



Great Ormond Street Hospital for Children NHS Foundation Trust: Information for Families

# Bilevel positive airway pressure (BPAP) non-invasive ventilation

**This information sheet from Great Ormond Street Hospital (GOSH) explains bilevel positive airway pressure (BPAP) non-invasive ventilation, how it can be used as a treatment for breathing difficulties during sleep and how to manage it at home.**

BPAP stands for Bilevel Positive Airway Pressure. It is a type of non-invasive ventilation (NIV) or breathing support. It provides assistance when breathing in (inspiratory positive airway pressure or IPAP) and breathing out (expiratory positive airway pressure, EPAP). The BPAP machine also has a setting that maintains the child's breathing rate by ensuring a minimum number of efficient breaths are taken in one minute.

BPAP can also help to reduce the amount of work a child may require to breathe. This will help to support the breathing muscles, improve the amount of oxygen in the lungs and help to remove waste gas (carbon dioxide) from the lungs. BPAP is usually only needed at night time or during sleep.

The benefits of BPAP are:

- Reduced disruption to sleep and improved sleep quality
- Treatment of obstructive sleep apnoea (OSA) and snoring
- Reduced daytime sleepiness
- Reduced frequency of morning headaches
- Improved daytime functioning and cognition

## How does BPAP work?

The BPAP machine outputs normal room air at a fixed or prescribed pressure. The necessary pressure is usually calculated after review of a sleep study supervised by a sleep physiologist during an overnight stay.

The mask is held in place by straps or a mesh cap (headgear) to ensure a good seal around the nose and/or mouth.





## Getting started

Once we have identified that your child needs BPAP, we will invite you both to an acclimatisation session where you will see a nurse specialist and a play specialist who will introduce the equipment to your child in an age appropriate way. We will put together a plan to trial the mask during the daytime without any pressure for two to three weeks before you come back to GOSH for the overnight BPAP trial.

The BPAP trial consists of two nights where your child will wear the equipment overnight. Your child has already had a sleep study before they were diagnosed. The overnight BPAP trial will be much the same but this time your child will be requested to wear the mask and to use BPAP while a sleep physiologist adjusts the pressures. Ideally, your child will sleep through the entire process and the medical team will review the trial on the following morning. Further adjustment of pressures, if required, will occur on the second night of the trial.

After two nights, you will be ready to go home fully-trained and confident in how to use BPAP.

## Frequently asked questions

**“My child is refusing to wear the face mask now we are at home, what can I do?”**

- If your child will understand, try reasoning with them, make sure they know why they need it and the benefits it has.
- Find out what the problems are, if it is the mask they dislike or the pressure.
- If it is the pressure that they dislike, contact the Respiratory Sleep Unit at GOSH. It may be possible to put a ramp on the machine, which means the machine will slowly build up pressure which may make it easier to tolerate.
- If it is the mask your child dislikes, there are a few techniques which you could try.
- Make BPAP part of your child’s night time routine. Attach the mask without turning on the machine then read them a bedtime story – see if they can keep it on until the story has finished. Continue this technique each night until your child is comfortable then try switching on the machine.
- Reward charts are a good way of getting children to wear their masks routinely. Set up a chart on their bedroom wall, showing the days of the week. Each night that they





wear their mask, they get a sticker, and at the end of the week, if they managed to wear it every night, they get a treat, such as a trip to the park.

- If your child has brothers and sisters, get them involved. Ask them to play with the mask together so it becomes less scary.

#### **“How do I stop my child from getting pressure sores from the mask?”**

- Pressure sores can develop on your child's face if precautions are not taken. These can be very painful and prevent the child from wearing the mask.
- Always ensure that the mask is clean and dry before placing the mask on your child's face.
- GOSH recommends the use of a dressing called Siltape® and Aderma®. Both are silicone-based dressings and should be placed over the bridge of the nose and forehead if required. It is a preventative dressing and should be used every night to prevent the breakdown of your child's skin.
- Badger Ward or the Sleep Unit should give you some Siltape® to take home in the first instance. When you need further supplies, the Sleep team at GOSH can help. If your child does not like Siltape® or it is not effective, there are other dressings we can use such as Aderma®.
- If your child is still having problems with pressure marks, we may need to change the mask.
- If your child's skin has already broken down, contact your Nurse Specialist or Community Nurses who will refer you to a Tissue Viability Nurse.

#### **“What do I do if the face mask is broken?”**

- Contact the Respiratory Sleep Unit at GOSH or your Nurse Specialist for a replacement mask as soon as possible. We will give you a spare mask after your trial.

#### **“What do I do if my child gets a cold?”**

- Continue to use the BPAP machine if possible.
- If your child's nose is blocked or dry, consider using saline drops which you can buy from your community pharmacy (chemist). If the saline nose drops do not help, please contact us, we may be able to supply a humidifier.

