routine maintenance for inspections, filter changes, and oxygen analysis. Newer models may have an oxygen concentration indicator. This measures the oxygen level administered by the concentrator. If it falls below a certain level, an alarm will sound.

### ***Liquid oxygen reservoirs***

These stationary systems have a large reservoir tank, which your oxygen supplier fills once or twice a month.

Reservoir systems require no electricity, have very few moving parts, and require little maintenance or repair. But, when dealing with liquid oxygen, you must be careful not to spill it. That's because liquid oxygen is extremely cold and can injure the skin immediately upon contact.

A typical liquid oxygen reservoir weighs 124 pounds when filled and contains 31 liters, or 73 pounds, of liquid. At a flow rate of two liters per minute, this amount of oxygen lasts 208 hours or eight days.

Liquid oxygen systems continually lose oxygen through evaporation, even when not in use. They're great for regular use at home, or for filling up portable units. But they're not suitable as an emergency backup system.

It is important to note that it is becoming increasingly difficult to find oxygen suppliers who will provide liquid oxygen. It is a costlier solution for them and with the Medicare competitive bidding contracts implemented throughout most of the country, their profit margins have shrunk.

### ***Compressed gas oxygen***

Compressed gas oxygen in large tanks or cylinders is another type of stationary system. These large steel or aluminum tanks are heavy and can't be moved easily. They must also be safely secured, so they don't fall over and hurt someone.

Compressed gas oxygen may not be appropriate for some

people who need continuous-flow oxygen. This system is better suited as a backup system for a concentrator.

### **Portable oxygen storage systems**

In the past, many people thought oxygen concentrators were for homebound, inactive people. But today's newer, lighter-weight models are made for people on the move. Many work with car chargers and have battery packs. And some have conserving devices that allow you to spend more time away from home.

### ***Liquid oxygen storage***

As we mentioned earlier, most liquid oxygen reservoirs can be used to fill portable units at home. For instance, if you have a large liquid reservoir, you can connect small, portable liquid oxygen units directly to it, and fill them.

### ***Compressed gas oxygen storage***

Compressed gas comes in small cylinders in a range of sizes. The smaller ones fit into backpacks, fanny packs, or shoulder bags.

The following listing outlines how long each cylinder size lasts at a rate of two liters per minute. If you add a conserving device, you'll have more time.

- **E-cylinder:** up to five hours
- **D-cylinder:** up to three hours
- **M9:** up to two hours
- **M6:** up to one hour



E-cylinders weigh about 20 pounds. You can easily wheel one around on a cart or a stroller. Each cylinder has a regulator so you can adjust the flow rate. At a rate of two liters per minute, they only last a few hours.

People who use concentrators often choose E-cylinders for their backup oxygen supply. But they're not appropriate as a sole source of oxygen for continuous, long-term therapy.



**IT'S A FACT:** You should be aware that Medicare covers the cost of portable systems only if they are needed for mobility within the home, not for away-from-home activities.

## OXYGEN DELIVERY SYSTEMS

Home oxygen equipment has two essential components: the oxygen [storage system](#) and the oxygen delivery system. The first stores oxygen. The second moves the oxygen from the storage container to your lungs.

Your oxygen delivery options include:

- Nasal cannulas
- Transtracheal catheters
- Reservoir cannulas
- Pulsed delivery systems
- Face masks
- Oxygen-conserving devices

### Nasal cannula

Most people who use oxygen at home use low-flow, dual-pronged nasal cannulas. The nasal cannula consists of two small prongs connected to plastic tubing. The prongs rest in your nostrils, and the tubing connects to the oxygen source. You get a continuous flow of oxygen that's been diluted with room air. Flow rate: generally, up to six liters per minute.

PROS	CONS
Simple and inexpensive	Continuous oxygen flow can dry out the mucous membranes in your nose
	Delivers oxygen when you're breathing in and out, so it's not efficient or cost-effective

### Transtracheal oxygen delivery

Transtracheal oxygen (TTO) catheters can continuously deliver a high flow of oxygen. As its name implies, this device is a catheter that's inserted into the windpipe (trachea). Oxygen enters the windpipe through the catheter.

PROS	CONS
Reduces shortness of breath while you're eating	Requires a strict self-care routine and someone to help with care and problem-solving
It may look better to you than tubes in your nose	Not recommended if you take high-dose steroids every day
Delivers oxygen at a reduced flow rate, which saves you a lot of money	Many possible complications, especially if the catheter gets dirty



**KEY LEARNING:** Transtracheal oxygen is not recommended for individuals who require chronic high-dose steroids, since these medications can mask infections and delay the healing process.

## Reservoir cannulas

Reservoir cannulas store oxygen in a small chamber while you exhale, then deliver it back to you when you inhale. They're often used by people who need higher flow rates to get enough oxygen. Reduced-flow settings can cut the amount of oxygen you use by half.

