



Ways to support breathing: Non-Invasive Respiratory Support

Your NICU team may use different ways to support your baby's breathing. In this chapter we will go over options to deliver breathing support **without** a breathing tube – **this is sometimes called non-invasive respiratory support**. Options for respiratory support through a breathing tube and with the use of ventilators (sometimes called invasive mechanical ventilation) are covered in another chapter.

We try to use the most appropriate respiratory support needed to help your baby breathe – not too much and not too little. Our goals are that your baby:

- Breathes comfortably while asleep and while awake
- Has appropriate and safe oxygen and carbon dioxide levels
- Can interact positively with you, the nurses, therapists, and other caregivers
- Grows well
- Makes progress with their development

Babies may require breathing support because they need additional (or supplemental) oxygen, extra flow or air pressure to their lungs, or both. Two common ways to provide this support include using:

- Nasal cannula
- CPAP (continuous positive airway pressure)

Nasal Cannula

A nasal cannula is plastic tubing with short prongs that sit in each nostril. The amount of help provided by the nasal cannula is measured by how much "flow" (a combination of air and additional oxygen) is given to an infant. This flow is measured in liters per minute.

A nasal cannula is used in two ways:

- To help provide some additional oxygen
- To provide extra air flow in cases when babies do not breathe enough on their own



In the NICU, we warm and humidify the air (add moisture to the air) for nasal cannulas, so that it is gentler and less drying to an infant's nose.



CPAP

CPAP is used when babies need pressurized air to help them keep their lungs open to breathe comfortably. Premature babies' lungs are often not well inflated, so the pressurized air eases the passage of oxygen in and carbon dioxide out of their lungs. Bubble CPAP consists of a larger nasal cannula or small mask that goes over a baby's nose attached to plastic tubing that connects to a sterile water chamber. The pressure used to create the bubbles in the water chamber is delivered to the lungs to keep them open.

CPAP can also be provided using a Ram Cannula®, which is a wide nasal cannula that can be connected to a ventilator to deliver constant pressure. It is a less efficient way to deliver pressure than bubble CPAP, because the seal between the baby's nose and the machine is not air-tight, and some of the pressure escapes.

Other methods

Sometimes we use **NAVA** (neurally adjusted ventilatory assist). NAVA can be given through a breathing tube (invasive) or nasal cannula (non-invasive). In either mode, a baby starts breathing, and the machine then gives extra pressure that is synchronized (or timed) to support each breath. We place a special tube in the baby's nose that goes into the stomach and can sense the work of the diaphragm (a big muscle below the lungs). This tube detects when the baby is ready to take a breath, and tells a ventilator how much to support the breath. Since the tube goes to the stomach, your baby may also be given feedings through this special NAVA tube.

It is important to understand why your baby is using a nasal cannula, CPAP, or NAVA. Some babies are ready for non-invasive breathing support (without a breathing tube and a ventilator), and others are not. Your medical team will explain how to track progress, and how long your baby may need this level of support.