inthe**know**
CAREGIVER TRAINING

A CLIENT CARE MODULE:

OXYGEN SAFETY FOR CAREGIVERS

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CAREGIVER TRAINING

A Client Care Module:

OXYGEN SAFETY FOR CAREGIVERS

We hope you enjoy this inservice, prepared by registered nurses especially for caregivers like you!

Instructions for the Learner

If you are studying the inservice on your own, please do the following:

- Read through **all** the material. You may find it useful to have a highlighting marker nearby as you read. Highlight any information that is new to you or that you feel is especially important.
- If you have questions about anything you read, please ask your supervisor.
- Take the quiz. Think about each statement and pick the best answer.
- Check with your supervisor for the right answers. You need **8 correct** to pass!
- Print your name, write in the date, and then sign your name.
- Email In the Know at feedback@knowingmore.com with your comments and/or suggestions for improving this inservice.

THANK YOU!

After finishing this inservice, you will be able to:

Describe why the human body needs oxygen to live.

❖

List at least two types of oxygen delivery systems.

❖

Explain what makes oxygen a dangerous fire hazard.

❖

List at least three abnormal observations that may indicate a client has too little oxygen or may be experiencing oxygen toxicity.

❖

Demonstrate proper safety precautions and provide supportive comfort measures in your daily work with clients on oxygen therapy.

Inside This Inservice:

inthe**know**
CAREGIVER TRAINING

A Client Care Module:
Oxygen Safety for Caregivers

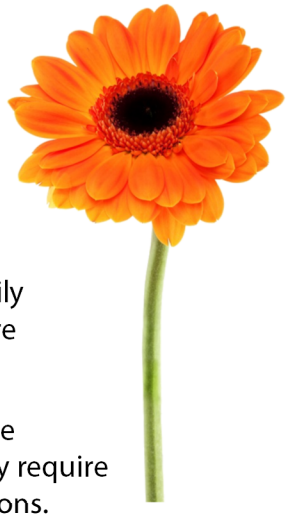
EATING PIZZA AND PICKING DAISIES

Oxygen makes up about one-fifth the volume of Earth's atmosphere and is an essential element of life as we know it.

There are a few places on earth that are said to be anoxic (or without oxygen), like the Dead Sea, and there are organisms that have adapted to live in these places . . . but humans are not among them!

But why do we need oxygen? The answer is *energy*. The human body has several things it can use to create the energy needed to stay alive. Food is one of those things. It helps to make, repair and replace cells as needed.

Another way the body makes energy is from oxygen. When you inhale, oxygen is absorbed into your bloodstream and carried to every cell in the body. It supplies the energy needed to *devour pizza, digest it and to dance the night away (to work off all those calories)!*



Oxygen also supplies the energy needed to *pump your blood, pick daisies and it gives you the power to think, plan and imagine.*

Everything you do, every movement you make, every bodily function (even those you don't have to think about) require oxygen to happen.

Unfortunately, some people with lung disease have trouble getting enough oxygen through normal breathing, so they require extra oxygen to maintain energy and normal bodily functions.

The oxygen in the air we breathe is safe, but supplemental oxygen comes with many warnings and precautions. **So, why are there so many safety precautions with supplemental oxygen?**

Keep reading to learn all about oxygen therapy. You'll learn what makes it dangerous and how you can protect yourself and your clients from that danger.

WHAT IS OXYGEN THERAPY AND WHO NEEDS IT?

Oxygen therapy is a treatment that delivers extra oxygen to the body. Oxygen is a normal part of the air that we breathe. Our bodies use it to create the energy to do everyday things like walking, talking, folding laundry and laughing. Without oxygen, the body will die in less than 10 minutes.

Normally, the lungs absorb oxygen from the air. However, some diseases and conditions can prevent oxygen getting to the lungs the way it should.

When things work normally . . .