PROS	CONS
Simple to use	Large
Reliable	More noticeable than other systems
Don't cost a lot	

## Pulsed oxygen delivery devices

These devices may be separate units or built into your oxygen storage device. They deliver a small amount of 100% oxygen when you start to inhale. This brings oxygen to the alveoli, which makes it easier for oxygen to get into your blood.

Pulsed delivery devices sense when you start to inhale. You can pre-set them to adjust to specific demands.

- **Fixed-pulse devices** can be set to deliver oxygen at a set rate along with each breath. You can also program it to skip one or more breaths.
- **Demand-pulse devices** can deliver oxygen the whole time you inhale, or for part of the time. It can also adjust to your oxygen needs on-demand.
- **Variable-demand devices** adjust oxygen delivery based on how you're breathing.

Each system should have a fail-safe mode, so it can be set to full, constant oxygen flow if the device malfunctions or fails.

PROS	CONS
Adjust for use during different activities, like exercise or rest	Need a doctor's prescription
	Can't use while sleeping

## Face mask

Some people need a face mask to get enough oxygen. These plastic masks fit snugly over your nose and mouth.

PROS	CONS
Deliver a lot of oxygen	Can be uncomfortable
	Makes it hard to talk
	Has to come off when you eat or drink

## Paying for home oxygen delivery

[The American Lung Association](#) estimates more than one million Americans use home oxygen on a long-term basis. It's a huge national health expenditure with home oxygen costs adding up to more than 2.8 billion dollars every year. Home oxygen is the most expensive non-surgical treatment paid for by Medicare as part of its Durable Medical Equipment (DME) coverage.

Make sure you know the facts about [your insurance coverage](#).



**GOOD NEWS:** Home oxygen therapy is the most expensive non-surgical treatment reimbursed by Medicare.

## HOME OXYGEN COSTS AND COVERAGE: WHAT YOU NEED TO KNOW

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### What home oxygen costs does Medicare cover?

The typical monthly cost for oxygen equipment and supplies is \$300. Medicare and most private insurance companies pay 80% of this cost — about \$240 per month. You must pay the remaining \$60 unless you have a second insurance policy.

Many companies follow [Medicare's reimbursement guidelines](#). But, check with your insurance company just to be sure.

Remember, if you have original Medicare, Medicare reimbursement rates for oxygen equipment and supplies differ depending on where you live. Your share is based on what Medicare reimburses. You should check with the oxygen supplier to see what the reimbursement rate is for your area since it affects your co-payment.

### Get the system you want

Many supply companies will push certain systems because they're less expensive to buy and maintain. You may have to negotiate to get the specific system your doctor prescribes. This is especially true for liquid oxygen systems, which cost more than others.

### Take a stand for your health

In recent years, Medicare has made deep cuts to [oxygen](#) therapy reimbursement. There will likely be more cuts in the future. These cuts make it hard for some people to pay for the services they need. This threatens their health and safety.

If you are concerned about future cuts, speak up! You can call or write lawmakers and voice your concerns. Help make sure that people who need this life-saving therapy can get it.



**IT'S A FACT:** You may want to familiarize yourself with these Medicare legislative issues and become involved in seeking remedies.

## HOME OXYGEN SAFETY TIPS

Oxygen is a well-known fire hazard. It saturates clothing, hair, and bedding. That makes it easier for fires to start and spread. Here are some home oxygen safety tips to keep your home and family safe:

- Keep [oxygen canisters](#) at least 5–10 feet away from gas stoves, lighted fireplaces, wood stoves, candles, or other sources of open flames.
- Post “No Smoking” signs in every room of your home where you use oxygen. And make sure nobody smokes around you when you’re using oxygen.
- Secure your oxygen cylinders so they can’t be knocked over.
- Be careful with oxygen tubing. Make sure you don’t trip over it or tangle it in furniture.
- Don’t use an electric razor while using oxygen.
- Do not use any oil, grease, or petroleum-based products on your equipment, or nearby while using oxygen.
- Use water-based creams and lotions on your face, neck, and chest.
- Keep your equipment supplier’s contact information by your phone. Follow their guidelines for safety checks. And, never try to fix broken equipment yourself.
- Check your smoke detectors every month. Make sure they have fresh batteries.
- Keep a fire extinguisher in the house, and practice what to do if there’s a fire.
- Notify your local fire department, gas and electric companies, and telephone companies when you start using home oxygen therapy. You can request a “priority service listing” in case of power outages or when you need repairs.

Following these home oxygen safety tips should give you peace of mind about using supplemental oxygen at home. If you’d like to learn more, the [American Lung Association](#) has additional safety information.

## BREATHE EASIER AND LIVE LONGER

Supplemental oxygen therapy may become necessary to provide adequate oxygenation when lung function has declined and hypoxemia results. The benefits of oxygen therapy are well documented and are known to reverse the ill effects of hypoxemia and prolong lifespan. Although there are challenges with therapy, today’s oxygen systems are efficient and portable. Your understanding of the need for oxygen and your compliance with therapy is one of the most important ways in which you can manage your lung disease and continue to promote a healthy lifestyle.



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