"INHALED MEDICATIONS"

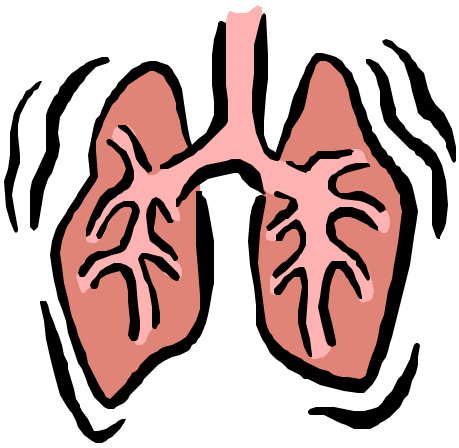
In this article I want to answer your most common questions about inhaled medications. When you are done, you should have answers to all of the following questions:

- **What is a "inhaled medication"?**
- **Why should you inhale medications?**
- **What is a bronchodilator?**
- **How do bronchodilators work?**
- **Should I use more than one type of bronchodilator?**
- **Are inhalers just as good as nebulizers?**
- **Can't I just take it when I feel bad?**
- **How do I use the nebulizer?**

What is an inhaled medication?"

The main problem for someone like you who suffers with an obstructive lung disease such as COPD, chronic bronchitis, asthma, or emphysema, is that the ***airways*** into the lungs have become obstructed due to narrowing. This narrowing is caused by a variety of things including ***swelling*** of the airway walls, contraction of the ***muscle*** that surrounds the airways, and excess ***mucus*** inside the airway. A primary goal is to relieve the airway obstruction so that it is easier for you to breathe, and more fresh air is able to get to the air sacs in the lungs. Inhaled medications are a key part of treating and opening your narrowed airways. Nebulizers or metered-dose-inhalers are simply devices which take the medication and turn it into a mist that you can inhale into your lungs.

Why should I inhale medications?



A natural question is, "Why take a medication by inhaling it? Isn't it easier to take a pill?" Taking medicines by inhaling them versus a pill is preferable for several reasons.

- ♥ When the medication is being delivered straight to the airway, a lower ***dosage*** can be administered than when taking the medication as a pill. With pills, the medication is absorbed by the intestine and carried by the blood stream throughout the body. Only a small amount of the drug goes to the lung where it provides the desired results.

- Because the inhaled drug goes directly to the part of your body that needs it, that means that you can use a smaller amount of the medication. Therefore, less medication goes to other parts of your body. This results in fewer problems with side effects from these medications, such as a fast heart rate. This is especially important for medications such as steroids where taking the medication by pill can result in significant problems with unwanted side effects.

- When the medication is inhaled into your airways, it reaches the site of action almost immediately compared to a pill which goes to the stomach where it is dissolved, absorbed, and carried to the site of action by the bloodstream—taking much longer to act. So the response time for your inhaled medications is more rapid than when you take your medication as a pill. For example, albuterol starts working almost immediately after inhalation and reaches its maximum effectiveness within minutes.

Quotable Quote

The following statement appears in the book ***"Frontline Treatment of COPD,"*** written by eight widely-known pulmonologists including Dr. Thomas Petty, a leader in oxygen therapy and the "Grandfather of Pulmonary Rehabilitation."

The regular use of bronchodilators or inhaled corticosteroids in the early stages of disease may help forestall or prevent irreversible damage and may make impairment, disability, and death from "end-stage" COPD less likely.

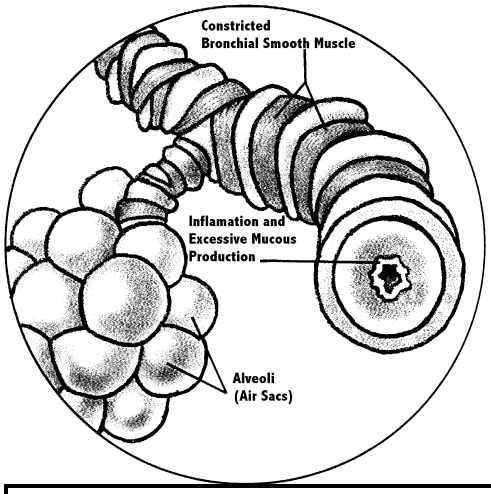
Dr. Thomas L Petty, Frontline Treatment of COPD

What is a bronchodilator?