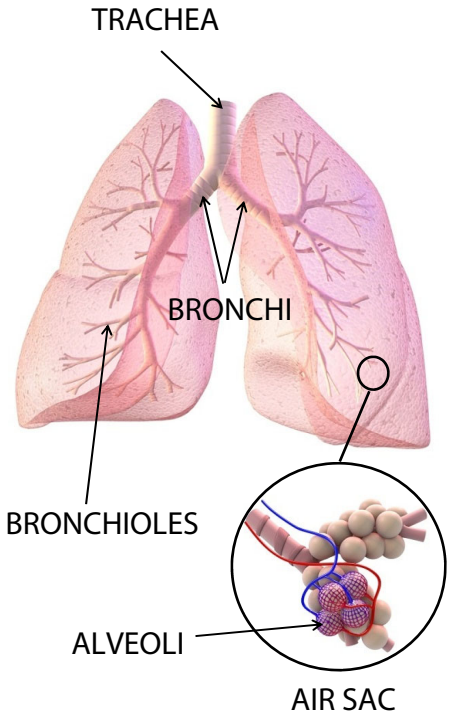
Each time a person breathes, oxygen enters the mouth or nose.

- From there it passes through the pharynx, which forces it into the trachea.
- Then, the oxygen goes through the ***bronchi*** to the ***bronchioles*** which spread out like the branches of a tree.

From there, millions of very small airways carry the oxygen to tiny air sacs called ***alveoli.***

- These tiny air sacs deliver the oxygen to the blood.

In the *normal* lung, oxygen has no problem getting through to the air sacs because airways are clear and open.



What can go wrong?

- A ***common cold, pneumonia*** or the ***flu*** can cause excess mucus and swelling in the airways that can make breathing a challenge.
- People with ***asthma*** can have swelling and tightening in the bronchi which keep oxygen from getting to the lungs.
- ***COPD*** causes the airways to become stiff; this makes taking a deep breath difficult.
- People with ***heart disease*** may have trouble pumping oxygen-rich blood to where it's needed in the body.

The Facts

- The air that we breathe contains about 21% oxygen. For most people with healthy lungs, this is enough.
- Oxygen levels in blood can be measured by an arterial blood gas (ABG) or by using a pulse oximeter.
- The general goal is to keep oxygen levels at or above 88%.
- Oxygen is considered a *drug*. So if a client's level is low, a doctor will prescribe oxygen just like any other drug.
- A prescription for oxygen must include the dose (usually from 2 to 7 liters per minute), the frequency (could be continuous, only during sleep, or during periods of activity), and the route of administration (more on this on pages 3 &4).

WHAT EXCITES YOU?

HYPERBARIC OXYGEN

Oxygen as a therapy is not just a part of "modern medicine." Long ago, Native healers knew that wounds healed faster if a patient was transported from thin mountain air to a richer atmosphere in a low-lying valley.

Today oxygen is known as the element most essential to healing.

The therapeutic use of oxygen under pressure is known as *hyperbaric oxygen therapy*. It involves breathing pure oxygen in a pressurized room.

Hyperbaric oxygen is used for decompression sickness, (a hazard of scuba diving). It is also used to treat serious infections, bubbles of air in blood vessels, and wounds that won't heal as a result of diabetes or radiation injury.

TYPES OF OXYGEN CONTAINERS

Compressed Oxygen Cylinders

Compressed oxygen for medical use is stored in silver aluminum cylinders with green dome-shaped tops.

Large tanks or "H tanks," must be secured in a safe corner of a room.

Smaller units called "E" or "D" tanks are portable and can be pulled along in a cart.

Oxygen Concentrators

These devices concentrate oxygen from room air and deliver it to the client. Most oxygen concentrators are not portable. They require electricity to work.

There are a few models of portable oxygen concentrators, but they are expensive and some very specific requirements must be met for the device to be covered by Medicare.

Oxygen concentrators are often used for individuals who are on oxygen only at night, but they can also be used 24-hours a day.

Clients with this type of device may also have a portable E tank for use during transportation or if there is a power failure.

Liquid Oxygen Systems

These systems consist of a large main tank and one or two portable units. The portable units are used as needed for travel outside of the home.

