PATIENT/CAREGIVER INSTRUCTIONS

Home Ventilator: for Invasive and Non-Invasive Use

To be used in conjunction with ventilator equipment, prescribed by physician, and product-specific operating manual.
See page 2 for more information.

APRIA HEALTHCARE®

Table of Contents

Introduction

Your decision to use or provide mechanical ventilation and respiratory care in the home is an important one. We fully appreciate the concern and commitment that preceded this decision and Apria Healthcare is committed to helping you learn the techniques that you and your caregivers will need to make your home ventilation a safe and positive experience.

While you are still in the hospital, your home ventilation education program will begin. This program will cover the mechanical and technical aspects of your home care and equipment.

This booklet has been written to help you learn how to operate and care for your ventilator. Although it may seem like a tremendous amount of information, in time and with practice, you will become familiar with the care and use of the equipment. We require individuals sharing in the care of the ventilator and ventilated patient to become well acquainted with the information found within this manual. This book is only a guide. If you have any questions, we encourage you to follow up with your healthcare professionals.

Apria, in collaboration with your hospital and physician, will provide support and training to your family and caregivers in order

training to your family and caregivers in order to successfully transition you home with a ventilator. All home ventilation plans require a strong caregiver support system. Apria will help coordinate with your physician and hospital to establish other resources that may be necessary.

Each caregiver must be trained in the use and care of and be competent in the management of following areas:

- The home ventilator and accessories
- General anatomy and physiology of the lung
- Respiratory care equipment
- Emergency procedures
- Community resources and support services

Once you are transitioned from the hospital to your home, Apria will visit you on a regular basis to provide training reinforcement and routine equipment checks and maintenance. Our clinicians will regularly contact you to schedule these required visits. Caregivers must cooperate to ensure Apria is able to perform the prescribed activities and preventative maintenance on the equipment.

Your Home Ventilator

Your physician has prescribed a home ventilator system for you. This booklet will assist you in understanding general ventilator use, but each system also has its own product-specific operating manual. Along with this booklet, you should have the manufacturer's operating manual. A copy of the manufacturer's manual may be found on **apria.com**.

How the Lungs Work

Introduction

The respiratory system is designed to bring oxygen into the body and expel carbon dioxide into the air. This very sophisticated system can be simply understood by dividing it into three separate areas:

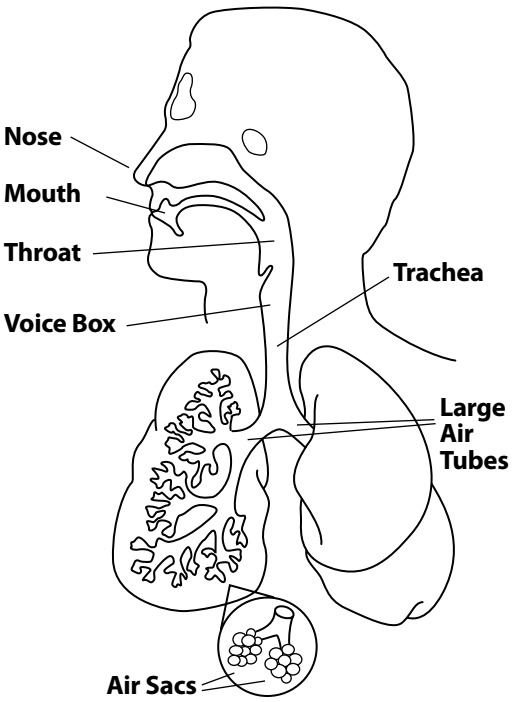
1. The upper airway, which includes the opening of the air passages of the nose, mouth and passages leading to the trachea (windpipe).
2. The trachea, bronchi and alveoli, which consist of the main windpipe, the vocal cords (voice box), the large air passage dividing into each lung and air sac where the air which is inhaled comes into contact with the bloodstream.
3. The respiratory muscles, including the diaphragm and other breathing muscles that are responsible for the pumping action which draws air in and pushes it out of the body.

What Makes Up the Respiratory System?

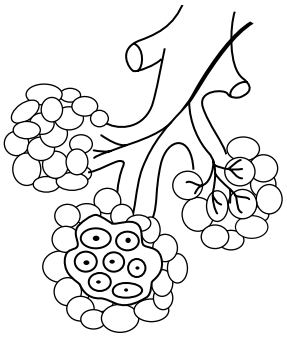
Nose (nasal cavity) — Air enters the lungs at this point. As air passes through the nose, dust and other particles are removed, the air is warmed and moisture is added.

Mouth (oral cavity) — Air also enters the lungs at this point.

Throat (pharynx) — Airway between the mouth and voice box. (Your tonsils are here).



The respiratory system



Air sacs (alveoli) in the lungs

Voice box (larynx) — This is a group of incomplete cartilage rings, the largest being the Adam's apple, which you can feel and sometimes see on the front of your neck. Inside the Adam's apple are the vocal cords that produce your voice as you speak. The epiglottis is also located in the larynx. This is a flap that covers the windpipe during swallowing to prevent choking.

Trachea (windpipe) — This is the large air tube below the voice box that divides at its base into two branches (bronchi), one to each lung.

Large air tubes (bronchi) — These allow air to pass into the lungs. The large air tubes continue to divide into smaller air tubes (smaller bronchi and bronchioles).

Air sacs (alveoli) — Very small sacs which occur at the ends of the smaller air tubes and look like a cluster of grapes. This is where the oxygen is taken into the blood and carbon dioxide is removed from the blood. Carbon dioxide is removed from the body by breathing out (exhaling).

Diaphragm — The diaphragm is a dome-shaped muscle under the lungs and the primary muscle of respiration. Its movement causes air to be drawn in through the nose and mouth, down through the windpipe and air tubes and into the air sacs.

How We Breathe

Fresh air enters the upper airway through the mouth and nose, goes into the back of the throat and through the larynx or voice box into the main air passages. In the nose, air is warmed, filtered and humidified. The warmer air is able to hold on to more moisture. This is to prevent the air passages from drying out as the air passes into the lungs. The moist surfaces in the nose also filter dust particles and inhalants.