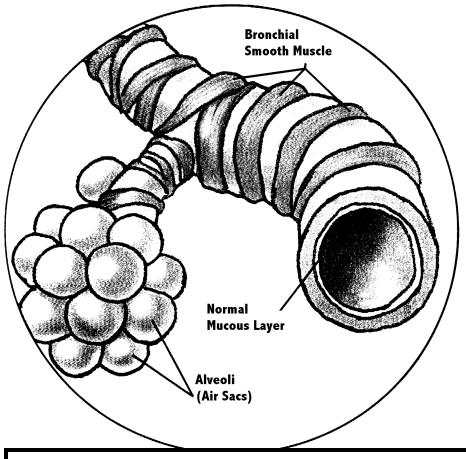
Bronchodilators are medications that you can use to ***dilate*** (*expand*) the ***bronchial tubes*** (*airways or air passages*) that lead from the back of your throat to the depths of your lungs. Because many of your breathing medications are supposed to dilate these bronchial airways, they are called bronchodilators and are said to cause bronchodilation.

How do bronchodilators work?

Your airways are surrounded by a continuous ring of ***bronchial smooth muscle*** (*muscle that is controlled automatically by the body*). Your airway size becomes smaller when your bronchial smooth muscles tighten and larger when your smooth muscles relax again.



When bronchial smooth muscle tightens, it causes your airway to get smaller.

