



Home Oxygen Therapy

Assisting and educating caregivers and those receiving supplemental oxygen.

This article is part of a series, *Supporting Family Caregivers: No Longer Home Alone*, published in collaboration with the AARP Public Policy Institute. Results of focus groups, conducted as part of the AARP Public Policy Institute's No Longer Home Alone video project, supported evidence that family caregivers aren't given the information they need to manage the complex care regimens of family members. This series of articles and accompanying videos aims to help nurses provide caregivers with the tools they need to manage their family member's health care at home. Nurses should read the articles first, so they understand how best to help family caregivers. Then they can refer caregivers to the informational tear sheet—*Information for Family Caregivers*—and instructional videos, encouraging them to ask questions. For additional information, see *Resources for Nurses*.

Approximately 48 million Americans provide unpaid care to adult family members, friends, or neighbors who have health or functional needs.¹ This number has risen by 8 million since 2015, likely driven by an aging population, limitations on the availability and affordability of formal care, increased efforts by state and local governments to support aging in place, and greater recognition of informal caregiving.¹ The care provided by family caregivers is complex—almost 60% of caregivers report that they assist with medical and nursing tasks, such as administering medications, providing wound care, and operating equipment, such as that used in providing supplemental oxygen therapy.¹ Health professionals play an important role in educating and supporting caregivers who perform medical and nursing tasks, yet many caregivers still report finding these tasks difficult and say they need more education to confidently assist with them.²

The management of supplemental oxygen therapy can be particularly complex, with users and their caregivers reporting problems related to education, equipment, suppliers, and insurance coverage.³ Chronic lower respiratory diseases—including chronic obstructive pulmonary disease (COPD), interstitial lung disease, and pulmonary hypertension—are the fourth leading cause of death in the United States.⁴ It's estimated that more than 1.5 million U.S. adults who have chronic lung diseases use supplemental oxygen therapy to improve their quality of life and prolong survival.³ In people receiving home health care, dyspnea and home oxygen use are known to be associated with an elevated risk of

readmission to the hospital, underscoring the importance of appropriate oxygen therapy management.⁵

Education provided by nurses or other health care professionals is associated with fewer reported problems and greater adherence.⁶ However, most home oxygen users report receiving their education from the person delivering their oxygen, not from a health professional.⁷ In a national survey of home oxygen users, more than one-third of respondents said they felt unprepared to operate their oxygen equipment, and more than half reported having problems with the equipment, including malfunctions and a lack of portability, which limits activity outside the home.⁷ Caregivers play an important role in managing oxygen equipment, especially when users leave the home.⁸ People who have lower respiratory conditions, particularly COPD, tend to experience muscle weakness and often rely on their caregivers to carry their equipment. Without this assistance, oxygen users may be unable to safely leave their homes.^{8,9} Using ambulatory oxygen can also be emotionally challenging for those receiving it and their caregivers. People have reported feeling self-conscious or embarrassed about being seen using oxygen and distressed by their loss of independence should they need help to manage the equipment.⁸ Caregivers and their family members may experience anxiety about running out of oxygen, managing the equipment when going out, and the increased risk of fire when using oxygen at home. Nurses thus need to address emotional readiness and provide support, in addition to ensuring caregivers and oxygen users are technically proficient in managing home oxygen.



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A home oxygen therapy technician shows a family caregiver how to use her father's oxygen tank. Photo courtesy of the AARP Public Policy Institute.

In this article, as in the corresponding videos, we provide nurses with simple and useful instructions and practical tips they can use to educate and support caregivers and oxygen users (see *Information for Family Caregivers*).

CONSIDERATIONS AT THE INITIATION OF THERAPY

The decision to begin long-term supplemental oxygen therapy requires careful analysis and discussion about the benefits, disadvantages, and other considerations specific to each person's condition and situation.