When the portables are empty, they can be refilled from the large tank.

Portable units weigh 8 to 10 pounds and can be carried with a shoulder strap, backpack or cart.

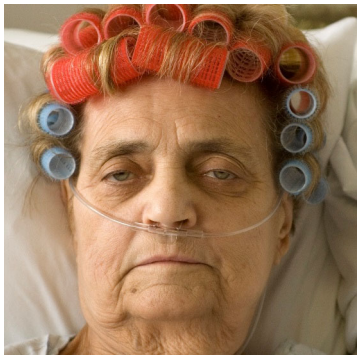
Liquid oxygen will evaporate if not used frequently. Therefore portable units should be filled just prior to use. The liquid systems are often more costly.

METHODS OF ADMINISTRATION

The method of oxygen delivery is chosen by the doctor. The choice is based on the need for oxygen, the client's mobility, comfort, cost and the client's ability to cooperate.

Delivery methods are classified as being either **Low Flow** or **High Flow** systems. Most clients will use *low* flow devices.

LOW FLOW DEVICES



- **Nasal Cannula.** This is the simplest low flow method. Most clients find it fairly comfortable and acceptable. It delivers a low, continuous flow of oxygen while the client is still able to move around in bed, eat, talk and even cough without disturbing the device.

  The client must be *alert* and *cooperative* to use this device. If the cannula is removed or dislodged, the oxygen will not be delivered as needed.

- **Simple Face Mask.** This is another low flow delivery option, but allows a greater concentration of oxygen to be delivered. A mask will be chosen for a client with a slightly greater need for oxygen. This device is less comfortable than the cannula and must be removed to eat or drink.

  There is a greater risk for pressure ulcers to develop where the mask touches the skin on the face.

- **Non-Rebreather Mask.** This mask is required when the client requires a high concentration of oxygen. The oxygen flows into a bag and the mask when the client inhales. A valve prevents the air from flowing back into the bag during the exhale.

  The mask should fit snuggly and the bag must not be allowed to collapse or completely deflate when the client inhales.

- **Tracheostomy Collar.** This is a collar that attaches to the neck with an elastic strap and delivers oxygen to a client with a trach. Fluid can build up in the tubing and drain into the trach, causing the client to choke and/or develop pneumonia. For this reason, the device needs to be removed and cleaned every 4 hours.

  Ask your supervisor about your responsibilities in caring for a client with a tracheostomy collar.

HIGH FLOW DEVICES

- **Venturi Mask.** This mask can deliver a precise amount of highly concentrated oxygen. It is a cone shaped device that is fitted to the face. It tends to be uncomfortable and must be removed to eat. The client can talk but the voice will be muffled.

HOW TO...

KEEP IT CLEAN!

Nasal cannulas and masks need regular cleaning. Here's how:

The nasal cannula should be wiped with alcohol after each use. If it is used continuously, then a spare should be available to switch out one while the other is being cleaned.

If the cannula is visibly soiled or blocked with mucous, clean it out with a soft tissue or cotton swab.

If the tubing looks wet inside, switch it out for a dry set and allow it to dry completely before using again. Moisture gives bacteria a place to grow, and you don't want that in your clients' lungs!

The cannula should be replaced once a week and the tubing should be replaced once a month or just after having a cold.

An oxygen mask should be wiped clean every day. Pay particular attention to the areas of the mask that touch the skin.

THE FIVE FOOT RULE

The "Five Foot Rule" for oxygen safety says that all oxygen should be kept ***at least five feet away*** from any heat source.

Heat sources include (but are not limited to) all of the following:

- Gas stoves.
- Lighted fireplaces.
- Woodstoves.
- Candles.
- Space heaters.
- Electric blankets.
- Hairdryers, electric razors, and electric toothbrushes.
- Toys with electric motors.

Check your clients who use oxygen for the five foot rule. If you see a heat source that is too close move it right away.

Be sure to teach the client and the family members about the five foot rule for oxygen safety.

