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Patient education: Inhaler techniques in adults (Beyond the Basics)

Authors: Lynn B Gerald, PhD, MSPH, Rajiv Dhand, MD, FCCP, FACP, FAARC, FRSM, ATSF

Section Editor: Peter J Barnes, DM, DSc, FRCP, FRS

Deputy Editor: Helen Hollingsworth, MD

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Literature review current through: Feb 2021. | **This topic last updated:** Sep 29, 2020.

INHALER OVERVIEW

Inhalers are the primary method of delivery for medications used to treat asthma and chronic obstructive pulmonary disease (COPD). However, they can only be effective if they are used properly. Using your inhaler correctly delivers the medication to your lungs, where it can work to control your symptoms. Using an inhaler incorrectly means that little or no medicine reaches the lungs.

Studies have shown that almost everyone can learn proper inhaler technique with adequate training and practice. This article discusses how to use inhalers for adults. A separate article discusses inhaler use in children with asthma. (See "[Patient education: Asthma inhaler techniques in children \(Beyond the Basics\)](#)".)

Talk to your healthcare provider if you have difficulty paying for your medications, as assistance programs may be available.

Other topics about asthma and COPD are available separately. (See "[Patient education: Asthma treatment in adolescents and adults \(Beyond the Basics\)](#)" and "[Patient education: Asthma symptoms and diagnosis in children \(Beyond the Basics\)](#)" and "[Patient education: How to use a peak flow meter \(Beyond the Basics\)](#)" and "[Patient education: Trigger avoidance in asthma \(Beyond the Basics\)](#)" and "[Patient education: Chronic obstructive pulmonary disease \(COPD\) \(Beyond the Basics\)](#)" and "[Patient education: Chronic obstructive pulmonary disease \(COPD\) treatments \(Beyond the Basics\)](#)".)

TYPES OF INHALERS

Three major types of inhalers are used to deliver asthma and chronic obstructive pulmonary disease (COPD) medications: metered dose inhalers (MDIs), dry powder inhalers (DPIs), and soft mist inhalers (SMIs). Each type has advantages and disadvantages. The techniques for using the various inhalers are described below.

The Allergy and Asthma Network-Mothers of Asthmatics, a patient advocacy organization, has created a [graphic](#) showing pictures of many different inhalers used for treating symptoms of asthma and/or COPD.

METERED DOSE INHALERS

Metered dose inhalers (MDIs) are used to deliver a variety of inhaled medications.

The MDI canister contains the medicine as well as other products that help to deliver the medicine to the lungs ([picture 1](#)). MDIs use the propellant hydrofluoroalkane (HFA) to deliver medication to the lungs.

How to use an MDI — Each inhaler manufacturer has specific instructions for using their inhaler; the following are general instructions.

When using an MDI **FOR THE FIRST TIME** (with or without a spacer), prime the inhaler first:

- Shake the MDI for five seconds.
- Press down the canister with the index finger to release the medication. Hold the inhaler away from your face to prevent medication from getting into your eyes.
- Wait a few seconds, shake the inhaler, and press the canister down again.
- Repeat the last step two more times (for a total of four times).

After an inhaler is used for the first time, it does not need to be primed again unless you do not use it for two weeks or more.

Instructions for using the inhaler are available in the table ([table 1](#) and [table 2](#)).

Getting the most out of your inhaler — The following tips can help to get the most out of a metered dose inhaler.

- Remember to take the cap off the mouthpiece
- Be sure there is medication in the canister (see '[Determining when an MDI is empty](#)' below)
- Shake the MDI vigorously for five seconds before each puff
- Inhale through the mouth when breathing in the medication, not the nose
- Keep your tongue under the mouthpiece so that it does not block the opening of the mouthpiece
- Take a slow, deep breath at the same time you press down on the medication canister
- Hold your breath for as long as comfortable (5 to 10 seconds) and then exhale

If you have difficulty timing your breath while spraying the medication, talk to your health care provider about whether you might be able to switch to a dry powder inhaler (DPI). DPIs release the medication exactly when you take a breath (see '[Dry powder inhalers](#)' below). Another alternative is to use a spacer with your metered dose inhaler ([figure 1](#)). (See '[Spacer devices](#)' below and '[Dry powder inhalers](#)' below.)