Potential benefits and disadvantages. The nurse should have a frank conversation with the person in need of supplemental oxygen and the family, addressing the potential benefits of this therapy, including reduced dyspnea and fatigue and an increased capacity for activity or exercise.⁶ The potential disadvantages of home oxygen therapy include the financial costs, challenges of managing and maintaining supplies and equipment, perceived social stigma, and the possibility that symptoms may not substantially improve.⁶ The benefits of supplemental oxygen for people with severe hypoxemia have been well established and inform clinical practice guidelines.¹⁰ However, it's important to note that a recent study of people with COPD and moderate resting hypoxemia (those with a resting oxygen saturation level of 89% to 93%) found home oxygen therapy was not associated with a reduction in mortality.¹¹ Nurses should be

aware that one of the top five recommendations of the American Thoracic Society and American College of Chest Physicians, as part of the Choosing Wisely campaign, is the reassessment of patients for hypoxemia to avoid the continued use of supplemental oxygen when there is no longer a need for it.¹²

Smoking cessation. For important safety reasons, smoking status should be considered when creating and evaluating a plan of care for a person receiving supplemental oxygen. Smoking-related fires in residential buildings are a leading cause of civilian fire deaths,¹³ and fire can burn more vigorously in oxygen-rich environments, such as when supplemental oxygen is in use. It's estimated that a quarter of people using home oxygen continue to smoke.¹⁴ Assistance with smoking cessation needs to be identified as a priority for both the person using oxygen and family members and caregivers. For additional resources, see the Centers for Disease Control and Prevention's How to Quit Smoking web page, www.cdc.gov/tobacco/campaign/tips/quit-smoking/index.html.

Oxygen equipment options. Home oxygen therapy can be provided in a variety of ways. Compressed oxygen—in large tanks for home use or smaller portable tanks when going out—can be regularly delivered by a home oxygen supplier. A home oxygen concentrator, which uses electricity to draw in room air, remove other gases, and deliver purified oxygen, can be attached to 50 feet of tubing, allowing



Information for Family Caregivers

Tips for Managing Equipment

- Practice using the oxygen equipment, which will help you to feel more confident. Become familiar with the tanks or concentrator and practice selecting the prescribed flow rate. Ask the health care provider or oxygen supply company for information and advice.
- If a pulse oximeter is recommended to measure oxygen saturation, familiarize yourself with the product's instructions. Also, ensure you're aware of how often you should check oxygen saturation and what level is expected. Keep a written log to show the health care provider.
- Never change the oxygen flow rate from what was prescribed, unless you've discussed this with the health care provider.
- Wash the nasal cannula or mask once or twice per week in warm soapy water, rinse, then allow it to air dry. Do not allow water to enter the oxygen tubing. Change the mask or nasal cannula every two to four weeks or after your family member recovers from an illness.
- Clean the air filters on concentrators every week by washing them in warm soapy water, rinsing, and allowing them to air dry. Replace the filter monthly or per the manufacturer's instructions.
- If using a humidifier bottle, clean and sanitize it every two to three days. Wash it in warm soapy water, rinse, then soak for five minutes in a mixture of equal parts white vinegar and water. Rinse again and allow to air dry before refilling it with distilled water.
- Regularly check the levels of oxygen in the tanks. Call the oxygen supply company for refills in advance of the tanks running out.
- Let the power and phone companies know that oxygen is used in the home, so they can prioritize restoring service if there is an outage in your area.

Safety Tips

- Be sure the home has working smoke detectors and fire extinguishers.
- Never allow smoking in the home or around the person using oxygen. Post "no smoking" signs.
- Let the local fire department and neighbors know that oxygen is used in the home, so they can help in an emergency.
- Oxygen should not be stored or used within six feet of an open flame or heat source, such as candles, a furnace, a woodstove, electric heaters or heating pads, or when cooking with gas.
- Oxygen should not be used within six feet of any electrical appliances that could cause a spark or overheat, such as hair dryers, curling irons, electric razors, and toothbrushes.
- Turn the supplemental oxygen off when it's not in use.
- Do not use hair spray, air freshener, or other aerosol sprays that are flammable near oxygen.
- Use only water-based lotions or creams on skin. Do not use petroleum jelly (such as Vaseline), vapor rubs, or oil-based lotions or creams, which are flammable.