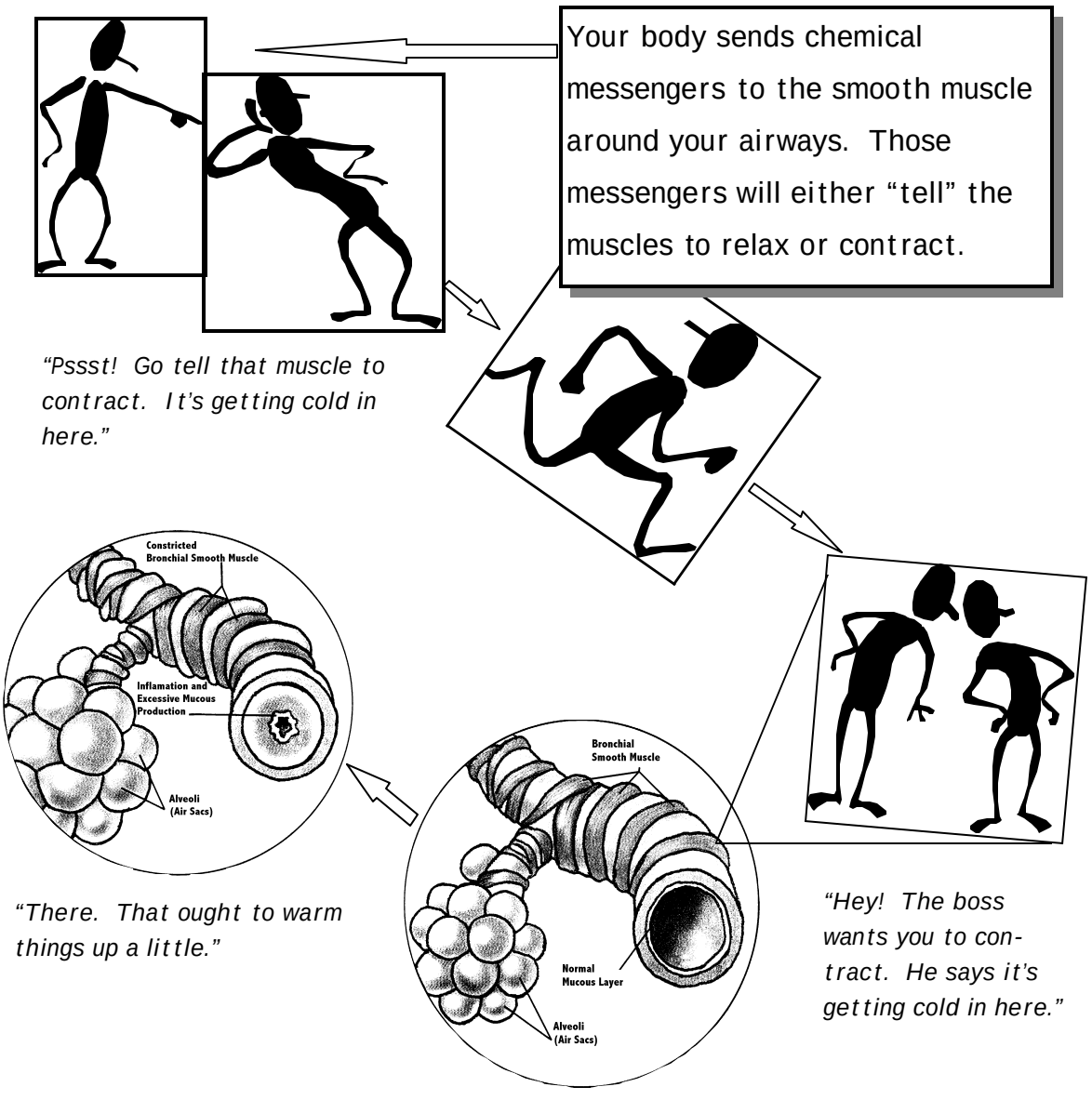


There are different ways that bronchodilators work, but they all cause your airways to open by telling your smooth muscle not to tighten. As a result, you can breathe more easily because air goes in and out of airways that have been ***dilated*** (*made larger*).

When bronchial smooth muscle relaxes, it dilates and allow the airway to get larger.

Do all bronchodilators work the same way?

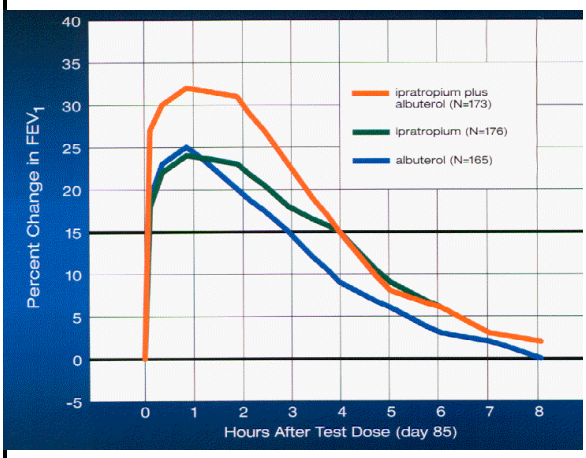
No. Your nervous system uses several chemicals to "talk" to (or send messages to) the smooth muscles around your airways. Special ***receptors*** (*sites in the airways*) then take the chemical messages and "tell" your muscles to either contract (***bronchoconstriction***), which makes your airways smaller, or relax, which makes them larger (***bronchodilation***).



There are two different types of receptors that play a role in dilating (opening) your airways. The first receptors (called beta receptors) are affected by the drug albuterol. When these receptors are stimulated by medication, they cause the muscle that surround your airways to relax, which opens your airway. You should also notice that albuterol helps you to get more mucous out. Some people cough more after a breathing treatment because they are moving more mucous out of their lungs—that is a good thing.

The other receptors (called muscarinic receptors) can "tell" your airways to tighten up, or contract. These receptors are affected by the drug ipratropium. Ipratropium keeps these receptors from telling your airways to contract, which keeps them open. Ipratropium also helps to reduce the amount of mucus in your airway without making it thicker.

You might think of these medications as keys and your receptors as locks. When the medications unlock the receptors, your airways open up, and your breathing becomes easier.



Should I use both bronchodilators?

