

Metered-Dose Inhalers

Nearly 24 million Americans have asthma or chronic bronchitis. Metered-dose inhalers (MDIs) are a primary means of delivering asthma medication to these patients.

When airways become constricted, medication is needed quickly. The most efficient means of getting the medication into the airways where it's needed is with a metered-dose inhaler. When properly used, the MDI gets up to 12 percent to 14 percent of a bronchodilator or other medication deep into the lungs with each puff. The medication acts more quickly than medication taken by mouth. And it causes few side effects, because the medication goes right to the lungs and not to other parts of the body. Many patients don't use their MDI correctly, though. When a MDI is used incorrectly, symptoms may persist and worsen. This may lead to a severe asthma episode.

What Is a Metered-Dose Inhaler? Metered-dose inhalers are used to deliver a number of commonly prescribed asthma medications that help open up the airways and ease breathing. They are especially important for delivering quick relief medication—short-acting beta agonists that relieve an acute asthma attack. MDIs are also used to deliver some long-term control medications, including antiinflammatory medications and long-acting bronchodilators. These are taken routinely to keep asthma in check. Metered-dose inhalers are devices designed to release a premeasured amount of medication into the air. They are not all alike. In general, though, they have a chamber that holds the medication and a propellant that turns the medication into a fine mist. You push a button to force the medication out through the mouthpiece. Some people have trouble using an MDI correctly. They can use a spacer to help them get the medication they need. Attached to the mouthpiece, spacers hold the discharged, premeasured cloud of medication in a chamber until the patient breathes in. Spacers are recommended for young children and older adults who have trouble coordinating breathing and activating the MDI. For these groups, a MDI is especially recommended for use with inhaled steroids because it reduces the amount of drug deposited in the mouth and throat thereby reducing unwanted side effects.

How Do I Use a Metered-Dose Inhaler? There are several basic steps for using an inhaler:

- Before using any MDI, read the product's instructions carefully. Remember that MDIs are not all alike. If you have any questions, call your doctor, nurse or pharmacist for help.
 - Remove the cap and look inside to see that nothing is blocking the mouthpiece.
 - Hold the inhaler upright with the mouthpiece at the bottom and shake it.
 - Tilt your head back slightly and breathe out fully.
 - Place the inhaler with the mouthpiece in the position that is correct for you. Close your lips on the inhaler or hold it 1 to 2 inches from your open mouth.
 - Press down on the inhaler to release the medication as you start to breathe in.
 - Breathe in slowly and steadily. Take 3 to 5 seconds for each breath.
 - Hold your breath for 10 seconds to allow the medication to settle in the lungs.
 - Breathe out slowly.
 - Repeat puffs as directed.
- If a steroid inhaler is used, rinse the mouth after use.
- How Do MDIs Work?** Most MDIs deliver premeasured doses of medicine to the lungs using a propellant. Older devices use chlorofluorocarbons, or CFCs, as the propellant. Too many CFCs can damage the ozone layer around the earth, and this can harm the environment. Now these older models are being phased out and replaced by new CFC-free devices. The Environmental Protection Agency has given manufacturers several years to come up with alternative ways to deliver medications. Several innovations are under way:
- Now on the market are MDIs using an environmentally safe propellant (HFA). An example is Proventil HFA. It contains albuterol (formerly available in a CFC-propelled MDI) as the active bronchodilator ingredient. Instead of chlorofluorocarbon, it uses hydrofluoroalkane (HFA) as the propellant. Overall, side effects of the two versions are "comparable." The new product's taste is less bitter, the canister size is smaller and less force of the spray is needed to get the medication into the lungs.
 - Also available are dry-powder inhalers (DPI). An example is Pulmicort Turbuhaler. It delivers the corticosteroid budesonide without a propellant. The device releases a fine cloud of dry powder when the patient closes his or her lips around the mouthpiece and breathes in. It avoids the common problem with many MDIs of coordinating the release of the medication with the effort of breathing in. Other CFC-free devices are in development, including pocket-size nebulizers, which turn a liquid drug into an inhalable mist. Be sure you do not cut back on the amount of medication you take because of concern about ozone. MDI usage accounts for a very small amount of the total CFCs used worldwide and have little effect on the ozone layer. Talk to your doctor about using a CFC-free inhaler.
- How Will I Know If I'm Correctly Using My MDI?** There are some signs that may suggest incorrect use:
- Number of puffs.** How many puffs of medication do you typically take when using your inhaler? If you routinely take more medication than your doctor has prescribed, your condition may have worsened, or you may need a refresher lesson on proper inhalation technique.
 - Timing.** When do you begin breathing in? Just before you push down on the canister? Just after? While you push down? The recommended method is to press down on the inhaler to release medication at the same time you start to breathe in slowly. This requires a certain coordinated technique to deliver the full premeasured puff of medication directly to the lungs. This is a problem for many patients. Besides dry-powder inhalers, the Maxair Autohaler has overcome this problem. It is designed to automatically release a precise dose of medicine to the lungs when you inhale.
 - Type of inhalation.** Do you take a quick gasp? A normal breath? Most experts say you should breathe in with a slow, steady force. However, with DPIs, a rapid, forceful inhalation is required.
 - Breath-holding.** How long do you hold your breath after inhaling the medication? Most patients should hold their breath for 10 seconds for the medicine to reach deep into the lungs.
 - Mouthpiece location.** Experts disagree on the best location for the mouthpiece when using the inhaler. Ask your doctor which is best for you. The three most commonly recommended locations include:

- Positioning the inhaler 1-2 inches away from your open mouth.
 - Placing the mouthpiece in a spacer if your doctor has prescribed one for you. Spacers are tubes that connect the inhaler to your mouth. They help overcome the problem of pressing on the inhaler and breathing in at the same time. Spacers hold the medication in a chamber until you breathe in. Always follow label directions or your doctor's instructions.
 - Placing the mouthpiece directly in your mouth and closing your lips firmly around it. Medication location. Do you feel the inhaler spray land on your tongue or on the back of the throat, or do you see it in the air? If you answer "Yes" to either of these questions, the medication hasn't reached your lungs, where it's needed. Refilling your bronchodilator prescription more often than necessary. A 200-puff canister of a bronchodilator should last at least 30 days. If you are buying refills before the refill time prescribed on the product label, you may not be using the inhaler correctly. It also could mean your asthma is worsening and you need other medication. If any of these problems are happening to you, check with your doctor.
- How Can I Take Responsibility for Using My MDI the Right Way?**
- If you are a new patient, make sure you know how to use it correctly. Review the package insert illustrations that show the steps to take. Also have your doctor or pharmacist demonstrate the correct technique for you. Then repeat your technique for the health care provider until you get it right.
 - Prepare a written action plan with the help of the doctor. Clearly list what medications to use when you first notice symptoms, as well as what to do—step-by-step—to handle certain symptoms or an emergency. Keep copies of your written action plan at home, work or school. Try to have a copy with you at all times. Children should have a copy of their plan at school, and school personnel should learn how to help the child with an asthma attack.
 - If you use more than one type of MDI, clearly label each so that you use them as indicated and in the correct order. For example, you may use a bronchodilator to relieve short-term symptoms, followed by an inhaled corticosteroid to reduce airway inflammation.
 - Clean inhalers often. Follow the directions on the label. This will prevent buildup that might affect how well they work.
 - If you have trouble using your MDI the right way, ask your doctor about trying a spacer to hold the medication until you breathe it in.
 - Every time you visit your doctor, demonstrate your inhaler technique to make sure you're using it correctly. Over time, many people get bad habits that affect use of MDIs. Refreshers on how to use them will make sure you get back on track quickly.
- How Do I Know If I'm Taking Too Much or I'm Almost Out of Medicine?** Read the MDI's label so you know how many total puffs it holds. Then, keep a daily log and record the number of times you use your MDI each day. Keep a separate log for each MDI you use. After a week or two, review your record. You'll know how long it takes to empty your MDI and can plan to refill your prescription so you're never without medication. If you use up a 200-puff canister of bronchodilator within 30 days, talk to your doctor. You may be taking too much, or you may need other medications. Some newer devices also have counters to help you know when you're about out of medication and need to get a refill.
- Can I Expect a Symptom-Free Life?** Every person with allergies, asthma or chronic bronchitis can expect to live a full and satisfying life free from most symptoms, most of the time. Even though they cannot be cured, they can be managed and managed well. To do that, you must take control of your disease and your life. The first step is learning to use your medications, and particularly your MDI, as prescribed. Metered dose inhalers are not all alike. Before using an MDI, read the product's instructions carefully. If you're unsure how to use, clean or test your MDI, call or visit your doctor, nurse or pharmacist. If you use more than one type of MDI, do not assume they can be used the same way.