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- If you use hand sanitizer, apply it at least six feet away from oxygen and allow it to dry completely before using oxygen or touching the equipment.
- Store oxygen tanks in an open area (not a closet) and be sure they are secured, upright, and at least six feet away from any heat source. When travelling, never put oxygen tanks in the trunk of a car or allow them to roll around.
- Keep the oxygen concentrator at least 12 inches away from the wall or curtains to allow for air flow. Never cover the concentrator. Never use an extension cord, which can increase the risk of a fire.
- If using a concentrator, never use tubing longer than 50 feet. Also, remind your family member to be careful around the tubing and equipment to prevent tripping and falls.


Troubleshooting and When to Contact the Health Care Provider


- If your family member is having trouble breathing or feels like she or he can't get enough oxygen, first check that oxygen is flowing at the correct flow rate and there are no leaks or problems with the tubing. Be sure the tubing hasn't become disconnected.
- Call the health care provider immediately if these safety checks don't resolve the issue or if you observe that your family member
 - is more nervous, restless, or anxious than usual.
 - is confused or more drowsy than usual.
 - has frequent headaches.
 - has blue (cyanosed) fingernails or lips.
 - is breathing slower, having difficulty breathing, or taking uneven or shallow breaths.

A family caregiver instructional video about supplemental oxygen therapy can be found on AARP's website:

 Operating Specialized Medical Equipment: Using Oxygen
<http://links.lwww.com/AJN/A179>

Related videos about medications commonly used by oxygen recipients can also be found on AARP's website:

 Managing Medications: Using Inhalers
<http://links.lwww.com/AJN/A180>

 Operating Specialized Medical Equipment: Using a Nebulizer
<http://links.lwww.com/AJN/A181>

For additional information, visit AARP's Home Alone Alliance web page:
www.aarp.org/nolongeralone.

the person to move around the home. A smaller, battery-operated concentrator can be used when going out. Liquid oxygen is sometimes used in people who need high-flow oxygen therapy.

To maximize the health benefits associated with this therapy and improve adherence to the supplemental oxygen prescription, the equipment must be appropriate to the person's needs.⁶ Some decisions about the type of oxygen equipment are directly linked to the oxygen flow rate required and to other medical needs. However, nurses should also assess, and regularly reassess, the usual activities and living conditions, physical strength, dexterity, and cognitive capacity of people receiving oxygen and their caregivers. This can help to ensure they have the right combination of equipment for safe and effective oxygen therapy when they are both inside and outside the home. Active people who frequently go out for long periods of time, for instance, will require a portable oxygen system that allows them to continue to receive supplemental oxygen for the duration of the outing. An older adult who has a frail caregiver will need a light-weight, portable option for infrequent trips outside the home, such as for health care appointments. Someone who lives in a rural area where power outages can potentially last for extended periods of time may need multiple backup tanks, because the oxygen concentrator will not be powered during an outage. A person living in a multistory home may need different options for use on different floors to avoid the need for a caregiver to carry equipment up and down stairs.

Qualifying for and receiving supplemental oxygen at home. Many people who use oxygen therapy are Medicare beneficiaries.⁶ To qualify for supplemental oxygen per Centers for Medicare and Medicaid Services regulations, a person needs to meet stringent testing and documentation requirements. (These requirements may be different for those receiving hospice care if the need for oxygen is related to the terminal illness.) Annual certification is required. If a provider fails to ensure the person is properly tested and all documentation completed to meet Medicare requirements, the result may be delays in the start of oxygen therapy at home and increased out-of-pocket costs for the recipient. To utilize their insurance benefits, Medicare recipients can only obtain oxygen equipment from suppliers authorized through a competitive bidding process. However, the competitive bidding program is on hold until January 1, 2021; so, until then, oxygen equipment can be obtained through any Medicare-enrolled oxygen supplier. The competitive bidding program was introduced to reduce Medicare's expenses while ensuring recipients' access to quality products and services and minimizing their out-of-pocket expenses.¹⁵ Unfortunately, these objectives have not been achieved for

recipients. Delays in the receipt of needed equipment, poor quality equipment or service, and increased out-of-pocket expenses have been reported by patients and providers, with some patients bypassing their coverage benefits and instead purchasing equipment or supplies privately to avoid delays or ensure better service.¹⁵ Nurses can elicit feedback from oxygen recipients to determine which authorized suppliers provide the best service. They can then use this information to direct others toward these suppliers, helping them to avoid potential equipment and supply problems.