Cleaning the MDI — Metered dose inhalers must be cleaned on a regular basis to prevent medication build up and blockages. Most manufacturers recommend cleaning the mouthpiece at least once per week; be sure to read the instructions that come with your inhaler carefully. In general, cleaning the MDI involves the following steps:

- Remove the medication canister and cap from the mouthpiece. Do not wash the canister or immerse it in water.

- Run warm tap water through the top and bottom of the plastic mouthpiece for 30 to 60 seconds. Use a soft cloth to remove any crusting of medication around the pinhole in the plastic mouthpiece.
- Shake off excess water and allow the mouthpiece to dry completely (overnight is recommended).
- If you need the inhaler before the mouthpiece is dry, shake off excess water, replace canister, and test spray two times (away from the face).

Spacer devices — Spacers and chambers are devices that some people use with MDIs to help them inhale the aerosol. While MDI inhalers do not usually require a spacer, it may be helpful to use a spacer if you have difficulty timing the spray with inhalation.

As the aerosol travels through a spacer, the propellant evaporates and the particle size and velocity of the particles is reduced. Even with a spacer, it's important to coordinate the timing between releasing the medication (also called "actuation") and breathing it in.

Spacers reduce deposition of medication in the mouth and throat and decrease the amount of swallowed drug that is absorbed through the stomach. As a result, spacers can lower your risk of certain adverse effects, such as thrush (a fungal infection of the mouth and throat).

Some spacers include a low resistance, one-way valve that allows airflow only during inhalation. These valved holding chambers hold the medicine in the chamber after you press the canister, allowing you to inhale slowly and deeply once or twice ([picture 2](#)).

There are many different designs of spacers available. In general, larger spacers appear to be more effective than smaller ones but choosing one depends on your preference. For example, one spacer has a pop-up design that allows it to be stored flat so that it can easily be placed in a purse or backpack. It is also available at a fraction of the cost of other spacers ([picture 3](#)). However, its cardboard design means that it cannot be cleaned, so it needs to be replaced if it gets torn or after significant use.

Proper technique is important to ensure optimal drug delivery. It is better to use one spray in the spacer at a time, rather than two or more sprays. It is also preferable to inhale as soon as possible after the medication is released into the spacer.

Be sure to read the package insert that comes with your spacer for specific directions about cleaning and use.

Cleaning the spacer — Non-cardboard spacers should be cleaned periodically, approximately every one to two weeks. The powder residue deposited in the spacer is not harmful. Nevertheless, you should wash the spacer with a dilute solution of warm water and dishwashing detergent to remove the electrostatic charge that can develop on the inside of the spacer. Otherwise, the electrostatic charge can reduce the effectiveness of the spacer. Spacer parts can be washed in a dishwasher, but should be placed on the top shelf.

After washing, air-dry the spacer before the next use. The spacer should **not** be wiped dry with a towel.

Determining when an MDI is empty — It is not always possible to determine when your inhaler is empty by shaking it; even when the medication is gone, some propellant remains in the canister. Several inhalers now have dose counters to track the amount of medication used ([picture 4](#)). Ask your healthcare provider if a counter is available on your inhaler.

If your inhaler does not have a counter but you use it on a regular basis (eg, two puffs twice per day), you will need a refill in 30 days. Write the date you will need the refill on the canister in permanent marker, and mark this date on

your calendar or planner.

If you have a "rescue" inhaler (for quick symptom relief) and use it infrequently, write the date you start using it on the canister in permanent marker and consider refilling it after three to four months, or sooner if you think it is no longer effective. The inhaler should not be used after its expiration date.