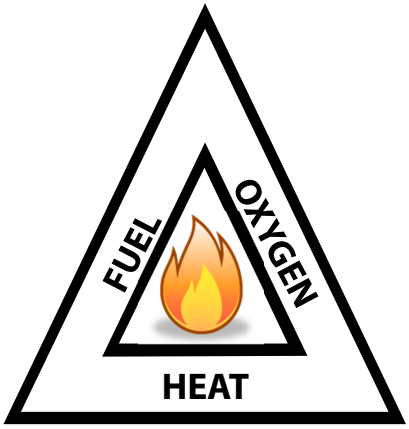
WHAT MAKES OXYGEN DANGEROUS?

If you've worked in healthcare longer than a minute, you probably already know that oxygen poses a fire risk. But did you know that oxygen by itself is not flammable? It can't ignite or explode on its own.

So if oxygen doesn't burn, then what's the danger? **Oxygen is dangerous because it makes others things burn more easily and more intensely.**

Think about this: Fire is a chemical reaction that needs 3 elements to happen. If you take any one of these elements away, the fire can't start or it will go out if it was already burning.

1. **Fuel:** Fuel is any material that is not fire resistant. It can be gasoline, a tree, a piece of furniture, or even an article of clothing.
2. **Oxygen:** The air we breathe is about 21% oxygen (O2). The oxygen level around someone using supplemental oxygen can be much higher.
3. **Heat:** Heat is the energy necessary to get a fire started. Heat can come from a cigarette, a fireplace, a stove, or even a spark from static electricity.



HERE'S HOW IT CAN HAPPEN:

Daniel, a 62 year old man who suffered from COPD, lived at home where he received oxygen therapy. Daniel knew that oxygen increased the risk for fire and he had been told many times to quit smoking—but, smoking is a powerful addiction and Daniel had a hard time quitting.

So, Daniel made a deal with himself. He promised that he would always remove the cannula and go outside (away from the oxygen source) to smoke, if he felt like he needed it.

One cold, winter day, Daniel needed to smoke. He removed his nasal cannula and set it down on the arm of his chair. He got up to go outside but found it was cold and raining. He sat back down in his chair and waited ten minutes for the urge to pass—but it didn't. So, he lit up. He thought it was safe because the oxygen had been off for nearly 15 minutes.

Unfortunately, when Daniel put the nasal cannula down on the arm of the chair, it continued to deliver oxygen. This "enriched" the oxygen in the fabric of the chair and in the air just around it.

As soon as Daniel flicked the lighter to light his cigarette, the arm of the chair ignited in a burst of flames. *Daniel had completed the fire triangle.* He had a fuel, (his chair) oxygen, and a heat source (the lighter).

Daniel didn't make out of that fire alive.

WHAT TO DO IF A FIRE STARTS

Don't panic! If a fire breaks out, stay calm and follow these R.A.C.E. guidelines.

R **RESCUE**: Move clients who are in immediate danger away from smoke or flames first. Smoke kills, so bend or crawl under it. DON'T BREATHE IT!

- If there is a lot of smoke, cover your mouth and your clients mouth with a cloth.
- If your clothes or the client's clothes catch on fire, do the following:
  - **STOP** right away. Running will increase the fire.
  - **DROP** to the floor and cover face with hands.
  - **ROLL** around on the floor until the fire is out.

A **ALARM:** Pull the fire alarm. If you are working in a facility Report the fire according to the facility's policies and procedures. If you are in a client's home, call 911. When you report the fire make sure you do the following:

- Identify yourself.
- Give the location of the fire. If you're in a healthcare facility—give the name of the facility, address, and closest intersection. If you're in a client's home, give the address and closest intersection.
- Tell the emergency operator the exact location, room number and floor level OR client's room, bedroom, kitchen, etc.
- Notify management in the facility or building. If you're in a client's home, notify your supervisor

C **CONFINE:** Turn off the oxygen, but only if it is safe to do so. Close the doors and windows to slow the spread of smoke and flames. Don't open doors without checking for heat. If the door is hot, it means there is fire on the other side. Opening a hot door can injure you and cause the fire to spread.