The heated, moistened and filtered air enters the trachea or windpipe. The trachea then divides into two main branches, or bronchi, that deliver air into the lungs. One branch serves the right lung and the other, the left. Inside the lungs, these airways divide many more times. They get smaller in size so that they may deliver air to the deepest areas of the lungs. Eventually these small airways end in alveoli where the body actually takes the oxygen from the air we breathe into

the bloodstream. It is also here where the carbon dioxide is returned to the air from the bloodstream. There are hundreds of millions of these alveoli in each of our lungs. They are made of an elastic tissue that stretches when we breathe in and recoils and relaxes when we breathe out. There is a network of very thin blood vessels called capillaries surrounding each alveoli. Blood is pumped to the lungs to pick up a fresh supply of oxygen from the air sacs and to release into the air sacs the carbon dioxide from throughout the body.

How the Lungs Keep Clean

Ordinarily, the lungs are protected by the nose, which provides filtered, warmed and humidified air. Any remaining dust or particles become trapped in the mucus that lines the trachea and bronchi. This mucus is continually moving toward the top of the trachea by cells called "cilia" so that the mucus can be coughed out or swallowed. For this system to work properly, the cilia must be able to move the mucus forward. Smoking inhibits the cilia's ability to do this. Drinking too little water can also make the mucus thick and hard to move.

Types of Ventilation

Ventilators are used both invasively and non-invasively.

Invasive ventilation is ventilation delivered through a tracheostomy. It may be used 24 hours per day or less than 24 hours per day. The ventilator delivers volume breaths of air directly into the lungs. Sometimes supplemental oxygen is added to the breaths delivered by the ventilator.

Non-invasive ventilation (NIV) assistance or non-invasive positive pressure ventilation (NPPV) uses a nasal mask, face mask, or mouthpiece, connected to a ventilator to provide ventilation support during sleep or intermittently throughout the day. This support rests the lung muscles, and improves breathing performance during the day. If use is at night only, this is referred to as nocturnal NPPV. If use is intermittent, this may be referred to as "Mouthpiece" or "Sip and Puff" ventilation. Supplemental oxygen may also be added to this type of system.

If you have a tracheostomy, continue below.

If you do not have a tracheostomy, proceed to page 5 ("Non-Invasive Ventilation Interfaces").

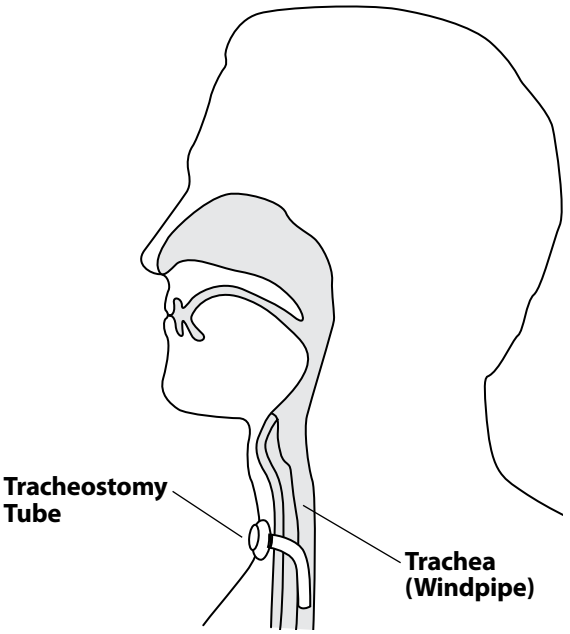
Tracheostomy

What Is a Tracheostomy?

A tracheostomy is a surgically produced hole in the trachea. A tracheostomy tube is usually used to hold the hole open.

A tracheostomy bypasses a person's nose and mouth and substitutes as his or her airway. That person breathes and coughs through the tracheostomy as long as it remains unobstructed.

When breathing through a tracheostomy, the air no longer passes through the nose where it normally would be warmed, filtered and humidified. Because of this, most patients require a heated humidifier which will warm and humidify the air delivered from the ventilator to the patient's lungs.



The location of a tracheostomy tube

Some patients may only require the use of a heat moisture exchanger (HME) to provide the humidity needed. HMEs are also referred to as artificial noses. This device retains the heat and moisture from the patient's exhaled air. The moisture is then returned to the air being inhaled on the next breath. This device also acts as a filter for keeping dirt, dust and bacteria from entering the lungs.

Normal speech occurs when the air passes through the vocal cords during exhalation. Because the tracheostomy is positioned below the voice box (larynx), airflow no longer moves through the larynx or vocal cords. Speaking aloud is difficult as long as the tracheostomy is open to the air. It is possible, in certain circumstances, to close off the tracheostomy and redirect air up the trachea through the vocal cords and to speak aloud. This may be done with a speaking valve, which requires a physician prescription.

Why Is a Tracheostomy Performed?

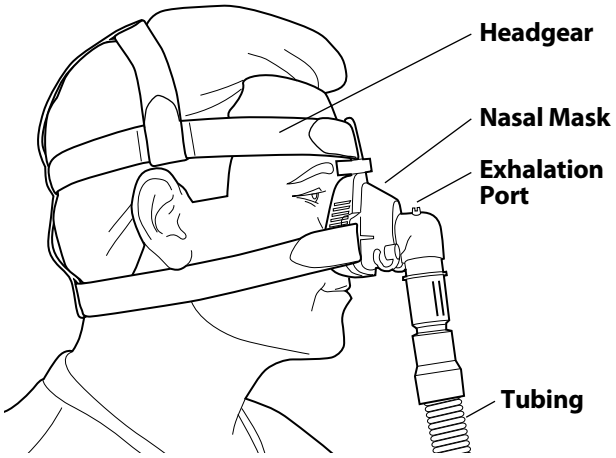
- To provide a secure airway for long-term mechanical ventilation
- To provide easy access for removal of secretions
- To bypass the nose or mouth when the upper airway is obstructed (often due to cancer of the mouth, larynx or oropharynx, etc.)

Non-Invasive Ventilation Interfaces

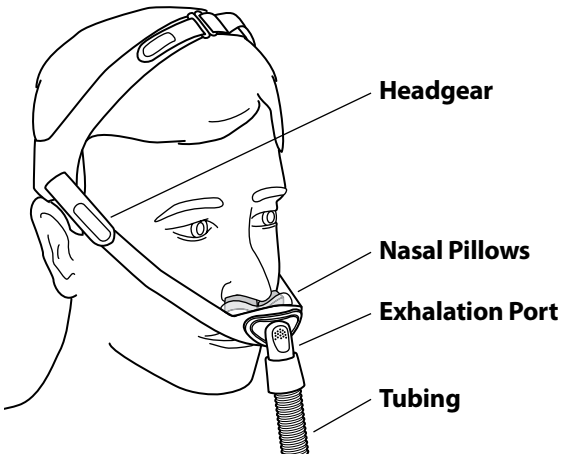
Some patients use ventilators at night, as needed, and occasionally for longer periods of time via a non-invasive interface (usually a mask). These interfaces are secured to the patient's face with a headgear specifically designed for the make and model of the interface.