Another option is to check the package insert to determine the number of puffs or sprays available in the inhaler. You can then divide that number by the average number of puffs you use each month. For example:

- If you use about eight puffs each week, divide 200 by 8 = 25 weeks (about 6 months)
- Write the date you will need a refill on the canister in permanent marker, and mark this date on your calendar or planner
- Refill your inhaler prescription at least one or two weeks before you will need it
- Be aware, however, that you may need a refill sooner if you use your inhaler more frequently

In the past, you may have been told to drop the canister into a bowl of water and see how it floats. However, this method is not reliable and it is no longer recommended. Spraying the inhaler is also not recommended because an inhaler can produce a spray without medication when it is used beyond the specified number of drug doses.

DRY POWDER INHALERS

Dry powder inhalers (DPIs) contain a dose of one or more medications in a dry powder form. DPIs deliver a fine powder to the lungs when you breathe in. With a DPI, you do not need to coordinate pressing the canister with inhaling. However, you must inhale more forcefully with a DPI than with a metered dose inhaler. Thus, DPIs may not be suitable for elderly people or people with nerve or muscle weakness. Also, it is important not to blow (exhale) directly into the device before breathing in, as this can scatter the medicine before it can be inhaled.

DPIs come in two main types:

- Multiple dose devices, which contain up to 200 doses; these come with a counter so you can see how many doses of medication remain
- Single dose devices, which require you to place a capsule in the device immediately before each treatment. DPI capsules should **not** be swallowed.

Some DPIs, known as "digihalers," come with a sensor that keeps track of when they are used. They can also measure how quickly you are breathing in when you use the inhaler (your "inspiratory flow"). These inhalers connect to a mobile app so you can access this information on your phone or other device.

DPIs do not contain hydrofluoroalkane (HFA), but most contain small amounts of lactose, which can have very small amounts of milk protein.

How to use a DPI — Instructions for using a DPI depend upon the individual type and brand. The following are general instructions. Consult the package insert with your device for specific instructions.

- Remove the cap. For single use devices, load a capsule into the device as directed.
- Breathe out slowly and completely (not into the mouthpiece).
- Place the mouthpiece between the front teeth and seal the lips around it.

- Breathe in through the mouth quickly and deeply over two to three seconds.
- Remove the inhaler from the mouth. Hold your breath for as long as possible (4 to 10 seconds).
- Breathe out slowly.

Cleaning the DPI — Most DPIs should **not** be washed with soap and water. The mouthpiece can be cleaned with a dry cloth. Consult the instructions with your inhaler for further information.

SOFT MIST INHALERS

Soft mist inhalers (SMIs) release medication in a fine mist that comes out more slowly and lasts longer in the air than the aerosol produced by MDIs. You release the medication by pressing down on a button on the side of the inhaler while breathing in ([figure 2](#)).

SMIs, also known as Respimat inhalers, are propellant-free. SMIs come with a dose counter built in, so you can see how many doses of medication remain; it also turns red when the inhaler is nearly empty. The device locks itself after all the medication has been used.

How to use an SMI — Each inhaler manufacturer has specific instructions for using their inhaler; the following are general instructions.

Before you can start using your SMI, you need to insert the cartridge. To do this, press the safety catch on the side of the inhaler and remove the plastic base. Push the cartridge into the inhaler until it clicks (to make sure it is inserted completely, push the cartridge against a firm surface, like a table top). Once the cartridge is in, put the clear plastic base back on and press until you hear a click.

SMIs also need to be primed before the first use. To do this:

- Hold the inhaler upright with the cap closed and twist the clear base clockwise (to the right) until it clicks
- Open the cap and point the inhaler at the floor, away from your face.
- Press the button on the side until you see a mist come out.
- Repeat these steps three more times.

If you have not used your inhaler for more than **three days**, you should do one "priming cycle" before using it. That means following the first three steps above to release one spray of medicine. If you have not used your inhaler for more than **three weeks**, do all the steps above. That means going through the priming cycle and repeating it for a total of four sprays of medicine.

To use your SMI for a dose of medication:

- Hold the inhaler upright with one hand, with the cap closed. Use your other hand to turn the clear base to the right until it clicks.
- Open the cap.
- Breathe out slowly and completely.
- Put the mouthpiece in your mouth, holding the inhaler horizontally (pointing toward the back of your throat).