E **EXTINGUISH:** Fight the fire ONLY if it is small and contained (such as a wastebasket or a frying pan) and ONLY if you have been trained to operate a portable fire extinguisher. However, before you begin to fight a small fire, make sure:

- The area has been ***cleared***,
- The fire has been ***reported***, and
- You have a clear exit ***path for escape***.

GET OUT!

THINK OUTSIDE OF THE BOX!

Working with clients in the home often requires coming up with creative solutions to uncommon problems.

THE PROBLEM: You provide care for Mr. C. who has smoked cigarettes since he was sixteen years old. Now, his doctor just ordered oxygen therapy.

WHAT YOU KNOW: You know he has tried to quit in the past by "going cold-turkey" but failed after a few days. He refuses to wear a patch.

When you try to talk to him about the safety issue—he denies that there is a problem and refuses to quit.

GET CREATIVE: Think of **3 creative solutions** you might suggest to your client right now to help him prevent a fire and stay safe.

TALK ABOUT IT: Share your ideas with your co-workers and supervisor and find out how they would solve the problem.

GENERAL OXYGEN SAFETY TIPS

- Post signs in every room where oxygen is in use. Make sure that absolutely **NO SMOKING** occurs when oxygen is in use.
- Secure any non-portable oxygen cylinders tightly and store in a well-ventilated area. Never store oxygen tanks in a closed cabinet or the trunk of a car.
- Oxygen cylinders and vessels must remain upright at all times. Never tip an oxygen cylinder or vessel on its side or try to roll it to a new location.
- Oxygen concentrators should be plugged into a properly grounded outlet only. Never use an extension cord.
- Be familiar with the equipment and the safety checks provided by your employer and the equipment manufacturer.
- Learn how to turn off oxygen in case of fire.
- Turn the cylinder valve off when the oxygen is not in use.
- Always turn oxygen cylinder or container valves *slowly*. Abrupt starting and stopping of oxygen flow may ignite any contaminant that might be in the system.
- Liquid oxygen is extremely cold. Touching it can quickly freeze the skin. The vapors from the liquid oxygen are also extremely cold and can damage delicate tissues, such as eyes. To prevent injury from freezing, never allow any unprotected skin to contact frosted parts of liquid oxygen vessels and stand clear of vapors.
- Keep oxygen tubing neatly coiled so the client cannot trip over it.
- Do not place the electrical cord or oxygen tubing under rugs or furniture.
- Do not use petroleum-based lotions or creams, like Vaseline, on your clients' face or upper chest. Use a water-based product to moisten lips and nasal passages if it is needed.
- If a skin moisturizer is needed, consider using cocoa butter, aloe vera or other similar products.
- Avoid bedding or clothes made of wool, nylon or synthetic fabrics as these materials have the tendency to produce static electricity. The use of cotton material bedding and clothes will avoid sparks from static electricity.
- Do not allow children or untrained individuals to handle or operate oxygen equipment.
- Never try to repair broken equipment on your own. Notify your supervisor to request replacement equipment right away.
- In home care settings, make sure smoke detectors are working. Have fresh batteries installed. Perform monthly checks.
- Ensure that you have an all purpose fire extinguisher close by and familiarize yourself with its use.
- Help clients and their families prepare an evacuation plan. Draw a rough plan of the home noting doors and windows that can be used for escape. Make sure doors and windows open easily. Designate one place to meet outside the home. Conduct a drill a couple of times each year so everyone is familiar with the routine.
- Notify the local fire department, gas and electric companies and telephone company when home oxygen therapy is started. Request a "priority service listing." This is for those times when there is a power or telephone failure or repairs are needed on any utility.

OXYGEN'S ABNORMAL OBSERVATIONS

As a nursing assistant, you have the very important job of recognizing and reporting any abnormal observations you make. For clients using oxygen, it's important to watch for and report any signs that the client is not getting enough oxygen or that the client may be experiencing oxygen toxicity.