There are four major interfaces that are used with non-invasive ventilation.

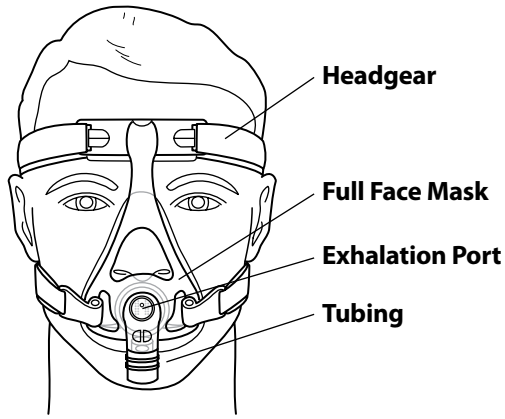
Nasal Mask: This type of interface covers the patient's nose.



Nasal mask circuit



Nasal pillow circuit



Full face mask circuit

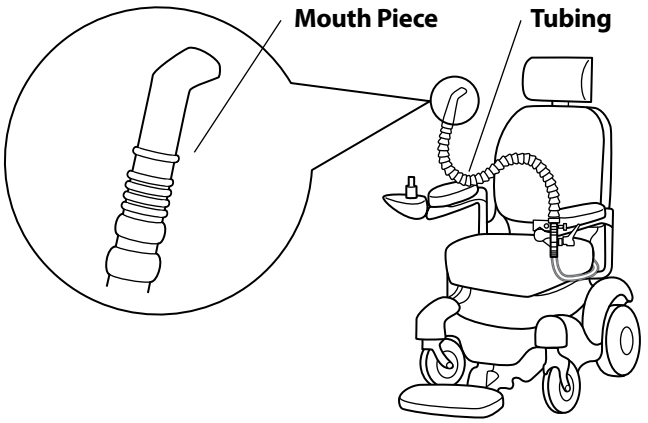
Nasal Pillows: This type of interface fits into the nares (nostrils) of a patient's nose.

Full Face Mask: This type of interface covers the nose and mouth of a patient, and is secured with a headgear.

Mouth Piece Ventilation: This type of interface is used for intermittent on-demand ventilation. The patient initiates a breath through the mouthpiece or straw to receive ventilation.

Introduction to the Ventilator

This section of the manual covers the ventilator and its operations, other related



Mouth piece ventilation

support equipment, and general care procedures. This section should be studied carefully to ensure a safe environment for home ventilation.

Learning the process of home mechanical ventilation requires a serious commitment and a lot of practice and patience. However, the tasks you are undertaking are not insurmountable. As you study this manual and practice the procedures, questions will arise. Please do not hesitate to call us. Your Apria professional is always available as a resource.

Maintaining the Ventilator

The ventilator, like any piece of equipment, needs routine maintenance. Your Apria clinician will monitor the equipment on each follow-up visit. There are, however, certain ventilator observations and tasks that must be performed each day.

It is extremely important for you to wash your hands before working with the ventilator or the patient.
(See "Handwashing" on page 19.)

Ventilator Check (Monitoring)

It is vitally important that the ventilator be checked regularly to guarantee proper function of the ventilator and to protect against accidental changes that may occur with the controls. Directions for performing ventilator checks are in the section entitled "Ventilator Monitoring" (see page 8).

Caregivers must remain within close proximity of the patient at all times to allow immediate response to alarms and/or patient distress.

Changing the Patient Circuit (Tubing)

The patient circuit includes all the parts that make up the ventilator tubing and humidification system, and must be changed and/or cleaned on a routine basis. This will prevent the patient from getting an infection and will provide a system that is as clean as possible. Routine cleaning and/or changing the circuit is required. Check with your Apria professional to establish the frequency of circuit changes ordered by the physician and/or the manufacturer's recommendation for circuit cleaning and changing. If not specified by your physician or the manufacturer, circuits should be changed/cleaned weekly. Directions for changing the circuit are in the section entitled "Changing the Ventilator Circuit and the Heated Humidifier Chamber" (see page 12). A spare ventilator circuit must be available for use at all times.

Equipment Disinfection

This section applies if you have been provided a " reusable" ventilator circuit.

The importance of equipment cleaning and disinfecting cannot be overemphasized. Ventilator patients are highly susceptible to respiratory infections. A very likely source of such an infection is equipment that is being used and not cleaned and disinfected regularly. For successful home mechanical ventilation, you must keep the equipment very clean.

Water Accumulation in the Ventilator Tubing

Water accumulation in the patient tubing should be removed by draining the water into a container and then emptying the container into the toilet. Remember to clean the container after you have dumped the water out. If too much water accumulates in the tubing it will make a "gurgling" noise in the ventilator tubing during inspiration. The amount of water in the tubing will vary, depending on the temperature of the water in the humidifier and the ambient air temperature. Do not drain condensation back into the humidifier chamber.

Reminder: The heater/humidifier must always be placed lower than the patient's head. Apria requires that humidifiers be secured to the ventilator, ventilator stand, or IV pole. Humidifiers that are kept above the level of the patient's head may cause water in the tubing to flow into the patient and cause it to go into the lungs.

Depletion of the Water Level in the Humidifier

When the water level in the humidifier is low, it must be refilled. If you have been provided

a gravity feed water system which provides a continuous flow of water into the humidifier, refilling occurs by replacing the water bag. This is usually required every 24 to 48 hours. If you do not have a gravity feed water system, distilled water is added until the humidifier reaches the "full" line on the chamber assembly. This is usually done every 4 to 6 hours.

When adding water to the humidifier, the patient can be connected directly to the ventilator by by-passing the humidifier.

Distilled water is required for use in your humidifier.

Humidifier Temperature

The temperature of the inspired gas should be monitored with a thermometer or temperature probe kept in line with the circuit, and close to the patient. The temperature should be kept close to body temperature (about 98.6°F or 37°C).