- Close your lips around the mouthpiece, making sure not to cover the air vents on the sides.
- Take a slow deep breath in. As you start to inhale, press the button on the side of the inhaler.
- When your lungs are full, hold your breath for 10 seconds to keep the medicine in your lungs.
- Take the inhaler out of your mouth and breathe out slowly.
- Put the cap back on the mouthpiece.

You do not need to shake your inhaler.

Cleaning the SMI — Clean your inhaler once a week by wiping the mouthpiece (inside and outside) with a clean, damp cloth.

Keep an adequate supply of medication — You should always have an adequate supply of your medication(s). This includes being sure that your medication is not expired and that you always have a spare inhaler.

WHERE TO GET MORE INFORMATION

Your healthcare provider is the best source of information for questions and concerns related to your medical problem.

This article will be updated as needed on our web site (www.uptodate.com/patients). Related topics for patients, as well as selected articles written for healthcare professionals, are also available. Some of the most relevant are listed below.

Patient level information — UpToDate offers two types of patient education materials.

The Basics — The Basics patient education pieces answer the four or five key questions a patient might have about a given condition. These articles are best for patients who want a general overview and who prefer short, easy-to-read materials.

[Patient education: Asthma in adults \(The Basics\)](#)

[Patient education: How to use your metered dose inhaler \(adults\) \(The Basics\)](#)

[Patient education: How to use your dry powder inhaler \(adults\) \(The Basics\)](#)

[Patient education: How to use your soft mist inhaler \(adults\) \(The Basics\)](#)

[Patient education: Medicines for asthma \(The Basics\)](#)

[Patient education: Inhaled corticosteroid medicines \(The Basics\)](#)

[Patient education: Medicines for chronic obstructive pulmonary disease \(COPD\) \(The Basics\)](#)

Beyond the Basics — Beyond the Basics patient education pieces are longer, more sophisticated, and more detailed. These articles are best for patients who want in-depth information and are comfortable with some medical jargon.

[Patient education: Asthma inhaler techniques in children \(Beyond the Basics\)](#)

[Patient education: Asthma treatment in adolescents and adults \(Beyond the Basics\)](#)

[Patient education: Asthma symptoms and diagnosis in children \(Beyond the Basics\)](#)

[Patient education: How to use a peak flow meter \(Beyond the Basics\)](#)

[Patient education: Trigger avoidance in asthma \(Beyond the Basics\)](#)

[Patient education: Chronic obstructive pulmonary disease \(COPD\) treatments \(Beyond the Basics\)](#)

Professional level information — Professional level articles are designed to keep doctors and other health professionals up-to-date on the latest medical findings. These articles are thorough, long, and complex, and they contain multiple references to the research on which they are based. Professional level articles are best for people who are comfortable with a lot of medical terminology and who want to read the same materials their doctors are reading.

[An overview of asthma management](#)

[Beta agonists in asthma: Acute administration and prophylactic use](#)

[Beta agonists in asthma: Controversy regarding chronic use](#)

[Delivery of inhaled medication in adults](#)

[The use of cromones \(cromoglycates\) in the treatment of asthma](#)

[The use of inhaler devices in adults](#)

[Acute exacerbations of asthma in adults: Home and office management](#)

[Treatment of intermittent and mild persistent asthma in adolescents and adults](#)

[Asthma education and self-management](#)

[Stable COPD: Overview of management](#)

[Stable COPD: Initial pharmacologic management](#)

[COPD exacerbations: Management](#)

The following organizations also provide reliable health information.