Here's how you'll know:

Take and record your client's vital signs *before* and *after* he or she uses oxygen. If the client is on continuous oxygen, be sure to check and record vitals at the beginning of your shift, and then as needed if you notice any changes.

NOT ENOUGH OXYGEN?

Hypoxemia (not enough oxygen) can occur when the lungs are not functioning properly or when the heart is unable to pump enough blood to the lungs for oxygenation.

For clients already on oxygen, hypoxemia can occur if the oxygen runs out, there is a kink in the tubing, the cannula is not properly placed, or if the prongs of the cannula become blocked by mucous.

Symptoms of hypoxia can include:

- Shortness of breath,
- Elevated blood pressure,
- Rapid heart rate,
- Lightheadedness, and
- Cyanosis, a bluish color to the skin.

OXYGEN TOXICITY

Usually, oxygen is a good thing. But not in all cases. Remember, most people breathe in oxygen and breathe out carbon dioxide. The carbon dioxide is the waste product that the body must get rid of.

For some people with COPD, supplemental oxygen causes the body to *hold onto* the carbon dioxide, which may cause drowsiness, headaches, and in severe cases lack of respiration, which may lead to death.

In people with chronic obstructive pulmonary disease, carbon dioxide toxicity can be prevented by careful control of the supplemental oxygen. Just enough oxygen is given to maintain an oxygen saturation of 88 - 92%.

TALK ABOUT IT!

Should smokers who refuse to quit be denied a prescription or insurance coverage for oxygen therapy?

Smoking and the need for oxygen therapy are closely linked.

COPD is the most common reason for oxygen therapy and around 90% of COPD is a result of smoking.

An estimated 20-40% of patients on long term oxygen therapy *continue* to smoke.

Although oxygen treatment may help the smoker feel better, it carries a risk of serious harm to patients, their family members, health care workers who visit the patient's home, and possibly even others, like neighbors in adjoining apartments.

What do you think? Talk about it with your supervisor and co-workers. Find out what policies are in place to help smokers in this situation to quit.

FIVE KEY POINTS!

REVIEW WHAT YOU LEARNED!

1. Everything you do, every movement you make, every bodily function (even those you don't have to think about) require oxygen to happen.
2. Without oxygen, the body will die in less than 10 minutes.
3. Oxygen by itself is not flammable. It can't ignite or explode on its own. Oxygen is dangerous because it makes other things burn more easily and more intensely.
4. The "Five Foot Rule" for oxygen safety says that all oxygen should be kept at least five feet away from any heat source.
5. It's important to watch for and report any signs that the client is not getting enough oxygen or that the client may be experiencing oxygen toxicity.

COMFORT MEASURES

Prevent Pressure Ulcers. When caring for a client on oxygen, check the elastic headband or ring that secures the face mask or cannula in place to see that it is not too tight and causing pressure areas.

- Look for irritation from the mask or cannula around the face and ears. Pad pressure areas with cotton. Pressure ulcers can result from tubing that rubs the skin on the top of the ear. Keep the skin clean and dry under the cannula or mask.

Hydration is important. Give frequent oral hygiene and adequate fluids to the client. Oxygen dries the tissues, causing the client's mouth to become dry and stale tasting.

Keep it clean. Observe the nasal cannula for mucus buildup. Assist the client or family member to clean or replace the tubing as needed.

Keep it flowing. Make sure the client is not lying on the tubing and that the tubing is not crimped or kinked. This will cut off the flow of oxygen.

Position for air flow. If your client is confined to bed, the best position is to elevate the head of the bed at least 30 degrees. If the client is able to move, encourage frequent position changes. If the client cannot move himself, reposition at least once every 2 hours.

Coughing and deep breathing exercises. Have client inhale deeply, hold breath for several seconds, and cough two to three times with mouth open while tightening the upper abdominal muscles. This technique can help keep airways clear and strong.

