

Treatment of Bronchopulmonary Dysplasia (BPD)

BPD is a chronic lung disease that occurs in some babies who are born early (premature). This fact sheet describes common treatments for BPD. With treatment, many babies with BPD can improve over time. For information about BPD, see the ATS Patient Information Series fact sheet *What is Bronchopulmonary Dysplasia (BPD)* at www.thoracic.org/patients/.



What are common treatments for BPD?

What treatment your baby needs for BPD will be based on his or her needs. Below are common treatments used at home and in the hospital for BPD.

Oxygen

Many babies with BPD will have a low oxygen level in their blood, even if the baby does not show any symptoms. A baby may not look blue even with a very low or borderline low oxygen level. A low oxygen level makes it harder for the baby to grow and stresses the heart and lungs. These babies can be helped by giving extra oxygen. Most babies with BPD need more oxygen than what is already present in the air. They may need oxygen for months and sometimes years. Before your baby goes home, your healthcare provider will test how much oxygen your baby needs when awake, during sleep and when eating. For example, your baby may need more oxygen when sleeping than when awake.

The amount of oxygen your baby needs will change over time. Usually your baby will need less oxygen as he/she grows.

Do not stop your baby's oxygen without checking with your healthcare provider. Remember, you cannot always tell by looking at your baby if they need oxygen. To learn more about oxygen therapy, see the ATS Patient Information Series fact sheet *Oxygen Therapy in Children* at www.thoracic.org/patients/.

Ventilator Support

Many premature babies need support from a breathing machine (called a ventilator) when they are born. This support to your baby's breathing is usually given by putting a breathing tube into the windpipe (trachea) through the mouth or nose. If your baby needs a ventilator for a long period of time, a tube called a tracheostomy is placed into the windpipe through the neck. This tube is more secure than leaving a tube in place through the mouth or nose and makes it easier to move the baby. It is also more comfortable than having a tube in the mouth or nose. A ventilator helps to open the lungs and helps them work better. If your baby's lungs are too small

or weak to work without this support, the ventilator may be needed during and after discharge from the hospital. Some babies need to go home on a ventilator until their lungs have grown to work entirely on their own. See ATS series *Use of a Tracheostomy With a Child* and *Using a Home Ventilator with a Child* at www.thoracic.org/patients/.

Tests are done to see how well the breathing machine is working to help your baby breathe. Tests are also done to see when your baby no longer needs its support. Your baby's healthcare team can talk with you about how to decide when your baby no longer needs help from a ventilator.

Medicines

There are several types of medicines used to treat BPD. Not every baby with BPD needs these medicines. Your health care provider will decide whether your baby needs medicines. Most of the medicines are given every day. Some are only used with symptoms. Do not stop any medicines without asking your child's healthcare provider. The following are groups of medicines sometimes used to treat BPD.

Diuretics: Premature babies can have difficulty getting rid of extra water from their bodies. All the nutrition they get (breast milk or formula) is liquid. Therefore they have to deal with a lot of water. Water can build up in their lungs, making it hard to breathe. Diuretic medicines may be given to help clear the body of excess water. Examples of these medicines are: furosemide (brand name Lasix®) chlorothiazide (brand name Diuril®) and spironolactone (brand name Aldactone®). Studies show that furosemide can help the lungs function better. Some babies need only one medicine; others may need more than one diuretic. Side effects of these medicines are low salt or potassium levels in the blood. Blood tests will be done regularly to check these levels. Some babies will need extra salt (sodium chloride) or potassium. Furosemide can cause kidney stones, so babies who are on furosemide may have a renal (kidney) ultrasound to check for stones. Furosemide can also cause hearing problems. Your healthcare provider can tell you more about these medicines if your baby needs them.

