Your Apria Respiratory Therapy

User Guide for Non-Invasive Home Ventilator

To be used in conjunction with ventilator equipment, prescribed by physician, and product-specific operating manual. See page 2 for more information.
Follow all warnings and instruction labels on medical devices.

To obtain a copy of the manufacturer’s product manual, visit us at Apria.com/ventilator-systems
Your decision to use or be provided non-life supporting non-invasive 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 is committed to helping you learn the techniques that you and your caregivers will need to make your home non-invasive ventilation a safe and positive experience.

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 the patient and their caregiver(s) 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 local Apria branch by calling 855.648.8369.

Support and Training

Apria, in collaboration with your hospital and physician, will provide support and training to your family and caregivers in order to successfully transition you home with a non-invasive ventilator. All home ventilation plans require a strong caregiver support system. Apria will help coordinate with your physician and hospital to establish other resources applicable to your care.

You, the patient, and your caregiver must be trained and competent in the equipment operation and maintenance, and understanding of the following areas:

- The home ventilator and accessories
- General anatomy and physiology of the lung
- Respiratory care equipment
- Emergency procedures
- Community resources and support services
- Compliance/usage
Once you are transitioned from the hospital to your home, Apria will follow up with you on a regular basis. Apria’s follow-up schedule may include follow up phone calls, telehealth video follow-up visits, or in-person follow-up visits. Our licensed practitioners will contact you to schedule these required visits. Caregivers and patients 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 non-invasive (NIV) 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, which may be found on Apria.com/ventilator-systems. If you do not have access to the manufacturer’s manual that is available online, you can request a printed copy from your local branch. If you have any questions, contact your local Apria branch by calling 855.648.8369.

Important Notice

The home ventilator device provided to you is rented by your insurance company. If your physician discontinues the home ventilator, the device will need to be returned to Apria once the discontinuation-of-use prescription is received.

Compliance

Your insurance provider/payor may require you to reach an average compliance usage of greater than four hours per day. Apria licensed practitioners are here to help you through your journey of adherence with your non-invasive ventilator (NIV) treatment. Apria’s licensed practitioners will contact you throughout this journey. Apria’s licensed practitioners encourage you to call Apria when you need help with comfort, synchrony, and tolerance of your NIV therapy.

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.)

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.

Non-invasive ventilation (NIV) assistance, or non-invasive positive pressure ventilation (NPPV), uses a nasal mask, nasal pillows, 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 includes daytime therapy, this additional mode may be referred to as “Mouthpiece” or “Sip and Puff” ventilation. Supplemental oxygen may also be added to this type of system.

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.
Introduction to the Ventilator

This section of the manual covers the ventilator and its operations, other related 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. As you study this manual and practice the procedures, questions will arise. Please do not hesitate to call us at 855.648.8369. Your Apria licensed practitioner is always available as a resource.

Maintaining the Ventilator

The ventilator, like any piece of equipment, needs routine maintenance. Your Apria licensed practitioner will follow up via telehealth video, phone call or an in-person home visit (if necessary). Your licensed practitioner will discuss ventilator observations and tasks that should be performed by you, the patient, each day.

It is extremely important for you to wash your hands before working with the ventilator. (See “Handwashing” on page 10.)

Ventilator Check (Monitoring)

It is vitally important that the ventilator be checked regularly in accordance with the manufacturer’s user manual instructions, which may be found on Apria.com/ventilator-systems. If you do not have access to the manufacturer’s manual that is available online, you can request a printed copy from your local branch. If you have any questions, contact your local Apria branch by calling 855.648.8369.

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

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.

Mouthpiece 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.
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 licensed practitioner to establish the frequency of circuit changes ordered by the physician and/or the manufacturer’s recommendation for circuit cleaning and changing. Unless otherwise specified by your physician or the manufacturer, reusable circuits should be cleaned weekly and disposable circuits should be replaced at least every 28 days.

Directions for changing the circuit are in the section entitled “Changing the Heated Humidifier Chamber” (see page 7). 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. Refer to “Cleaning and Disinfection Procedure” section for instructions (see page 8).