CAUTION: This is particularly important since high temperatures can cause airway burns or irritation and lower temperatures may lead to inadequate humidification and mucus plugging.

Troubleshooting

Some problems may occur during home ventilation. Usually these problems are easily resolved and there is no cause for major alarm. When such situations arise, they should be dealt with quickly and calmly, so as not to cause undue anxiety to the patient. Directions for troubleshooting the ventilator are located in the section entitled "Ventilator Troubleshooting Guide" (see page 21).

Patient Monitoring

In the event of a malfunction, it is important to know if there is a patient issue (e.g., the patient needs suctioning, a bronchodilator treatment, etc.) or if the equipment has malfunctioned. If the ventilator alarm activates, always look at and attend to the patient first, then address the alarm situation. Routinely monitor the patient's color, mental status and other vital signs as appropriate.

Do not make any changes or adjustments to the ventilator settings. However, if changes are ordered, ask the prescribing physician to provide Apria with a written prescription of these changes. Contact your Apria clinician to make changes to ventilator settings if ordered by the physician.

Ventilator Monitoring

The ventilator must also be monitored routinely for tidal volume setting, respiratory rate, system pressure and alarm function. Mechanical problems, such as punctures or kinks in the tubing, malfunction of the exhalation valve, changes in the respiratory rate, alarm failure, or the patient's condition, can result in insufficient or decreased ventilation to the patient. Routine monitoring of the ventilator and tubing can help identify potential problems before they create difficulties.

The ventilator is equipped with safety alarms. These alarms are sensitive to low and high

pressures in the ventilator circuit or airway. Bronchospasm (coughing) or excessive secretions may cause the ventilator to alarm. Under no circumstances, shall the patient disconnect alarm (low pressure or low exhaled volume) or high pressure alarm be disabled. In order for one to hear and react to these alarm sounds, someone must always be within hearing range of the alarm. Audible alarms must be loud enough to be heard by all caregivers in all areas of the home.

An accurate record of ventilator monitoring must be kept. **It is important that the patient be kept on the ventilator using the ventilator settings prescribed by the physician.** Monitoring ventilator settings will ensure the physician's orders are followed and will alert the caregiver if settings change. The following procedures explain how to monitor the ventilator. A sample form is included at the end of this discussion.

1. **Date:** Fill in the date.
2. **Time:** Fill in the time of day.
3. **Ventilator mode:** Observe the setting of the mode control and record the setting:
   - For invasive ventilation (i.e., Assist/ Control, Control, SIMV, Pressure Limit or Pressure Support)
   - For non-invasive ventilation (i.e., Bi-Level, AVAPS)
4. **Oxygen concentration or liter flow (LPM):** If the patient is not receiving supplemental oxygen, the oxygen concentration will be room air (21%). If the patient is on oxygen record the liter flow.
5. **Tidal volume:** If the ventilator is set in volume mode, record the set tidal volume. Also, observe the exhaled tidal volume in the patient display screen and record. This setting should never be changed without a physician's order.
6. **Breath rate — ventilator:** Observe the breath rate set on the ventilator setting display/menu and record the number of breaths the ventilator is delivering to the patient.
7. **Breath rate — patient:** Observe the patient's actual breath rate on the ventilator patient display panel. (The breath rate recorded here will include both the breaths that the ventilator is delivering as well as the patient's own respiratory rate.) To ensure you have the correct breath rate, you can also count the number of times the patient breathes in 60 seconds to get the respiratory rate of the patient.
8. **Patient pressure:** Observe the pressure display and record the Peak Inspiratory Pressure (PIP). **Note:** This pressure may vary from breath to breath. Record the average pressure observed.
9. **Inspiratory time:** Observe the inspiratory time set. Record the inspiratory time on the ventilator setting display/menu.
10. **Trigger/sensitivity (breathing effort):** Observe the trigger/sensitivity set on the ventilator and record. The assist/ spontaneous indicator will light to indicate that the patient has taken a spontaneous breath.

11. **Low pressure alarm setting:** Observe the low pressure alarm setting and record the setting observed on the ventilator setting display/menu. This setting should never be changed without a physician's prescription.
12. **Is the low pressure audible alarm operational?** Disconnect the circuit from the patient and wait 15 to 20 seconds. Manual ventilation may be necessary with a resuscitation bag. After the alarm sounds, reconnect the patient and reset the alarm. Record a "yes" if an audible alarm sounded during the above procedure. Do not forget to reconnect the circuit to the patient.
13. **High pressure alarm setting:** Observe the high pressure alarm setting and record the setting observed on the ventilator setting display/menu. This setting should never be changed without a physician prescription.
14. **Is the high pressure audible alarm operational?** Disconnect the circuit from the patient and aseptically occlude air flow at the patient end of the circuit until the audible alarm sounds. If patients are prone to coughing or have excessive secretions, they may activate the high pressure alarm more frequently. Record a "yes" if an audible alarm sounded during the above procedure. Do not forget to reconnect the circuit to the patient.
15. **Positive End Expiratory Pressure (PEEP) setting** (if applicable): If the patient is on PEEP, record the amount of PEEP set on the ventilator setting display/menu.
16. **Pressure support setting** (if applicable): If there is a pressure support setting ordered, record the observed setting on the ventilator setting display menu.
17. **Humidifier heater setting:** Observe the setting on the Humidifier Heater. Record the setting. If an artificial nose or heat moisture exchanger (HME), is used, place an "NA" in the box.
18. **Temperature:** Observe and record the temperature registered on the thermometer or temperature read out on the humidifier heater display. Typically, the temperature should be maintained around 93.2°F to 98.6°F (34° to 37°C).
19. **Battery check: Is the internal charge level OK?** Check the internal battery charge following the manufacturer's instructions. Record "yes" or "no."
20. **Battery check: Is the external charge level OK?** Check the external battery charge following the manufacturer's instructions. Record "yes" or "no."
21. **Caregiver initials:** The person performing the check should put his/her initials in this space.

