

Non-invasive ventilation (NIV)

If people are having difficulty breathing, they are unable to get sufficient oxygen into their lungs and may have difficulty expelling the carbon dioxide. These people may benefit from using a type of breathing machine, called a ventilator. In the past, the only option was to be attached to ventilator via a tube inserted into the windpipe through the mouth or the nose. This was carried out in the intensive care department and you had to be put to sleep in order to tolerate the tube. This type of 'invasive ventilation' is still used today when people are very seriously ill - when they are unconscious for example. If breathing support was needed longer term, whether in hospital or at home, either an iron lung was used or a hole was made in the windpipe through the front of the throat (a tracheostomy) in order to remain attached to the ventilator long term.

However, now the preferred treatment for people with lung disease who need some support to get sufficient oxygen into the body is non-invasive ventilation (NIV for short). It is non-invasive because it does not require a tube to be put into the windpipe. NIV does not necessarily require admission to an intensive care unit; it can be given by specialist nurses and doctors in a normal ward or high dependency unit in hospital. It can also be given at home on a long term basis in some conditions.

How does NIV work?

People receiving NIV need to wear a cushioned mask which is connected to an air pump machine. This mask either fits over your nose alone, or over both the nose and mouth; a strap holds the mask firmly in place but it can easily be removed, to enable you to eat and drink for example.

With NIV, a slightly pressurised airflow is blown into the mask while you breathe; the strength of the pressure varies during the breathing cycle. The airflow is strongest when you breathe in, to help you take in as much air as possible. Airflow pressure is lower when you breathe out, but remains positive. This continual positive pressure helps to 'splint' the airways open, enabling more air to get in and out of the lungs. This system is known as BIPAP (Bi-level Positive Airway Pressure). It differs from CPAP (Continuous Positive Airway Pressure) which provides a constant positive airway pressure. CPAP is recommended for people with sleep apnoea.

How does it help?

When we breathe in, we take oxygen out of the air to keep us alive - this oxygen is transferred to our blood in our lungs. The body then uses the oxygen and produces a waste gas called carbon dioxide, which we breathe out.

Some people with severe lung disease have problems getting sufficient oxygen in to the body. If their oxygen level drops below a certain level, it is relatively easy to give extra oxygen for them to breathe. However, in some conditions, the extra effort of trying to keep the oxygen up in the blood results in the person tiring. They may also have the additional problem that they are not expelling carbon dioxide from the blood efficiently. This is more difficult to deal with. It is a particular problem with diseases that cause obstruction to our airways, such as chronic obstructive pulmonary disease (COPD). Because the airways are narrowed, it is harder to get oxygen into the lungs and carbon dioxide out.

The aim of using NIV is to increase your oxygen level and particularly to help you breathe out more carbon dioxide. It also takes some of the effort out of breathing because your chest muscles don't have to work as hard; so it helps to ease the feeling of breathlessness.

When would I be given NIV?

People are treated with NIV if they are having severe difficulties with their breathing. NIV is only beneficial if it helps to improve the levels of oxygen and carbon dioxide in your blood.

In hospital

If you have COPD and have a flare up you may get a temporary worsening of your oxygen and carbon dioxide (acute respiratory failure). NIV can be very useful here and has greatly reduced the need for invasive ventilation in the intensive care unit. To begin with you may need the ventilator most of the time but as you get better, the time spent on the ventilator becomes less and less. Most people stop using the ventilator completely after a few days. The idea is that NIV will help you get over the infection and give you some extra support with your breathing until your antibiotics, steroids or other treatments start working.

NIV can be used in most severe lung diseases if breathing suddenly deteriorates due, for instance, to a chest infection. In these circumstances, it is also sometimes given to people with chest wall deformities and to people with weakness of the breathing muscles (e.g. motor neurone disease). NIV may also be used:

- in people who are frail and considered unsuitable for invasive ventilation
- in weaning people with severe lung disease off invasive ventilation
- as "a bridge to transplant", supporting peoples' breathing while they wait for a suitable lung to be found for their transplant - for instance in cystic fibrosis.

You will only be treated with NIV if you are fully conscious and able to both tolerate and co-operate with the treatment. It is also essential to have a strong enough cough to expel phlegm (sputum) when needed. Some people seem to get on better with NIV than others. The mask needs to fit snugly to your face, to make sure the air pressure is correct and that you are breathing in the optimum amount of oxygen. There are lots of different styles of mask available, and it's important you have one that fits well and is comfortable to wear. They can sometimes feel a little uncomfortable and claustrophobic at first, so it's important to persevere. The most important thing is that you wear the mask properly and coordinate your breathing with the air pressure of the ventilator machine.

Thankfully, most people experience few difficulties or complications using NIV. The most common problem patients have is rubbing and soreness to their face caused by the pressure effects of the mask and straps.

NIV at home

A small minority of people are offered NIV at home mainly for use at night. It is used for people with chest wall deformities or breathing muscle weakness (e.g. motor neurone disease or muscular dystrophy). After a period of adjustment, most people become accustomed to sleeping with the machine and find that they feel better because they feel more rested. It is fairly quiet but unfortunately may still disturb the bed partner's sleep. This can be a problem. However, a bonus point is that the machine is not heavy and is portable, so you can take it away on holiday for example. For more advice about NIV, call our helpline on 08458 50 50 20.

The British Lung Foundation Helpline

08458 50 50 20

Monday to Friday 10am to 6pm.

Advice and support for anyone affected by a lung condition.

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