Filter Maintenance

All patients are to have an in-line bacterial filter attached between the ventilator and the circuit. Bacterial filters are changed at the same time the circuits are cleaned/changed. For the gray spongy air inlet filters, once per week rinse with water (do not use soap), dry well, and replace every 6 months. **Note:** Please allow the inlet filter to air dry prior to inserting into the ventilator. For the Philips Evo ventilator, the white particulate filter should be replaced monthly. For the Astral ventilator, the air filter should be replaced every 6 months or sooner for dusty environments.

Water Accumulation in the Ventilator Tubing

Water accumulation in the patient tubing may occur. When water accumulates in the patient tubing, remove by removing the mask from the circuit and draining the water into a container and then emptying into the toilet or sink. 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. If excessive water accumulation continues to collect in the tubing, please contact your local branch licensed practitioner to discuss heater adjustments or adding a heated wire circuit where applicable.

**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 back to the patient and cause it to go into the lungs.

Depletion of the Water Level in the Humidifier Chamber

When the water level in the humidifier is low, it must be refilled. You should add distilled, sterile, or boiled water until the water reaches the “full” line on the chamber assembly. This is usually done every 4 to 6 hours.

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. Directions for troubleshooting the ventilator can be found in the manufacturer’s user manual and are located in the section entitled “Ventilator Troubleshooting Guide” (see page 12).

Patient Monitoring

In the event the equipment has malfunctioned and the ventilator alarm activates, remove the mask, then address the alarm situation.

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 licensed practitioner to make changes to ventilator settings if ordered by the physician.

Ventilator Cleaning and Maintenance

Routine cleaning and maintenance is important to ensure the ventilator function properly. The circuit (tubing), heated humidifier chamber, inlet filter, bacterial filter, and interface (mask) should be cleaned and/or replaced per the manufacturers’ guidelines.

Note: Ventilator manufacturers’ user manuals and Apria’s NIV patient education manual can be found on Apria.com.

Changing 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.

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

The following procedure should be followed:

1. Wash your hands before you begin changing the patient circuit. (See “Handwashing” on page 10.)
2. Have the clean circuit assembled and ready for use.

Note: If you are not using a Heated Humidifier, Skip to Step 6.

3. Connect the clean patient circuit to the clean humidifier chamber.
4. Fill the clean humidifier chamber with distilled, sterile, or boiled water, if applicable.
5. Disconnect and discard the dirty tubing from the ventilator and patient.

6. Remove the dirty humidifier chamber and discard it or clean it per the manufacturer’s guidelines.

7. Connect the clean circuit to the ventilator and test for leaks.

8. Connect the short connective tube from the humidifier chamber inlet to the ventilator.

9. Reconnect the mask to the patient and ensure proper operation of ventilator and circuit.

10. Take the patient off the ventilator by removing the mask and breathe spontaneously.

11. 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 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.

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. Do not use a hair dryer to dry the circuit.

8. Discard the vinegar and water solution.

9. After allowing the equipment to air dry, reassemble the humidifier and circuit, and store in a dry plastic bag, ready for the next use.

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 bloodstream 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 — call 911 or your acting medical provider.
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. 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

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

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

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

Power Failure

Home ventilators have an internal battery. In the event of a power failure, the ventilator will automatically switch to the internal battery unless the external battery is connected. The ventilator should remain plugged in at all times to ensure the internal battery remains charged. 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’s 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. 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.

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.

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, troubleshoot the equipment and attempt to correct the problem in accordance with the manufacturer’s user manual. If at any time you are unable to correct the issue, 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.
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.

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 that the bacteria filter and circuit are attached securely to the ventilator.
- b) Check that the humidifier is securely attached to the ventilator and the circuit.
- c) Check the exhalation valve for leaks.

**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) Check for and remove any water in the circuit.
- d) Check filter for blockages or build-up of dirt or debris

**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.

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 Customer Service for Patient Concerns at 800.260.8808
   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.
If you have any questions or need help setting up your equipment and getting started, please visit us at Apria.com/FreshAir

Or call Apria at: 855.648.8369

Apria is committed to safe, quality patient care. We encourage you to report any concerns to your local Apria branch. If your concern is not resolved, please contact the Patient Satisfaction team at 800.260.8808