



Welcome to Non-Invasive Ventilation (NIV)!

What It Is, What It's For, What It Offers

For people who have difficulty breathing due to such conditions as COPD (chronic obstructive pulmonary disease), non-invasive ventilation (NIV) is a proven effective therapy that has been widely used since the 1980s. For COPD patients who have obstructive sleep apnea components along with COPD, NIV can effectively treat both COPD and OSA when they are present together. This is called overlap syndrome.

Non-invasive therapy, or NIV, helps you breathe by using positive pressure to increase lung volumes and decrease your work of breathing. NIV also allows for the support of breathing without the need for intubation or a tracheotomy. Studies demonstrate that NIV also reduces the risk of infection, decreases hospitalizations, and improves quality of life.

NIV requires that you wear a mask over your nose, mouth, or both. The mask is connected to a device that delivers pressurized air set to treat your specific condition(s). NIV delivers ventilation support and enables your body to use oxygen more effectively. NIV also reduces the carbon dioxide in your bloodstream, which can cause shortness of breath, especially in people with respiratory problems.

Lesley Williams, Apria's Market Clinical Trainer, and a registered respiratory therapist, says, "NIV can be customized to your specific requirements, whether you need breathing support during the day, night, or both. It's suitable for people at home or in a hospital setting and is small enough to accompany you during travel."

How Does NIV Work?

There are several different modes and types of non-invasive ventilation and they each play a key role in treating specific diseases. All NIV modes require a mask to deliver pressure. However, pressure setting limits, auto adjusting algorithms, daytime settings, and safety features is what differentiates Respiratory Assist Devices (RAD) and the NIV therapy you may have been prescribed. Your physician will prescribe the device that is best for your condition.

First let's talk about the two modes and what they can do:

RAD (BiLevel or BiPAP™) with rate can be used to treat obstructive sleep apnea and respiratory insufficiency caused by COPD. With RAD there are 2 set pressures. One pressure is set for when you breathe in (IPAP) and the other pressure is set to maintain as you breathe out (EPAP). These pressure settings can help reduce the amount of carbon dioxide in your blood by allowing a deeper breath. Some RAD devices may also include target tidal volume settings.

NIV via Home Mechanical Ventilation is the other type of device used to treat respiratory insufficiency or failure caused by COPD. NIV with home mechanical ventilation is more advanced than RAD/BiLevel/BiPAP™. NIV will deliver a more customized treatment and allow your care team to optimize



your therapy, whereas a RAD device may be more limited or restrictive, NIV offers settings and algorithms available to adjust to your ventilation needs.

How Does NIV Differ from CPAP?

You may have heard of CPAP (continuous positive airway pressure), which is commonly used to treat sleep apnea.

Like BiLevel/RAD, and NIV, CPAP requires you to wear a mask attached to a machine. Unlike the other therapies, CPAP delivers a constant flow of air at one pressure setting as you inhale and exhale to keep airways open.

So every breath you take is completely dependent on your respiratory muscles and not the CPAP machine.

How Does NIV Differ from Regular Oxygen Therapy?

The purpose of both RAD and NIV is to help you use more of your lung capacity so you can take deeper breaths and breathe more easily.

The purpose of oxygen therapy (also called supplemental oxygen) is to deliver oxygen to your lungs and blood to help you perform daily activities.

NIV is administered by a specific NIV device. Oxygen therapy is delivered by one of the following:

- Compressed oxygen stores oxygen in a metal tank as gas under pressure
- Liquid oxygen uses compressed, frozen oxygen that turns into gas when it's released
- Oxygen concentrators separate and remove nitrogen from the air around you to deliver purified oxygen
- A common oxygen delivery interface is the nasal cannula (a thin tube) inserted into your nostrils, although there are other interfaces available.

What Are the Components of Your NIV Machine?

Your doctor will prescribe a NIV device and therapy settings. Additional components include:

Mask: several types are available, including full-face masks that cover your mouth and nose, nasal masks that cover just your nose, and nasal pillow masks that fit into your nostrils. Work with your homecare provider to select the ideal style for you—one that fits your face securely and comfortably.

Anti-bacterial filter: captures germs, dirt, and other contaminants to reduce the risk of infection.

Tubing: connects your mask to the NIV device. Some tubing is heated to keep the pressurized air you breathe warm and moist for increased comfort.



Exhalation port: a spring-loaded valve that helps prevent oxygen or water backflow to the device.

Heated humidifier: adds warmth and moisture to prevent nose and mouth dryness.