Home Ventilator Monitoring Record

Patient name _____

1. Date									
2. Time									
3. Ventilator mode: Invasive (Assist/Control, Control, SIMV, Pressure Support); Non-invasive (Bi-Level, AVAPS)									
4. Oxygen concentration or liter flow (LPM)									
5. Tidal volume (set))/exhaled tidal volume									
6. Breath rate — ventilator (set)									
7. Breath rate — patient (observed)									
8. Peak inspiratory pressure (PIP)									
9. Inspiratory time									
10. Trigger/sensitivity (breathing effort)									
11. Low pressure alarm setting									
12. Low pressure alarm audible? (yes or no)									
13. High pressure alarm setting									
14. High pressure alarm audible? (yes or no)									
15. PEEP setting (if applicable)									
16. Pressure support setting (if applicable)									
17. Humidifier heater setting (if applicable)									
18. Temperature (if applicable)									
19. Battery check: Internal charge level OK? (yes or no)									
20. Battery check: External charge level OK? (yes or no)									
21. Caregiver initials									
22. Wash hands thoroughly to maintain clean conditions									

Changing the Ventilator Circuit and the Heated Humidifier Chamber

As stated previously, it is essential that the patient circuit and humidifier chamber (if applicable) be cleaned or changed frequently to prevent the patient from getting an infection. The circuit must be changed or cleaned weekly or as directed from your physician or according to the manufacturer recommendations.

Note: The heated humidifier chamber should be changed or cleaned at the same interval as the ventilator circuit.

Equipment Required

- Clean patient circuit
- Clean humidifier chamber, if applicable
- Manual resuscitator
- Oxygen source, if needed
- Secondary ventilator, if available

Instructions

It is highly recommended that two people be available when changing the ventilator circuit. However, if only one person is available the following procedure should be followed:

1. Wash your hands before you begin changing the patient circuit. (See "Handwashing" on page 19.)
2. Place the manual resuscitator at the patient's side.
3. Have the clean circuit assembled and ready for use.

SKIP TO STEP 6 IF YOU ARE NOT USING A HEATED HUMIDIFIER

4. Connect the clean patient circuit to the clean humidifier chamber.
5. Fill the clean humidifier chamber with distilled water, if applicable, or change the continuous feed water bag.
6. If a second ventilator is available, place the patient on the secondary ventilator. If a second ventilator is not available, tell the patient you are going to interrupt his ventilation for 1 or 2 breaths.
7. Ventilate the patient with the manual resuscitator during the circuit/ humidifier change procedure.
8. Disconnect the dirty tubing from the ventilator and patient.
9. Remove the dirty humidifier chamber and replace it with a clean one.
10. Connect the clean circuit to the ventilator and test for leaks.
11. Connect the short connective tube from the humidifier chamber inlet to the ventilator.
12. Reconnect the patient and ensure proper operation of ventilator and circuit.
13. Observe the patient's chest and pressure displayed on the ventilator during the next inspiration. Both should rise.
14. Conduct a ventilator check at this time. See section on "Ventilator Monitoring" (on page 8).
15. If the ventilator does not appear to be functioning correctly, ventilate the patient with a manual resuscitator bag until the problem can be corrected

or until the patient is placed on the secondary ventilator.

16. If the patient is using reusable circuits, clean and disinfect the permanent patient circuit for reuse and discard any disposable items. See section on "Cleaning and Disinfection Procedure" (below).
17. Wash your hands thoroughly to maintain clean conditions.

Cleaning and Disinfection Procedure

NOTE: This section only applies if using a "reusable" ventilator circuit.

Equipment Required

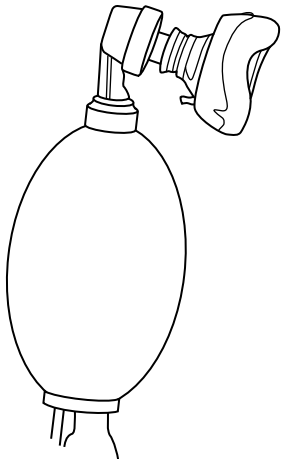
- White vinegar (or chemical disinfectant)
- Water
- Large, clean plastic container with lid
- Measuring cup
- Liquid dishwashing detergent
- Small brush
- Two buckets
- Rubber gloves

Instructions

1. Wash your hands thoroughly with soap and warm water.
2. Disassemble the permanent tubing, humidifier and circuit.
3. Scrub the parts with a small brush in the first bucket using warm soapy water. Be extra careful with the exhalation mushroom-like valve. This valve can tear easily and the tears are not always visible.
4. Rinse thoroughly under warm tap water and shake off the excess water.
5. Soak the equipment for at least 30 minutes in a solution of equal parts white vinegar and water.
6. Rinse thoroughly.
7. Shake excess water from parts and allow to air dry in a clean place.
8. After allowing the equipment to air dry, reassemble the humidifier and circuit and store in a dry plastic bag ready for the next use. Do not use a hair dryer to dry the circuit.
9. Discard the vinegar and water solution.

The Manual Resuscitator

A manual resuscitator is a bag and valve device that is used to deliver a volume of air to the patient's lungs. It is used at times when normal mechanical ventilation is either inconvenient or impossible. (i.e., for troubleshooting ventilator issues, changing the ventilator circuit, or during equipment failure/emergency). It may also be used to hyperoxygenate or hyperinflate patients following suctioning.



Manual resuscitator

The patient valve on the manual resuscitator connects directly onto the patient's tracheostomy tube. By squeezing the bag, air is pushed through the valve and into the patient's lungs. When the bag is released, exhaled air escapes through the patient valve and into the room. Fresh air enters through a check valve and refills the bag. A mask is supplied for use in the event that emergency bag/mask ventilation is required.

Equipment Needed

- Manual resuscitator
- Oxygen source, if ordered

Instructions

1. Explain the procedure to the patient.
2. Connect the manual resuscitator to the tracheostomy tube.
3. If the patient breathes on his/her own, squeeze the bag as he/she begins to inhale, attempting to synchronize the breaths you are giving the patient with his/hers own breaths. If the patient does not breathe by himself/herself, begin squeezing the bag as soon as it is connected to the tracheostomy tube.
4. Observe the chest while squeezing the bag. Continue to squeeze the bag until the chest rises.
5. Release the bag when an observable rise in the chest has occurred.
6. Repeat this squeeze/release cycle at the same respiratory rate at which the ventilator is set. Allow a 1:2 ratio for moving air in and out of the lungs. Exhalation should always be about twice as long as inspiration.
7. Wash your hands thoroughly to maintain clean conditions. (See "Handwashing" on page 19.)