Encourage activity as tolerated. Immobility makes breathing problems worse. Body movement helps mobilize secretions. Help your client get some form of exercise every day. It can be walking (if the client is able) or simply sitting upright and stretching a little.

Eliminate irritants. In home care, look for and eliminate things that may irritate your client's airways. This may be dust, animal dander, open windows during high pollen counts or harsh cleaning chemicals.

FINAL THOUGHTS ON OXYGEN THERAPY

- For people who do not get enough oxygen naturally, supplements of oxygen can have several benefits. Oxygen therapy can improve their sleep and mood, increase their mental alertness and stamina, and allow their bodies to carry out normal functions. It also prevents heart failure in people with severe lung disease.
- Although it seems natural and harmless, supplemental oxygen is a drug that requires a doctors prescription. Failure to use oxygen exactly as prescribed can result in harm or even death.
- You must know what flow rate (usually 2L to 7L) of oxygen is prescribed for your client and how to read the gauge to determine if the rate is correct. If the rate is wrong, report to your supervisor immediately. In most cases, you will not be allowed to adjust the rate yourself, a nurse or respiratory therapist must do it.
- Oxygen is a safe gas and is non-flammable. However, it *supports* combustion. That means things burn more readily in an oxygen-enriched environment.
- By far, fire poses the most dangerous risk to people who use oxygen. And cigarette smoking is the most common factor contributing to fires associated with oxygen therapy.
- Not only should people on oxygen therapy **QUIT SMOKING**, but they should also avoid places or people that can expose them to lit cigarettes.
- Always be prepared for the possibility of a fire:
    - In facilities, you must know the policy and procedure your employer has in place.
    - In home care, you set the policy and procedure. That means you must develop the escape plan (unless one is already in place.) You are responsible for testing the smoke alarms and making sure fire extinguishers are readily available in in working condition.
- Your observations and reports are always important. But when a client is on oxygen therapy, your observations are even more critical. Make sure you know the signs and symptoms of low oxygen and oxygen toxicity. Your keen observation and quick reporting may mean the difference between life and death for your client.

WHAT I KNOW NOW!

Now that you've read this inservice on oxygen safety, jot down a couple of things you learned that you didn't know before.

_____

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EMPLOYEE NAME
(Please print):

_____

DATE: _____

- ***I understand the information presented in this inservice.***
- ***I have completed this inservice and answered at least eight of the test questions correctly.***

EMPLOYEE SIGNATURE:

_____

SUPERVISOR SIGNATURE:

_____

Inservice Credit:	
☐ Self Study	1 hour
☐ Group Study	1 hour

File completed test in employee's personnel file.

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CAREGIVER TRAINING

A Client Care Module:
Oxygen Safety for Caregivers

Are you "In the Know" about oxygen safety? Circle the best choice or fill in your answer. Then check your answers with your supervisor!

1. The human body uses oxygen to create:
A. Fire.
B. Energy.
C. Food.
D. Waste.

2. Oxygen tanks should be stored:
A. In a small closet.
B. On its side.
C. Upright and secured.
D. None of these.

3. Your client on oxygen is complaining that her nose and lips are dry and painful. You should:
A. Apply Vaseline (petroleum jelly) to the areas.
B. Encourage her to take a break from the oxygen for a while.
C. Apply a water-based moisturizer to the dry areas.
D. Do nothing. This is a normal side effect of oxygen therapy.

4. Fire is a chemical reaction that needs all 3 of these elements to burn, EXCEPT:
A. Carbon Dioxide.
B. Heat.
C. Fuel.
D. Oxygen.

5. True or False
Oxygen is flammable.

6. True or False
Oxygen can be harmful to some people with COPD.

7. True or False
Touching liquid oxygen can damage the skin.

8. True or False
It's important to restrict or withhold fluids for people on oxygen.

9. True or False
If a fire starts, the first thing you should do is grab a fire extinguisher.

10. True or False
It's safe to smoke while on oxygen as long as you do it outside.