How to Adjust to Your NIV Therapy

Getting Comfortable with Your NIV Machine

For many people, it takes time to adjust to their NIV machine. The best way is to practice with your device:

- Wear just the mask on your face to see how it feels
- When you're comfortable with the mask, wear it for a few hours each day and gradually increase your time
- Now, attach the hose to the mask and turn on the NIV machine. Turn it on for 5 minutes, then 10—until you feel comfortable with your machine
- Use your NIV machine while you're watching TV or doing other activities, to take your attention off your therapy
- Use mouth piece ventilation throughout the daytime (if prescribed).

Choose the Perfect Mask

Your doctor or respiratory therapist will help you select the mask that's right for you—one that fits your face firmly, snugly, and comfortably. Here are two popular masks:

Nasal masks: These compact masks create a tight seal over your nose and upper lip. They can also withstand higher pressure settings. For people who breathe through their mouth, a chinstrap is sometimes recommended. But if you experience significant nasal congestion, nasal masks can be difficult to tolerate.

Full-face masks: If you find nasal masks uncomfortable, full-face masks may be right for you. They cover both your nose and mouth and secure under your chin to provide a firm seal. Full-face masks are a good choice for NIV to ensure the optimal pressure delivery and therapy benefit is achieved, especially if you breathe through your mouth. However, if you feel claustrophobic wearing a full-face mask, you should contact your care provider and review other mask alternatives.

Deal With Mask Leaks

One of the most frequent complaints we hear from NIV users is that their mask leaks. When they exhale, air rushes into their eyes, drying them out. They wake with a dry mouth or sore throat. Or they hear whistling noises, which bothers their bed partner.

A leaky mask also prevents you from getting the full air pressure you need.

Best way to prevent leaks:



- Make sure your mask and headgear are the right size
- Inspect your mask for tears or holes, replace as necessary
- Clean your mask as outlined in the manufacturer's recommendations, dirty masks won't seal properly
- Place them properly on your face to create a snug, airtight seal but not too tight. Masks are not made to be tightened down. They are made to use the air pressure and resistance of the straps create an airtight seal.
- Purchase mask liners to improve your mask's seal
- If you are a side sleeper, consider purchasing a NIV pillow, commonly also referred to as a CPAP pillow, which has special cut-outs to accommodate your mask and tubes and help prevent mask dislodgement

Prevent Nose and Mouth Dryness

NIV can cause mouth and nose dryness. If you feel dry, humidify! Adding a humidifier adds warmth and moisture to the air you breathe to make your NIV therapy more comfortable. It also reduces the risk of bloody noses and infections.

Heated tubing increases humidity and reduces the buildup of moisture inside the tubing.

You may also want to add a room humidifier. And over-the-counter saline-based nasal sprays and gels help with nasal dryness.

How to Keep Your NIV Equipment Clean

It's critical that your NIV equipment is kept regularly cleaned and maintained. However, without proper cleaning and maintenance, this equipment can cause serious health risks. Bacteria, mold, and other harmful contaminants can thrive within unsanitary NIV machines, ultimately compromising respiratory health.

The Cleaning Supplies You'll Need

- Warm, clean water
- Mild soap (although don't use harsh dish detergents, alcohol, bleach, strong-smelling products, scented oils, or antibacterial soaps)
- White vinegar
- Clean, dry towels
- A sink, tub, or basin large enough to hold your hose or tubing

Also, reserve enough space to allow your equipment to dry.

How Often to Clean Your NIV Device



Most manufacturers recommend cleaning your NIV device daily—or at the very least weekly.

Ideally, the following components should be cleaned daily.

Mask

Because your mask touches your face, bacteria and dead skin cells can collect on it. So, it's important to clean it daily to prevent infection. Plus, masks that aren't regularly cleaned can lead to leaks, which can cause skin or eye irritation and hamper the success of your therapy.

Your mask has three parts: the cushion, headgear, and frame. Each should be removed and washed in mild soapy water and rinsed thoroughly. Then let them completely air dry—preferably covered by a towel or cloth to prevent dust accumulation.

Always consult the manufacturer's suggested cleaning instructions on how to clean your mask. But one suggestion to disinfect the cushion weekly, is by soaking it in a mixture of 2-parts water and 1-part white vinegar for 20 minutes, then rinse with distilled water.

Ideally, the following components should be cleaned weekly.

Filters

Depending on your machine, it may have both reusable filters and disposable filters.

Reusable filters should be washed at least once a week, depending on how much pollen, dander, and dust they attract. Regularly cleaning prevents harmful particles from entering your machine and inhaling them.

To clean, rinse the filters under warm water, squeeze out excess water, then dry with a clean towel. Let them completely air dry before putting them back in your NIV device.