Because the medications do the same job in different ways, many patients with COPD will benefit more from using both medications together. Studies have shown that both medications together can provide you with better airflow, lower total cost of care, fewer rough times when you need more treatment, and fewer hospital days.

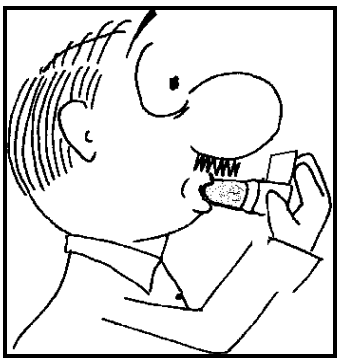
Are inhalers just as good as nebulizers?

When used appropriately, both systems are able to deliver medication to your airways. Your doctor will consider the strengths and weaknesses of each system when choosing which one you should use. An advantage of the MDI includes its small size. This makes it easier for you to carry it with you when you are away from home. It can also be quicker to use, but this advantage is lost if you use poor technique and end up using more than your prescribed number of puffs during the day. There are also more medications available via the MDI, although this is not a significant issue as the most commonly used medications are available via both routes.

Advantages of the Nebulizer

- With a nebulizer, adequate delivery of the medication to the airway is not dependent on the your technique, as it is with an inhaler. Using an MDI requires up to 10 steps for correct use. Studies have shown that 50-90% of patients using inhalers may not demonstrate good technique and may not receive the desired results from the medication.

- You may (especially if you are on Medicare) have to pay for your own inhalers, but the nebulizer and medication are covered by most insurance including Medicare. If you are on multiple medications, the out-of-pocket expense for inhalers may be $80 to $150 per month or more. At that rate, you may be tempted to ration or stop using inhalers due to the expense, resulting in poor disease management.



- The nebulizer delivers a higher dosage of medication, which you may need for the best treatment. Studies have shown that the optimal dosage for ipratropium may be 3-4 times higher than the commonly ordered two puffs, four times a day. It would get very expensive to deliver that much medicine by inhaler.

Quotable Quote

"The optimal dose of nebulized ipratropium solution is in the range of 0.4 mg. The effect of [two puffs from an MDI] corresponded to a dose of 0.1 mg by nebulization, and achieved only 63% of the response achieved by the highest dose of nebulized solution... One might infer from this that the optimal dose of ipratropium bromide by MDI in this population may be as much as 4-fold greater than the recommended dose."

Article by Dr. Gross and Dr. Petty Published in The American Review of Respiratory Disease

- You get education in the proper use and care of your nebulizer by trained personnel. Education is often lacking or absent for the inhaler and spacer devices.

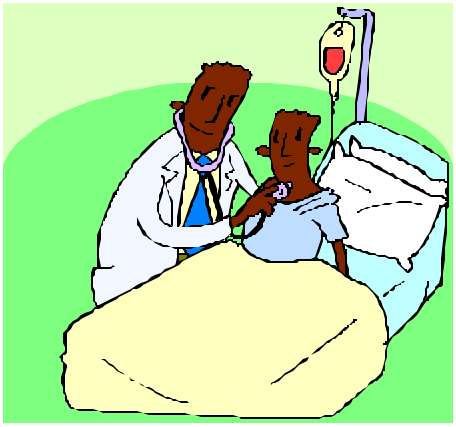
- The nebulizer may be more convenient as supplies and the medication can be delivered directly to your home. This can be significant for you if you have difficulty traveling outside your home.

Can't I just use my nebulized medicines when I feel bad?

These medications have an effective period of from four to six hours. After that period, your airways return to the same level of function as before the medication. For diseases with persistent airflow problems, such as COPD, use "as needed" is simply not enough to maintain good control of your problem. To keep your airways open and performing at their best, it is important to take the medication as it was ordered by the doctor.