NOTE:

- Oxygen may be added, if prescribed, to the manual resuscitator to provide oxygen to the patient during the suctioning procedure.
- A face mask should also be available and stored with the manual resuscitator in case the tracheostomy site closes and the patient must be ventilated through the nose.
- If it is necessary to use a face mask for manual resuscitation, it may be necessary to obstruct the opening to the tracheostomy site to alleviate leaks.

Cleaning and Disinfection of the Manual Resuscitator

Equipment Required

- Liquid dishwashing detergent
- Two basins (buckets)
- White vinegar
- Water

Instructions

1. Wash your hands.
2. Remove the valves from the bag.
3. Disassemble the valves.

4. Wash all parts in mild dishwashing detergent.
5. Rinse all parts well and shake to remove excess water.
6. Soak the equipment for at least 30 minutes in a solution of equal parts white vinegar and water.
7. Rinse all parts well and shake to remove excess water.
8. Dry parts and reassemble. Test the bag for proper function by obstructing the air outlet port completely and squeezing the bag. The bag should not deflate and pressure should build in the bag. If pressure does not build, the bag has a leak and should be reassembled properly.
9. The manual resuscitator should be cleaned each day of use.
10. Store the resuscitator in a clean bag, readily accessible in the event of an emergency.
11. Wash your hands thoroughly to maintain clean conditions.

Introduction to Respiratory Care Procedures

Maintaining an open and clear airway is the most important part of home mechanical ventilation. As previously discussed, the airway is the pathway for air to get to the alveoli in the lung. This allows oxygen to be taken into the blood stream and carbon dioxide to be removed. The primary goal of airway care is to prevent obstruction of the airway so that the movement of air into the lungs is not restricted. A totally obstructed airway is a medical emergency which requires immediate action.

Therefore, this section will discuss the respiratory care procedures which are necessary to:

- Maintain a clear airway
- Avoid an obstructed airway
- Relieve an obstruction, should one occur

Suctioning: Why It Is Necessary

Coughing is the normal way a person clears his or her airway of secretions. When the ability to cough is weak or absent, secretions will build up in the lungs and airway. Secretions interfere with the lung's ability to get oxygen to the alveoli, and they can also cause the patient to have a difficult time breathing. When secretions begin to accumulate, suctioning the airway will be necessary. Suctioning removes the secretions from the airways and allows the patient to breathe easier.

- Your discharging facility will provide training on the proper suctioning procedure. If this has not already taken place, inform your Apria clinician so that training may be scheduled/coordinated with the facility.
- Refer to Apria's "Oral and Tracheal Suction" patient instruction booklet for more information about your suction machine.

Tracheostomy Care, Tracheostomy Tube Changes, Maintaining and Clearing the Airway, Stoma Care, and Manual Resuscitator Use

Your discharging facility will provide training on the proper techniques for tracheostomy care, tracheostomy tube changes, suctioning, maintaining and cleaning the airway, emergency reinsertion of the tracheostomy tube, stoma care, and manual resuscitator use. If this has not already taken place, inform your Apria clinician so that training may be scheduled/coordinated with the facility.

Tracheostomy tube must be changed routinely to minimize the chance of secretion build up and respiratory infection. The frequency that the tube needs to be changed will depend on what your physician orders. As a safety precaution, another trach tube of the same size, as well as a tube one size smaller, should always be available.

Please note: Your Apria clinician will not perform the trach tube change. Only a physician, nurse or trained caregiver may change the trach tube. DO NOT attempt to change the tracheostomy tube unless you have been trained to do so.

Early Warning Signs

It is important for you to be aware of the signs and symptoms that may indicate infection or heart and lung problems. Early recognition of these symptoms could help avoid more serious complications.

Infection

Improper equipment cleaning or failure to routinely clean the equipment can lead to respiratory infections. Likewise, improper aseptic techniques during suctioning, tracheostomy changing or stoma care can lead to infection. Changes in sputum consistency, volume, color, amount and odor are all indicators that should be observed for signs of infection. Dramatic changes in these clinical signs and symptoms could be a sign of infection and should be reported to the physician.

If any of these occur, notify your physician immediately.

Breathing Symptoms

- Increased shortness of breath
- Wheezing
- Increased coughing
- Increased respiratory rate
- Increased accessory muscle use

Sputum Changes

- Color
- Increase in quantity
- Change in thickness or consistency
- Presence of blood

Tracheostomy Site Symptoms

- Pulsating tracheostomy tube
- Bleeding at the tracheostomy stoma
- Discharge or odor from the tracheostomy area

- Swelling or redness around the tracheostomy stoma

Physical Body Symptoms

- Fever
- Loss of appetite
- Rapid weight gain
- Swelling of the feet, ankles or legs
- Headaches
- Sleepiness
- Visual disturbances
- Dizziness
- Cyanosis (blue skin color around nose and mouth)
- Confusion or anxiety

If you are having trouble with the **equipment**, call Apria.

If the patient is experiencing any **physical problems**, call the patient's physician.

If the patient is experiencing **severe physical problems**, call 911 or your local emergency services.

Emergency Procedures

Emergency Reinsertion of the Tracheostomy Tube

Manipulation of the tube during suctioning or tracheostomy care can lead to tube displacement. Consequently, when providing tracheostomy care, the tube must always be stabilized. If the tracheostomy tube accidentally falls out, follow the instructions for reinsertion of the tracheostomy tube provided by your discharging facility. If the facility instructions are not available, please see the below reminders.

If you have difficulty reinserting the tracheostomy tube, call emergency services.

1. Replace the trach tube, using a new sterile trach tube, as instructed by the facility staff
   OR
2. Reinsert the original trach tube
   OR
3. Occlude the stoma and use the manual resuscitator bag and mask to ventilate the patient at a rate of 8 to 16 times (breaths) per minute until medical assistance can be summoned.

During tube reinsertion, observe the patient's color and if possible, count his pulse rate. If his color becomes bluish or the pulse rate changes significantly, stop trying to insert the tube, occlude the stoma and ventilate with the manual resuscitator bag and mask until medical assistance can be obtained. If the patient cannot breathe on his own, you must reinsert the tube within 30 seconds or ventilate until reinsertion is possible. If unable to reinsert the tube, ventilate the patient and call emergency services immediately.

You may want to have access to a trach tube which is one size smaller than the tube the patient uses. Inserting this tube will be easier than the standard tube if the airway is swollen.