PATIENT AND CAREGIVER EDUCATION

The American Thoracic Society's definition of optimal home oxygen therapy focuses on maximizing the oxygen user's quality of life and health while minimizing any associated burden. Jacobs and colleagues note that "an effective and transparent interface between patients, caregivers, clinicians, durable medical equipment . . . companies, and payers [is needed] to ensure patient-centered, long-term management of hypoxemia," with the clinician ensuring "an individualized action plan and therapeutic oxygen patient education program."³

Several key details and elements should be incorporated into the nurse's plan of care when providing education to oxygen recipients and caregivers, including information about

- why oxygen is prescribed.
- the flow rate and equipment prescribed.
- anticipated out-of-pocket costs.
- monitoring oxygen saturation (and titration of flow, if prescribed).
- safe oxygen use at home and while away from home.
- comfort measures when using oxygen.
- how to resolve problems with equipment, including how to file a complaint with the home oxygen supplier, Medicare, or an insurance company (for more information, see www.medicare.gov/claims-appeals/file-a-complaint-grievance/complaints-about-durable-medical-equipment-dme).
- when to seek medical help.

Related issues and topics nurses must consider when providing information and education to caregivers and recipients of oxygen are discussed below.

Managing equipment. Building caregiver capacity and confidence to manage a family member's oxygen equipment is an important nursing role. When the oxygen equipment and supplies are delivered, the caregiver should be aware of the need to be present and prepared to ask questions. The equipment should be set up and demonstrated by the person who delivers it. The caregiver should practice operating the equipment




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Resources for Nurses

 Operating Specialized Medical Equipment: Using Oxygen^a
<http://links.lww.com/AJN/A182>

 Managing Medications: Using Inhalers^a
<http://links.lww.com/AJN/A183>

 Operating Specialized Medical Equipment: Using a Nebulizer^a
<http://links.lww.com/AJN/A184>

^a Family caregivers can access these videos, as well as additional information and resources, on AARP's Home Alone Alliance web page: www.aarp.org/nolongeralone.

while the delivery person is watching and providing instruction; the delivery person should stay until the caregiver is ready to manage this independently. Contact information for the supply company should be provided, so the caregiver can easily contact them with any questions or concerns. Written instructions or equipment manuals should be supplied. Caregivers should also be taught how to clean the oxygen mask or nasal cannula, how and when to change these, and how to clean concentrator filters and humidifier bottles, if used, to reduce the risk of infection and ensure effective operation of the equipment. There are many resources available to help nurses explain to caregivers and oxygen recipients what type of equipment has been prescribed and how to use it. The American Lung Association, for instance, provides resources that are easy to read and understand, including basic information about oxygen equipment (see www.lung.org/lung-health-diseases/lung-procedures-and-tests/oxygen-therapy/oxygen-delivery-devices).

One very important caregiver role is ensuring there is an adequate supply of oxygen available at all times. Caregivers need to know they should check regularly to see how full the tanks are, particularly when planning outings, and bring extra tanks to avoid running out while away from home. If their family member uses a concentrator, a backup tank should always be available in case the power goes out and the concentrator cannot operate. The timing of reordering supplies and equipment should allow for any delays in delivery. For further guidance about Medicare coverage and how to work with an oxygen supplier, see *The Supplemental Oxygen Guide* from the COPD Foundation, www.copdfoundation.org/Downloads/The_Supplemental_Oxygen_Guide_COPD-March-2020.pdf.

Monitoring oxygen saturation. It's important for caregivers and oxygen recipients to be aware of the desired blood oxygen saturation level and how to

measure this using a pulse oximeter. Knowing that the oxygen saturation level is within an expected range can be reassuring to the oxygen user and caregiver. In addition, knowing when to call the nurse, based on oxygen saturation levels and other indicators, is important. Patient-friendly information about pulse oximetry can be found on the Chest Foundation website (see <https://foundation.chestnet.org/lung-health-a-z/pulse-oximetry>). If the health care provider prescribes a saturation range, caregivers will need instruction on how to titrate the oxygen flow to achieve the desired oxygen saturation level and what to do if this is not achieved.