Benefits of taking your inhaled medication regularly may include:

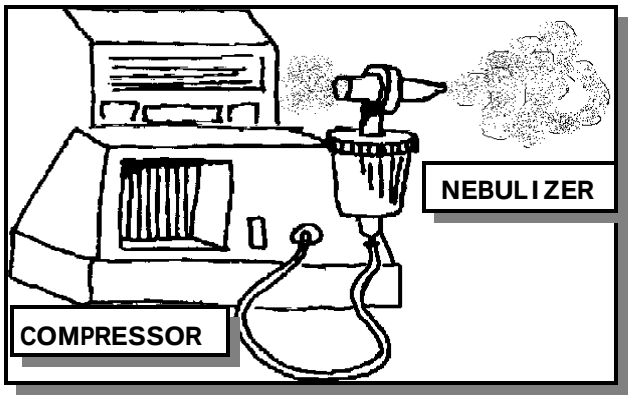
- More open airways and less work to breathe
- Improved clearance of mucus resulting in fewer infections
- Fewer symptoms (wheezing, coughing, tight chest)
- Fewer "exacerbations" (These are periods when your lung function worsens requiring hospitalizations, ER visits, or unplanned visits to the doctor.)
- Improved activity levels



Failure to use the inhaled medications as ordered may result in your airways narrowing, difficulty getting mucus out, and increased difficulty breathing. Patients who do not use their medications as ordered tend toward more hospitalizations, ER visits, and other difficulties in maintaining control over their disease.

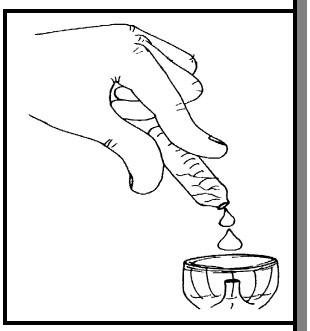
Many patients quit using their medications when they don't see an immediate improvement in their condition after using the medicine. Some respiratory medications will not provide a rapid response but do prevent the lungs from getting worse (eg, ipratropium). Other medications may require days and even weeks of use before you begin to get their full benefit (eg, steroids). Never stop taking a medicine simply because you don't notice an immediate effect.

Patients may also quit using medicines because of unwanted results or side effects of the medication. Side effects can usually be minimized or eliminated by adjusting the medication type or amount. If you suspect you are having an unwanted side effect from your inhaled medication, call us. We will contact your doctor.



How do I use the nebulizer?

The nebulizer set-up will include a compressor that forces air through a *hand-held nebulizer* (a device that holds the medication). The medication then turns into a mist for you to breath. The hand-held nebulizer includes a mouth piece or mask, and tubing that leads from your compressor to your nebulizer. Using the nebulizer is simple:



Instructions for Use

1. Place the ordered amount of medication into the nebulizer.
2. Attach the tubing from the compressor to the nebulizer.
3. Turn the compressor on, place the mouthpiece in your mouth (or mask over face) and breathe in and out normally.
4. About every 10 breaths, take a slow, deep breath and hold it for a few seconds. This helps more of the medication to deposit in your lungs and may help to reopen small air sacs that have collapsed.
5. Keep this up until the mist stops coming out of the nebulizer. Tapping on the nebulizer once it starts sputtering will help to nebulize more of the mediation.
6. Cleaning your nebulizer properly is an important part of using it. You should clean it according to the instructions provided to you. Failure to do so can result in more frequent infections.

Questions About Breathing Medicines

To help us to better serve you, please read and answer the following questions.

1. Describe the feeling you get when you use your nebulizer.

_____
_____

2. If you have used different inhaled medications, which ones do you think did the most good? Why?

_____
_____

3. Rank the following (1, 2, 3…) in terms of importance to you when using your inhaled medications. (1 being the most important to you)

____ Ease of Use	____ Frequency of Use	____ Delivered To Home
____ Out of Pocket Cost	____ No/Few Side Effects	____ Cost to Insurance
____ Improvements in Condition Noticed	____ Clear Instructions	Other:_____

4. Please describe any benefits/side effects you have experienced with your inhaled medications.

Name of medication:_____
Benefit:_____
Type of side effect:_____

Name of medication:_____
Benefit:_____
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