Bronchodilators: Some babies with BPD can have times when they have muscle spasms (called bronchospasm) in their air tubes (bronchi). Bronchospasm causes the air tubes to narrow. This makes it hard to breathe and you may hear wheezing. Medicines that help relax the airway muscles are called bronchodilators. Bronchodilator medicines are usually inhaled as a mist using a nebulizer and facemask or as puffs using a metered dose inhaler with a face mask holding chamber (often called a spacer). Examples of this type of medicine are Albuterol (brands include ProAir®, Proventil®, Ventolin®) or Levalbuterol (brand name Xopenex®). Sometimes they cause shakiness or increased heart rate. Your healthcare provider can tell you more about these medicines if your baby needs them.

Anti-inflammatory medicines: Inflammation can also occur in the breathing tubes of some babies with BPD. This causes swelling, irritation, and increased mucus that can make it hard to breathe. Medicines to treat inflammation are called anti-inflammatory medicines. Examples of this type of medicine are:

- montelukast (Brand name Singular®) which is taken by mouth
- inhaled corticosteroids such as:
 - budesonide (Brand name Pulmicort Respules®)
 - fluticasone (Brand name Flovent®)

Inhaled corticosteroids are usually given either as a mist with a nebulizer or as puffs using a metered dose inhaler with a spacer. Your healthcare provider can tell you about these medicines if your baby needs them.

Fluid restriction

Infants with BPD can have problems getting rid of extra fluids in the body. The extra fluid can build up in the lungs making it harder to breathe. Limiting fluid intake may be needed in addition to giving diuretic medicines. Formula can be concentrated to give more calories with less fluid. Over time, as the lungs heal and the kidneys mature, your baby's ability to handle fluids will improve.

Good Nutrition

Good nutrition is vital to help the baby grow and gain weight. Premature babies need more calories than babies who are born on time. Premature lungs need calories to heal and grow. As the body grows, the lungs grow too. Good nutrition is also important to the immune system to help fight infection. This is a time of rapid growth and maturing. Your healthcare team will help you watch how your baby is growing and gaining weight. A growth chart is used to track how the baby is growing. You can expect to have changes in the amount and type of feeding to happen often in the first years of life.

Breast milk is a good choice because it provides substances that will help your baby fight infections. There are additives that can be used to add extra calories to your breast milk if needed. Otherwise you will use a formula designed for premature babies for "catch up" growth. Sometimes the formula is concentrated. Make sure that you know how to mix your baby's formula and how much to feed your baby. If the

formula is not mixed correctly, it can be very dangerous to your baby's health.

Feeding Problems: Some premature babies have a hard time feeding. Your baby may have problems swallowing or problems breathing while they try to suck on a breast or bottle. The baby can tire out and stop feeding early. Special nipples that allow the formula to flow more easily can help. If your baby cannot take enough food by mouth, a small tube is placed in the nose (called an NG tube) or mouth (OG tube) to give formula or breast milk directly to the stomach. At times, a tube is placed directly into the stomach through a small opening in the abdomen (belly), this is called a gastrostomy or G-button. This can be removed in the future when your baby is able to safely take enough nutrition by mouth.

Infant CPR (Cardiopulmonary Resuscitation)

Make sure that you and anyone who stays with your baby knows how to perform infant CPR. Classes are usually given to caregivers (parents, relatives, etc.) before leaving the hospital. While it is very unlikely you will have to do CPR, it is important to be ready if you have an emergency.

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Rx Action Steps

- ✓ Work with your healthcare team to learn to care for your baby with BPD
- ✓ Give your baby oxygen and other treatments or medicines as directed by the healthcare provider.
- ✓ Make sure your baby is getting good nutrition to grow.
- ✓ Take actions to help your baby stay well and avoid respiratory infections.

Healthcare Provider's Contact Number:

Resources:

NORD—National Organization for Rare Disorders
<https://rarediseases.org/rare-diseases/bronchopulmonary-dysplasia-bpd/>

National Heart Lung and Blood Institute (NHLBI)
 Exploring Bronchopulmonary Dysplasia
<http://www.nhlbi.nih.gov/health/health-topics/topics/bpd/>

Medline Plus
<https://medlineplus.gov/ency/article/001088.htm>

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