#### **“How long will my child need to use BPAP?”**

- Your child will be followed up with regular sleep studies to assess how effective the BPAP treatment is, check whether they still require it and to adjust the pressures or rate as necessary. This is different for every child and is dependent on many factors such as their medical condition, age, severity of obstruction and surgical interventions if necessary.
- We will also see you and your child once a year (minimum) in the Non-Invasive Ventilation clinic.

## **Cleaning the equipment**

Fully clean the mask and tubing once a week with warm, soapy water and leave to air dry. This will reduce the risk of infection, pressure sores and maintain the integrity of the equipment.

If the mask is contaminated with secretions at any point, please clean using the above method.

If using humidification, empty the water from the chamber every day and replace with fresh distilled or cooled boiled water (to the specified line) before use each night.

If you have limescale build-up in the humidifier chamber, soak the chamber in a solution of one part vinegar to 10 parts water for 10 minutes, then rinse thoroughly and leave to dry.

Replace the air filter when it becomes discoloured – usually this occurs approximately every three months.



## Alarms

“Why is the machine alarm going off and what can I do about it?”

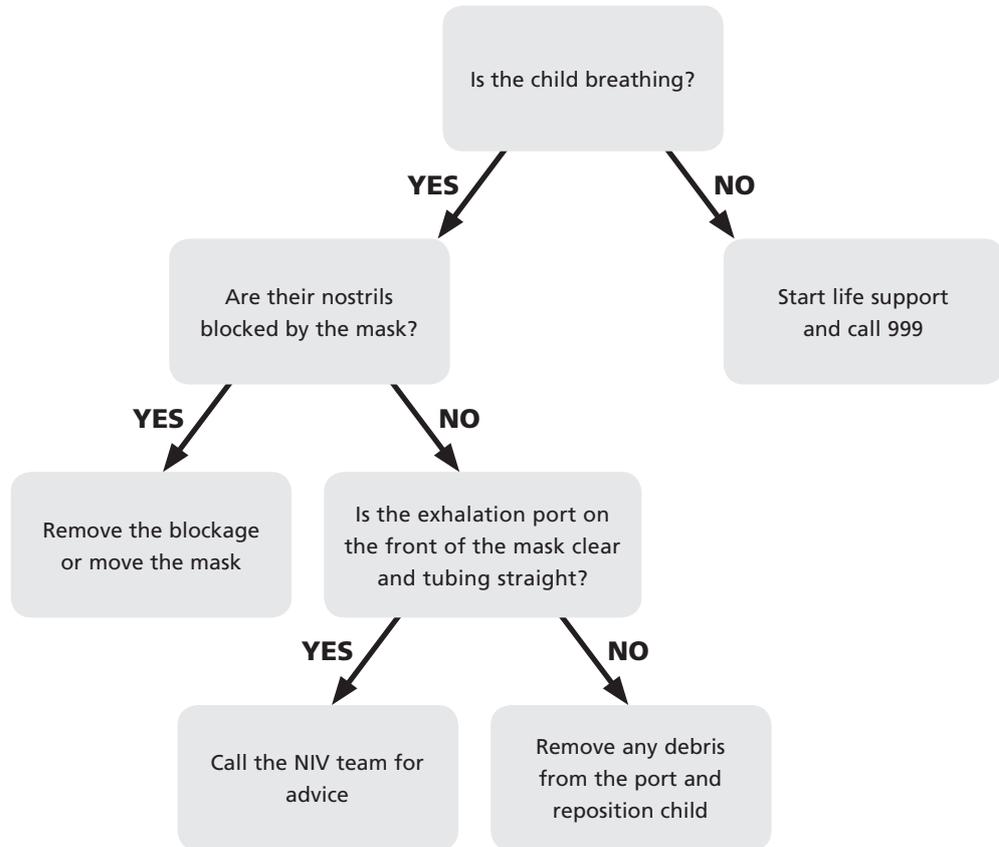
Firstly check that your machine is plugged in properly and it is not a battery failure.

If this is not the case, the alarm is likely to be a pressure alarm which means there may be a leak from the mask or tubing, follow the flow chart below to help to fix this.





If you do not have a leak and your machine alarm is showing 'non-vented mask' or 'blocked tube' follow the flow chart below:



## Support for you and your child

The Non Invasive Ventilation (NIV) Nurse Specialists are available for you to contact Monday to Friday from 8am to 4pm on 020 7405 9200 ext. 1726. You can also email them at [Victoria.robinson@gosh.nhs.uk](mailto:Victoria.robinson@gosh.nhs.uk) or [garry.rendle@gosh.nhs.uk](mailto:garry.rendle@gosh.nhs.uk).

Out of hours, please call the Sleep Unit on 020 7405 9200 ext. 0462.

Your BPAP machine will be covered by the manufacturer's service contract. This is available 24 hours a day, seven days a week. We will give you your own code and number to call once the contract has been set up following the trial.

We have drop-in clinics available for you to attend, please book this with the NIV nurses. In case of medical emergency, always call 999.