- Center for Disease Control and Prevention

[\(www.cdc.gov/ASTHMA/\)](http://www.cdc.gov/ASTHMA/)

- American College of Chest Physicians

[\(http://onebreath.org/patient-education-resources/pulmonary-procedures-and-treatments\)](http://onebreath.org/patient-education-resources/pulmonary-procedures-and-treatments)

- American Lung Association

[\(http://www.lung.org/lung-health-and-diseases/lung-disease-lookup/asthma/living-with-asthma/managing-asthma/understand-your-medication.html\)](http://www.lung.org/lung-health-and-diseases/lung-disease-lookup/asthma/living-with-asthma/managing-asthma/understand-your-medication.html)

- American Academy of Allergy, Asthma, and Immunology

[\(www.aaaai.org/patients.stm\)](http://www.aaaai.org/patients.stm)

- American College of Allergy, Asthma, and Immunology

[\(www.acaai.org/allergist\)](http://www.acaai.org/allergist)

- Aerosol Drug Management Improvement Team (ADMIT)

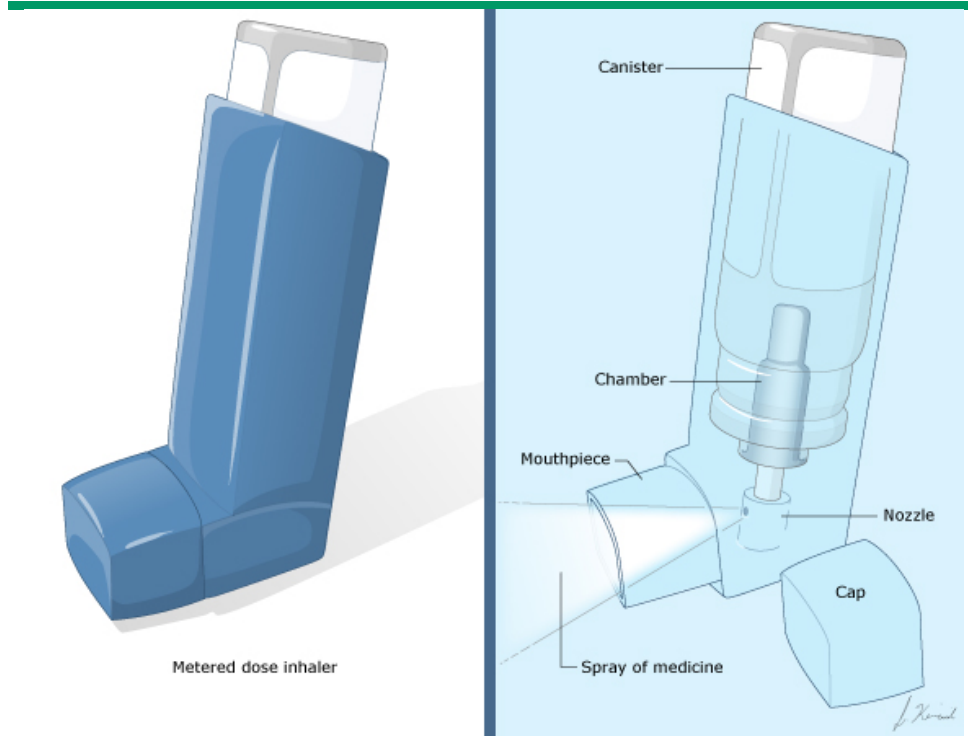
[\(www.inhalers4u.org\)](http://www.inhalers4u.org)

ACKNOWLEDGMENT

The editorial staff at UpToDate would like to acknowledge William Bailey, MD, who contributed to an earlier version of this topic review.

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Topic 369 Version 33.0

GRAPHICS**Metered dose inhaler**

Medicine is stored in the canister. When you press down on the top of the canister, the medicine travels through the dosing chamber and sprays out of the mouthpiece.