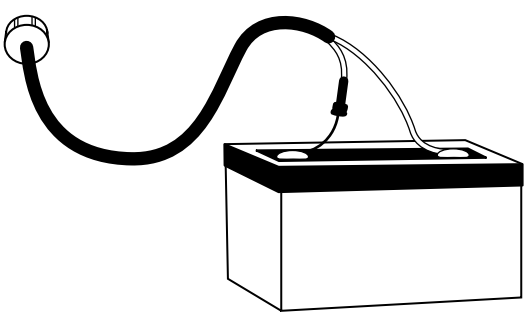
NOTE: Tube reinsertion can be a difficult procedure. It is important to practice changing the trach tube in the hospital before the patient goes home.

Power Failure

Home ventilators have an internal battery, and if used for life support, an external battery will be provided. In the event of a power failure, the ventilator will automatically switch to the internal battery unless the external battery is connected. The external battery must always be kept fully charged and, if possible, connected to the ventilator so that in the event of a power failure, it is ready for use. Internal and external battery duration varies by ventilator model, settings, battery type, and the age of the battery. Check the manufacturer manual for estimated battery duration. It is recommended that the external battery should be used to power the ventilator at least one day during every month.

Some batteries require monthly discharging. Be sure to follow the manufacturer's instructions for routine battery care.

NOTE: The internal battery is intended for use during short periods while switching between external power sources, emergency situations, or short durations when the user needs to be mobile. The length of time the ventilator will operate on internal power depends on many factors such as device settings, battery charge level, and condition or age of the battery.



External battery

For patients who rely on the ventilator for life support, it is critical that at least one fully charged external battery is available when the patient is mobile or does not have access to an A/C power source, and that the patient make arrangements to get to an A/C power source as soon as possible.

The internal battery is NOT intended to serve as a primary power source. It should only be used when other sources are not available, or briefly when necessary — for example, when changing power sources.

It is important to mark the circuit breaker or fuse in your home that controls the ventilator. Extra fuses should be available.

The local power company should be notified that you are using life support equipment in your home, and you should request to be placed on a priority list to have services restored in the event of a power failure.

If the patient lives in an area that experiences frequent, or extended power outages, he or she may wish to purchase a generator. A generator with 1000 watt capabilities with surge protection will power most ventilators. Higher voltage generators may be needed to power the humidifier, heater and suction units. Some patients prefer to relocate to an area that has power until their power has been restored.

Equipment Failure

If a problem arises with the home ventilator, those in attendance must hand ventilate the patient using the manual resuscitator bag. As soon as the patient is being ventilated adequately with the resuscitator, troubleshoot the equipment and attempt to correct the problem. If the patient has a secondary ventilator, place the patient on his or her secondary system and attempt to troubleshoot the primary ventilator problem. **If at any time during this process the patient exhibits difficulty in breathing, call for emergency medical assistance.**

After the patient is stabilized using the secondary ventilator and/or resuscitator bag, and if the equipment issue has not been corrected, contact Apria for assistance.

Infection Control

Apria employees follow state and national guidelines in order to reduce the chance of an infection spreading to, or from, patients and caregivers. The term "universal precautions" refers to procedures that prevent or reduce the chance of spreading such infection. The basic elements of universal precautions are:

Wear gloves when performing any procedure that might cause contact of the hands with blood or body fluids.

Wash your hands or use an alcohol-based antiseptic solution before and after contact with the patient, blood, body fluids or broken skin, and after removing gloves.

Wear a mask if the patient has a communicable respiratory disease.

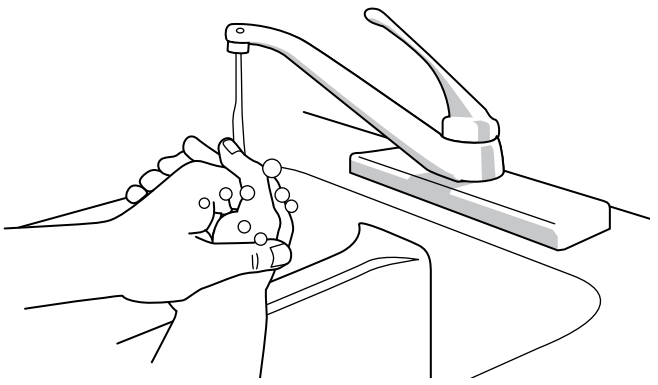
Handwashing

Thorough handwashing must be done prior to all procedures. Contaminated, dirty hands are one of the most common sources of infection.

1. Wet your hands thoroughly with warm water.
2. Use soap.
3. Scrub hands for 20 seconds using a rotary motion and friction. Wash:
   - Back and palm of each hand
   - Between all fingers
   - Fingernails

   Need a timer? Hum the "Happy Birthday" song from beginning to end twice.
4. Rinse your hands under the running water.
5. Dry on clean towel or with a paper towel.

For additional good health habits, visit our patient education section on **apria.com**.



Wash hands for 20 seconds

Safety Precautions

Use all equipment safely.

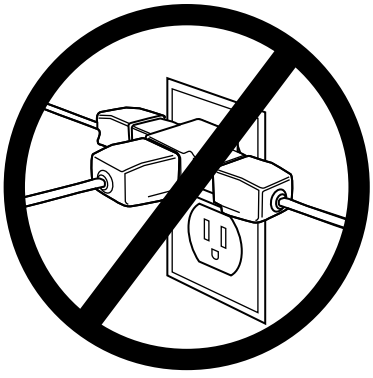
- Never change ventilator settings unless directed by a physician.
- If oxygen is used with the ventilator, always turn off the oxygen flow before turning off the ventilator.
- Always bleed the oxygen into the ventilator following the manufacturer's recommended method.
- Respond immediately to any alarm. It may indicate a potentially life-threatening event. Refer to the ventilator operator's manual for information regarding alarms on your model of ventilator.
- Always remain within proximity of the ventilated patient at all times to allow for immediate response to alarms and/or patient distress.

Never immerse the ventilator or any electrical equipment in water.

Never plug in the ventilator if it is wet or damp. Moisture always increases the potential of electrical shock.

Do not store any liquid on top of the ventilator.

