

BiPAP Ventilation

For a child with neuromuscular issues

BiPAP is a form of breathing support. It helps by delivering pressurized air through a snug-fitting mask over the nose and/or mouth so that your child can take bigger breaths.

It is an important tool during both health and sickness.

What is BiPAP?

BiPAP stands for “bilevel positive airway pressure.” It is a machine that can help your child breathe better when muscles are weak or fatigued because of muscular dystrophy or other conditions. BiPAP is used mostly at night while your child sleeps, but can also be used while awake.

How will BiPAP help your child?

BiPAP helps your child breathe better through the use of pressurized air. It is considered a type of “non-invasive ventilation” because the machine connects to your child using a mask that can be removed. There are no tubes in your child’s airway (such as a tracheostomy). BiPAP machines and mask look very similar to CPAP, which you may have heard of being used to treat sleep apnea. Unlike CPAP, there are two levels of pressure in BiPAP – high when your child breathes in, and low when your child breathes out – helping them to take big deep breaths. The BiPAP machine uses a small motor to create air pressure at settings chosen by your child’s doctor. The pressurized air passes through a mask that fits over the nose, or sometimes, over the nose and mouth. A respiratory therapist will help decide the best fit for your child.

Most of the time, BiPAP is started after a lung function test or a sleep study that shows shallow breathing or sleep apnea. Sometimes it is started in the hospital because your child is sick, or recovering from surgery.

Can BiPAP harm my child’s lungs?

BiPAP helps to support weak breathing muscles, but does not make them weaker or stronger. Your child will not become “dependent” on BiPAP, though in situations where muscles are weaker (such as illness), they may ask to wear it for longer amounts of time. Children can talk while wearing their BiPAP, and some children and young adults even wear it outside the home.

To Learn More

- Respiratory Care 206-987-2149
Rehab Clinic 206-987-2114
Pulmonary Nurses 206-987-2197
- Ask your child’s healthcare provider
- seattlechildrens.org

Free Interpreter Services

- In the hospital, ask your nurse.
- From outside the hospital, call the toll-free Family Interpreting Line, 1-866-583-1527. Tell the interpreter the name or extension you need.

BiPAP settings and what they mean

IPAP - Inspiratory pressure, or the amount of pressure the machine provides to your child when breathing **in**. This pressure helps to fill the lungs with air. Typical range is 10 to 20 cmH₂O, depending on the size of the child and how weak the breathing muscles are. IPAP may need to be increased when sick, or as your child gets older.

EPAP - Expiratory pressure, or the amount of pressure the machine provides when your child is breathing **out**. This pressure helps to hold the throat and lungs more open to make the next breath easier. Typical range is 4 to 8 cmH₂O. EPAP is usually not increased with illness, but may need to be higher if your child is overweight.

Rate - this setting ensures that your child does not breathe too slowly when in a deep sleep. Some children with breathing muscle weakness have pauses or very shallow breaths during sleep, this setting will prevent those from being too long. It will only activate if your child is breathing slower than the setting.

There are additional settings that can be adjusted to make the BiPAP as comfortable as possible for your child, including: inspiratory time (I-time), trigger, rise and ramp. Please talk to your child's doctor or respiratory therapist to learn more about these.

How to start BiPAP - getting it comfortable

You will be prescribed BiPAP with equipment through a home care company. The clinic or home respiratory therapist can help your child find the most comfortable mask. They will set the initial pressures and help your child to become comfortable using device. They will teach you how to turn the BiPAP machine on and off, how to get the mask fitting comfortably, and how to clean all of the parts.

Getting comfortable with BiPAP is critical to using it successfully. Sometimes you have to slowly work up to wearing the nasal mask and using BiPAP. Contact the Pulmonary Clinic or sleep center respiratory therapist if your child has problems tolerating BiPAP. This early stage of first wearing the device is called the desensitization process. Changes can be made in order to help your child progress through this process. The 4-step "desensitization process," which can help your child get used to non-invasive ventilation, is listed below.

The 4-step BiPAP desensitization process:

1. Get used to wearing the mask. Have your child try wearing the mask for ½ to 1 hour at a time once or twice a day with no air pressure turned on. During this time, have them do something that distracts them from the device like listening to music, watching TV, or reading. Adjust the headgear so that it is secure and not too tight. It may take several days before your child feels comfortable enough to progress to the next step.
2. Attach the air. Once your child feels pretty comfortable wearing the mask, you can attach the breathing circuit hose from the machine to the interface. Start the BiPAP machine and use for short time periods. Give your child time to adjust to the mask with the feeling of the in-and-out pressure airflow. If at first your child feels uncomfortable with the airflow, try having someone hold the mask on their face rather than securing the headgear. This is so they have some control in initiating

this step. If your child feels very uncomfortable with this step, start with very short periods of time, 1 to 5 minutes, and try to progress up to ½ to 1 hour as able. The flow of air from the mask will feel quite strong until you seal it on the face. The flow of air should then be more comfortable as your child feels the machine respond to their breathing pattern. Once your child is able to use the system for ½ to 1 hour at a time without difficulty, they are ready to move to the next step.

3. This step is optional. Your child may not have the time in their schedule to take naps during the day. If they can, it is good to try napping with the system before using it at night. This can help to gain both additional comfort and the confidence in knowing that they can sleep while using this therapy.
4. The last step is to progress towards using BiPAP therapy all night long. It is important not to become frustrated. Using this therapy at night may feel uncomfortable at the beginning. If your child first tries sleeping and cannot fall asleep, move back to step 2 or 3 before trying again. If they are not able to sleep using BiPAP for a short period and cannot fall asleep again after awakening, do not have them lie in bed. Simply start again the next night. Your child's ability to sleep even part of the night using BiPAP is a successful step! Keep trying to increase the amount of time they use BiPAP until they sleep comfortably through the night with the device.

Other important care tips:

- Remember, it is important to identify anything that limits your child's comfort in using this therapy. Contact either your pulmonary clinic or homecare respiratory therapist if it's not working for your child. Changes can be made to the therapy to better suit them.
- Humidification is usually provided with the BiPAP system. This warms and humidifies the air going through the mask. Using the system without humidity will often cause your mouth and throat to be uncomfortably dry, but it is optional.
- This equipment can cause a stuffy nose at night. If this happens, ask your therapist about using heated humidity or nasal decongestants to breathe more comfortably.
- There are no set rules regarding how fast your child should get used to this therapy. You should continue to progress through the desensitization process as best as you can. Your pulmonary clinic and homecare respiratory therapists will support your ongoing use of this therapy.
- It is important to follow the cleaning instructions from the equipment provider.

This is an adaption by Seattle Children's Hospital Pulmonary Division with permission from the UW Pulmonary Rehabilitation Clinic.