Graphic 61575 Version 6.0

Technique for use of a metered dose inhaler (MDI) with a spacer or chamber*

Uncap mouthpiece and check for loose objects in the device.
Prime your inhaler if this is the first time you are using it, if you have not used it for several days, or if you have dropped it. Priming an MDI usually involves shaking it and spraying it into the air (away from your face) a total of up to four times. See the information that came with your inhaler for exact instructions.
Insert MDI into spacer.
Shake canister vigorously for about five seconds.
Hold the MDI upright with your index finger on the top of the medication canister and your thumb supporting the bottom of the inhaler. You may need to use the other hand to hold the spacer.
Breathe out normally through your mouth.
Put the mouthpiece between your teeth and close your lips tightly around mouthpiece of spacer. (If using a mask attached to the chamber, place the mask completely over your nose and mouth.)
Make sure your tongue does not block the opening of the mouthpiece of the spacer.
Press down the top of the canister with your index finger to release the medicine.
At the same time, breathe in deeply and slowly through your mouth until your lungs are completely filled; this should take three to five seconds.
Hold the medicine in your lungs for about 5 to 10 seconds. If you didn't get a full breath or can't hold your breath long enough, you can inhale a second time to fully empty the chamber and hold your breath again for about five seconds. For infants and young children, or if unable to cooperate with a deep breath or breath-holding, 5 to 6 normal breaths will allow complete emptying of the chamber.
If you need more than one puff, wait about 15 to 30 seconds between puffs. Shake canister again before the next puff. Do not load both puffs into the chamber and then empty the chamber with a single inhalation.
When finished, recap mouthpiece.
If your inhaler contains a steroid medicine (sometimes called glucocorticoid or corticosteroid), rinse your mouth and gargle with water after you use it. Then spit out the water. Do not swallow it.
You can use your spacer for more than one medication. Just remove the first MDI and insert the other one.

These instructions do NOT apply to dry powder or soft mist inhalers. Cleaning instructions are provided separately.

MDI: metered dose inhaler.

* We prefer to use a "valved holding chamber" for the spacer. The valve holds the medicine in the chamber. This helps get the medicine into your lungs. Also, when you breathe out into the mouthpiece, the valve prevents your breath from going into the chamber.

Graphic 93619 Version 8.0

Technique for use of a metered dose inhaler (MDI) without a spacer or chamber

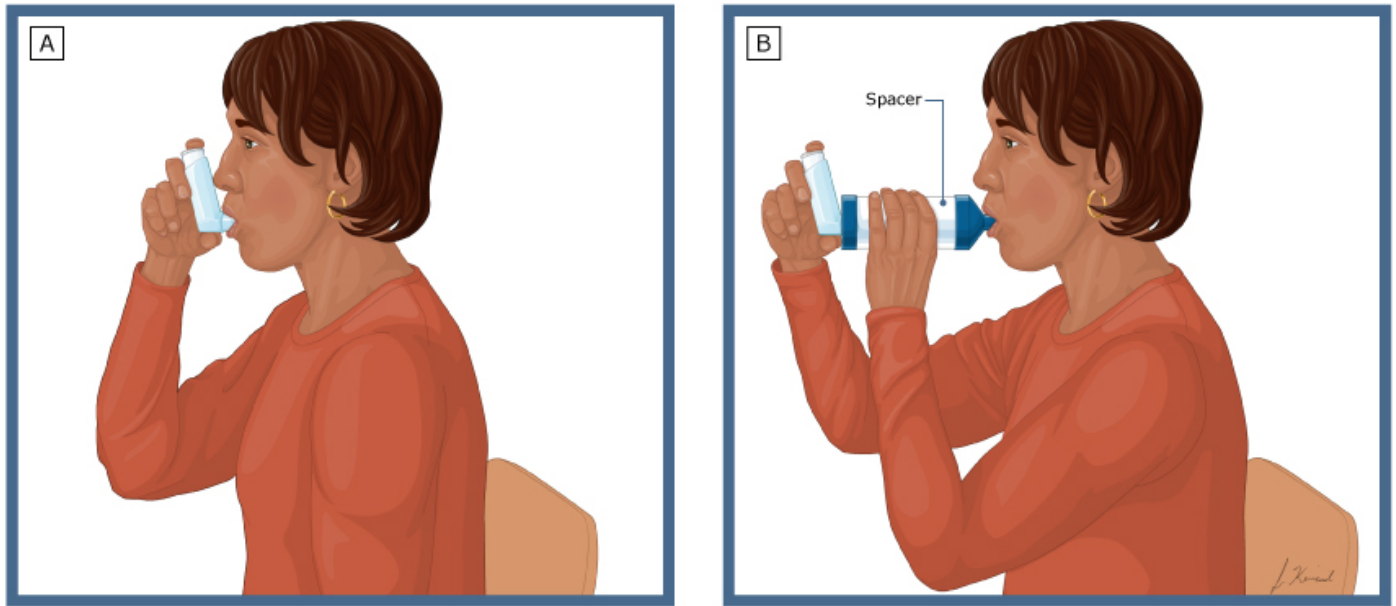
Remove the cover of the mouthpiece
Prime your inhaler if this is the first time you are using it, if you have not used it for several days, or if you have dropped it. Priming a metered dose inhaler usually involves shaking it and spraying it into the air (away from your face) up to 4 times. See the information that came with your inhaler for exact instructions.
Shake MDI canister vigorously for 5 seconds.
Hold the MDI upright with your index finger on the top of the canister and your thumb supporting the bottom of the inhaler.
Breathe out normally.
Put the mouthpiece between your teeth and close your lips around mouthpiece or position mouthpiece about 4 cm (about the width of 2 fingers) from your mouth.
Keep your tongue away from the opening of the mouthpiece.
Press down the top of the canister with the index finger to release the medicine.
At the same time as the canister is pressed, breathe in deeply and slowly through your mouth until your lungs are completely full. This should take 4 to 6 seconds.
Hold the medicine in your lungs for as long as comfortable (about 5 to 10 seconds) before breathing out.
If you need a second puff, wait about 15 to 30 seconds between puffs. Shake the canister again before the next puff.
When finished, put the mouthpiece cover back on.
If your inhaler contains a steroid medicine (sometimes called a "glucocorticoid" or "corticosteroid"), rinse your mouth and gargle with water after you use it. Then spit out the water. Do not swallow it.