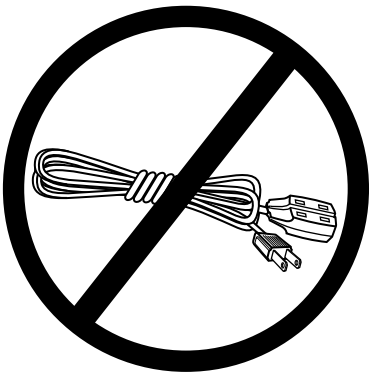
Never plug the ventilator into an electrical outlet that is being used to supply power to another major appliance.



Plug the ventilator into an electrical outlet that is NOT being used to supply electricity to other major appliances. If you need to use the same outlet that is shared by other equipment, make sure the other appliances are NOT being used at the same time.

Never try to repair the ventilator. The ventilator is considered lifesaving medical equipment and must be worked on by a professional. If you are renting your ventilator, call Apria and the ventilator will be replaced. If the ventilator has been purchased, contact Apria for assistance in getting it repaired.

Never use your ventilator with an extension cord or power strip. Plug the power cord directly into the wall outlet.



Make sure the patient's home address is visible. Make sure that the patient's home address can be easily seen from the street during both day and night. If you are expecting a night delivery or visit, turn on the porch light. Check to see that the address numbers are easy to spot and read from the street. This will allow Apria and/or emergency services to locate the home easily.

Follow emergency and natural disaster instructions. In the event of an emergency or natural disaster, follow the instructions of your local authorities broadcast by radio or television.

Ventilator Troubleshooting Guide

In learning to use the ventilator, occasionally, problem situations may arise. The information provided below, although certainly not all-inclusive, lists the more common problems that arise and how they may be solved.

SITUATION #1:
Low pressure alarm sounds frequently.

Solution:

a) Always check the patient first.
b) Ensure that the trach adapter is firmly connected to the trach tube.
c) Verify that the patient is properly connected to the ventilator and that all connections are secure.
d) Check that the humidifier is securely attached to the ventilator and the circuit.
e) Check that the low pressure alarm is at the correct setting.
f) Check the cuff of the trach for leaks.
g) Check the exhalation valve for leaks.
h) If there is any question if the patient is being ventilated, use the manual resuscitator.

SITUATION #2:
Patient ventilation pressure has dropped markedly.

Solution:
See Situation #1 solutions.

SITUATION #3:
High pressure alarm sounds frequently.

Note: Frequent coughing will initiate the high pressure alarm.

Solution:

a) Always check the patient first.
b) Check for kinks or crimps in the tubing.
c) Suction the patient if needed.
d) Check that the high alarm is at the correct setting (not too low).
e) Check for and remove any water in the circuit.
f) Check the trach tube for obstruction (change the inner cannula).

SITUATION #4:
Low power alarm is sounding.

Solution:

The internal battery is running down. Connect the ventilator to a wall circuit or external battery power source. If no other power source is available, remove the patient from the ventilator and ventilate with a manual resuscitation bag.

Advance Directives

An advance directive is a written instruction that relates to the provision of healthcare when an individual is incapacitated. In an advance directive the person states choices for medical treatment and/or designates who should make treatment decisions if the person creating the advance directive should lose decision-making capacity. State law determines the type of advance directive that is recognized within the state.

Feedback on Our Services

Apria is among America's most experienced and respected home respiratory care providers, and our patient satisfaction scores are consistently high. It is possible, however, that you may have a concern and we welcome feedback. To voice a concern, you should take these steps:

1. Call the Apria branch at the number listed on your Sales, Service and Rental Agreement,
   OR
2. Contact us by e-mail at:
   Patient_Satisfaction@Apria.com
   OR
3. Visit our web site at **apria.com**

Satisfaction Survey Process

Our goal is to ensure your satisfaction. You will likely receive an Apria patient satisfaction questionnaire and we hope that you will take a few minutes to fill it out and return it to us. The postage is prepaid by Apria.

Notification Letters

The following notification letters must be mailed by the caregiver/guardian to the electric company, telephone company and fire department for invasive ventilator patients.

These notification letters do not apply if using non-invasive ventilation.

Power Company:
Letter for Special Consideration

Attention:
Customer Service

_____ is under a physician's care and uses a ventilator at home. This individual cannot breathe independently and thus relies on the ventilator at home to breathe for him/her. Any prolonged disruption in the breathing process may result in brain damage or death. Hence, the ventilator is a life support system. It runs on AC current but has a battery backup which can last from one to eight hours.

In the event of a power failure, the battery can be used as a temporary power source. During a power failure, the electric company's support is needed to place the address listed below on a priority list for restoration of electricity. Also, if there is a forewarning of a power disconnection, please notify the home so that arrangements can be made to obtain a power generator.

The ventilator is being supplied by Apria Healthcare.

They may be contacted at: _____

The ventilator-dependent individual's physician, Dr. _____

may be contacted at: _____

Patient's name _____

Address _____

_____

Phone _____ Date _____

APRIA HEALTHCARE®

Telephone Company:
Letter for Special Consideration

Attention:
Director of Emergency Services

_____ is under a physician's care and uses a ventilator at home. This individual cannot breathe independently and thus relies on the ventilator at home to breathe for him/her. Any prolonged disruption in the breathing process may result in brain damage or death. Hence, the ventilator is a life support system.

In the event of an emergency, outside medical assistance is imperative. Therefore, telephone contact with emergency services must be available at all times.

The telephone company's support is urgently needed. If there is an interruption of service, please place the address listed below on a priority list for restoration of service. If there is a forewarning of temporary phone disconnection, please notify the home so that arrangements can be made to re-establish communication.

The ventilator is being supplied by Apria Healthcare.

They may be contacted at: _____

The ventilator-dependent individual's physician, Dr. _____

may be contacted at: _____

Patient's name _____

Address _____

_____

Phone _____ Date _____

APRIA HEALTHCARE®

Fire Department:
Notification of Home Ventilator

Attention:
Director of Emergency Services

_____ is under a physician's care and uses a mechanical ventilator at home. This individual cannot breathe independently and thus relies on the ventilator at home to breathe for him/her. The ventilator runs on AC current but has battery backup capabilities. In the event of a fire or the need for emergency evacuation, please check to see that this person has been removed from the residence listed below.

The ventilator is being supplied by Apria Healthcare.

They may be contacted at: _____

The ventilator-dependent individual's physician, Dr. _____

may be contacted at: _____

Patient's name _____

Address _____

_____

Phone _____ Date _____

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