Disposable filters should be replaced regularly according to the manufacturer's instructions.

Bacterial inlet filters should be changed monthly with your circuit, or sooner if the manufacturer specifies.

Tubing

Disposable circuits and tubing should be replaced monthly, or sooner if indicated by the manufacturer. Wash reusable tubing with mild soap and warm water on a weekly basis. Be sure to clean the inside of the tubing by submerging it under water. Then rinse and hang to dry.

Don't use bleach or scented products, which can break down tubing material and release unhealthy vapors into your device.

Humidifier



The heated humidifier chamber should be changed or cleaned at the same interval the ventilator circuit, every month, or sooner if indicated by the manufacturer guidelines.

References

- Soo Hoo, GW. (Updated 2020, June 18). Noninvasive Ventilation. Medscape. <https://emedicine.medscape.com/article/304235-overview>.
- Non-Invasive Ventilation (NIV). Indiana University Health. <https://iuhealth.org/find-medical-services/niv>.
- Noninvasive ventilation (NIV). ResMed. <https://www.resmed.com/en-us/healthcare-professional/diagnosis-and-treatment/ventilation/niv/>.
- Non Invasive Ventilation. Physiopedia. https://www.physio-pedia.com/Non_Invasive_Ventilation.
- Landry, J. (Updated 2023, August 31). Noninvasive Ventilation: Overview and Practice Questions. Respiratory Therapy Zone. <https://www.respiratorytherapyzone.com/noninvasive-ventilation/>.
- Rabatin JT, Gay PC. Noninvasive ventilation. Mayo Clin Proc. 1999 Aug;74(8):817-20. doi: 10.4065/74.8.817. PMID: 10473360.
- Gong Y, Sankari A. Noninvasive Ventilation. [Updated 2022 Dec 11]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 Jan. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK578188/>.
- Soo Hoo, GW. (Updated 2020, June 18). Noninvasive Ventilation. Medscape. <https://emedicine.medscape.com/article/304235-overview>.
- Non-Invasive Ventilation (NIV). Indiana University Health. <https://iuhealth.org/find-medical-services/niv>.
- Non Invasive Ventilation. Physiopedia. https://www.physio-pedia.com/Non_Invasive_Ventilation.
- Landry, J. (Updated 2023, August 31). Noninvasive Ventilation: Overview and Practice Questions. Respiratory Therapy Zone. <https://www.respiratorytherapyzone.com/noninvasive-ventilation/>.
- Hess DR. Noninvasive Ventilation for Acute Respiratory Failure. Respiratory Care. June 2013;58(6):950-972.
- Non-invasive ventilation (NIV). Open Critical Care. <https://opencriticalcare.org/faq/what-is-the-difference-between-niv-nippv-cpap-and-bipap/>.
- Cheese, F. (2023, September 27). CPAP vs NIV (BiPAP). Geeky Medics. <https://geekymedics.com/cpap-vs-niv-bipap/>.
- Non-Invasive Ventilation. Apria. <https://www.apria.com/services/care-for-copd-and-breathing-problems/non-invasive-ventilation>
- "Equipment Cleaning." rqsbreathetx. Accessed April 11, 2024. <https://www.rqsbreathe.com/equipment-cleaning>
- Ferreira, Rosario. "Interfaces, Circuits and Humidifiers." Frontiers in pediatrics, December 7, 2020. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7750325/>
- "Non-Invasive Ventilation (NIV)." IU Health. Accessed April 11, 2024. <https://iuhealth.org/find-medical-services/niv>
- "Non-Invasive Ventilation Equipment Care & Maintenance." London Health Sciences Centre. Accessed April 11, 2024. <https://www.lhsc.on.ca/long-term-ventilation/non-invasive-ventilation-equipment-care-maintenance>
- Schönhofer, B, and Sortor-Leger. "Equipment Needs for Noninvasive Mechanical Ventilation." The European respiratory journal. Accessed April 11, 2024. <https://pubmed.ncbi.nlm.nih.gov/12412700/>

LEGAL DISCLAIMER: Material in this newsletter is provided for general health education and informational purposes and to provide references to other resources only; it may not apply to you as an individual. While Apria Healthcare believes that the information provided through this communication is accurate and reliable, Apria Healthcare cannot and does not make any such guarantee. It is not intended to be a replacement for professional medical advice, evaluation, diagnosis, services or treatment (collectively, "medical treatment"). Please see your healthcare provider for medical treatment related to you and your specific health condition(s). Never disregard medical advice or delay seeking medical care because of something you have read on or accessed through this website. Reading this newsletter should not be construed to mean that you have a healthcare provider/patient relationship.