These instructions do **not** apply to dry powder or soft mist inhalers. Cleaning instructions are provided separately.

More detailed information about individual medicines can be found at <http://www.accessdata.fda.gov/scripts/cder/drugsatfda/index.cfm>.

MDI: metered dose inhaler.

Graphic 72362 Version 11.0

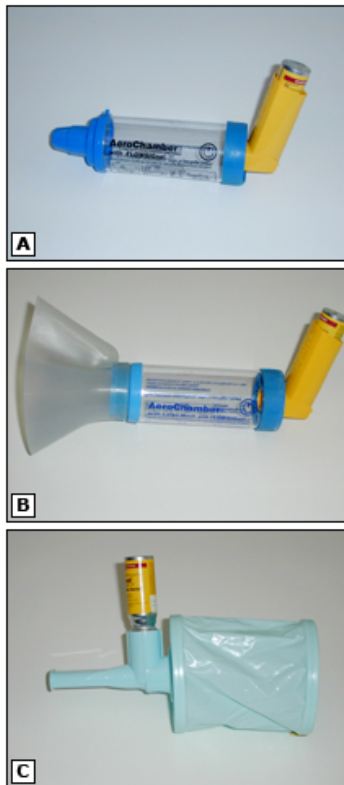
Adult using a metered dose inhaler

Hold the MDI upright with your thumb supporting the bottom of the inhaler (panel A). If you use a spacer, you might need to use your other hand to hold it (panel B). Different types of spacers are available.

MDI: metered dose inhaler.

Graphic 114257 Version 2.0

Accessory devices used with metered dose inhalers



These pictures show different types of spacers, with and without a face mask. A spacer makes it easier to use an inhaler and helps more of the medicine reach the lungs. Picture A shows an AeroChamber spacer. Picture B shows an AeroChamber spacer with a face mask. Picture C shows an InspirEase spacer.

Graphic 56533 Version 4.0

Disposable cardboard spacer for use with pressurized metered dose inhalers



Reproduced with permission from: Thayer Medical Corporation. Available at: <http://thayermedical.com/products/liteaire/liteaire-data-sheet/> (Accessed on September 12, 2018).