Safety. Caregivers need to know how to reduce the risk of fire when supplemental oxygen is used. Homes should be equipped with smoke detectors and fire extinguishers (for information about the placement of smoke alarms and their need for regular maintenance, see www.usfa.fema.gov/downloads/pdf/smoke_alarm_infographic.pdf). A person using oxygen needs to stay six feet away from flames, fires, and heat, including candles, stovetops, barbecues, woodstoves, and electric heaters. Items with electric motors that could cause a spark should also be avoided, including electric razors, hair dryers, toothbrushes, and toys. Cleaning and personal care products that contain alcohol and petroleum should be avoided by people using oxygen, as should aerosol sprays (including hair spray and deodorant).

Oxygen should be turned off when not in use. Oxygen tanks need to be stored upright and secured in an open area, at least six feet away from a furnace or heat source. When traveling by car, tanks should not be stored in the trunk. They should be secured, so they do not roll around, and a window should be left partially open to prevent oxygen from building up inside the vehicle. Oxygen concentrators should never be covered and should be placed as least 12 inches away from walls, furnishings, or curtains.

No smoking should be permitted within a home or car in which supplemental oxygen is used, and "no smoking" signs should be posted throughout the home. Nurses should encourage any oxygen recipients, family members, and caregivers who smoke to quit, which will help to reduce the risk of a fire.

Supplemental oxygen can also present a tripping hazard. Tubing from concentrators can be up to 50 feet long, increasing the risk of falls, as can tanks or other equipment that is not secured. To further promote safety, caregivers should let neighbors and the local fire department, power company, and telephone provider know that supplemental oxygen is used in the home.

Comfort. Supplemental oxygen is often delivered via a nasal cannula with tubing that loops over the

ear. Small foam pads may be placed on the top of the ears or lips to cushion the tubing and reduce irritation. The oxygen supplier may provide these on request or with a prescription. Oxygen can cause dryness of the nasal passages and lips. Caregivers should offer the oxygen recipient aloe or water-based gel to apply to lips or nares, if needed, and inhaled saline spray may be helpful to moisturize nasal passages. The nurse should emphasize the importance of avoiding the use of flammable products, like petroleum-based lotions or creams (such as Vaseline) on the face or upper body. If high-flow oxygen is ordered, a humidifier bottle may be added to the oxygen delivery system to moisten the oxygen flow.

Cleaning and care. At least once or twice each week, the nasal cannula or mask should be washed in warm soapy water, rinsed, then left to air dry. The tubing should not be placed in water but instead wiped clean with a damp cloth and checked for damage every week. The mask or nasal cannula should be replaced every two to four weeks by the oxygen supply company. If the oxygen recipient has a cold or other illness, the nasal cannula, mask, and tubing should be replaced when the person recovers. If a humidifier is used, the bottle should be cleaned every two to three days. Wash in warm soapy water, rinse, then soak for a few minutes in a solution of equal parts white vinegar and water before draining and allowing it to air dry. Filters in the concentrator should be regularly cleaned and replaced, according to the manufacturer's instructions. The oxygen supply company should service the concentrator annually. The outside of the concentrator can be wiped with a damp cloth to remove dust.

When to seek medical help. Caregivers, as well as oxygen recipients, need to understand which signs and symptoms might indicate a problem and when they should call their health care provider. Signs of increased respiratory distress, such as difficulty breathing, accompanied by cyanosis of the lips or fingertips, are easily recognized. Other signs, such as frequent headaches, increased drowsiness, confusion, agitation, and nervousness, may also be related to low oxygen saturation levels and should be reported to the provider. If severe respiratory distress occurs, the caregiver should call 911.

Emotional support. Oxygen recipients and their caregivers may benefit from connecting with others who have similar experiences. The American Lung Association hosts an online support and discussion community, in which people can post questions and learn from each other (see www.inspire.com/groups/american-lung-association-lung-disease). The organization also offers tips for family and caregivers on how to

support someone who is receiving oxygen (see www.lung.org/lung-health-diseases/lung-procedures-and-tests/oxygen-therapy/supporting-someone-on-oxygen). ▼

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