Graphic 118983 Version 2.0

MDI with counter

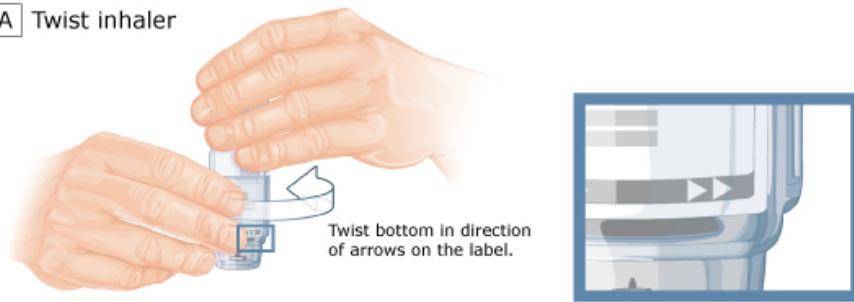


Some metered dose inhalers have built-in dose counters. When the counter reads 0 (zero), there is no medicine left in the inhaler.

Graphic 69302 Version 3.0

How to use your soft mist inhaler

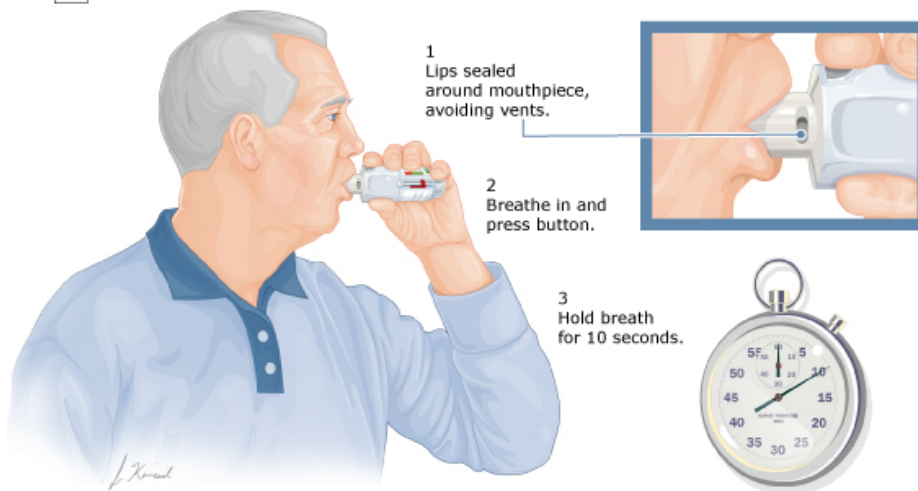
A Twist inhaler



B Open cap



C Breathe in medicine



After you have put in the cartridge and "primed" the inhaler, you are ready to use it. This picture shows the main steps:

- A) With the cap closed, hold the inhaler upright and turn the clear base (following the arrows) until it clicks.
- B) Open the cap, then breathe out slowly and completely.
- C) Hold the inhaler horizontally and put the mouthpiece in your mouth. Take a slow, deep breath. As you start to breathe in, press the button on the inhaler to release the medicine. Continue to breathe in until your lungs are full. Hold your breath for 10 seconds, then remove the inhaler and breathe out slowly. When you are done using your inhaler, close the cap again.

Graphic 120583 Version 1.0

Contributor Disclosures

Lynn B Gerald, PhD, MSPH Grant/Research/Clinical Trial Support: Thayer [Asthma]. **Rajiv Dhand, MD, FCCP, FACP, FAARC, FRSM, ATSF** Grant/Research/Clinical Trial Support: Mylan [COPD]. Consultant/Advisory Boards: AstraZeneca [COPD]; GlaxoSmithKline [COPD]; Boehringer-Ingelheim [COPD]; Mylan [COPD]; Theravance [COPD]; Teva [COPD]. Speaker's Bureau: Boehringer-Ingelheim [COPD]. **Peter J Barnes, DM, DSc, FRCP, FRS** Grant/Research/Clinical Trial Support: AstraZeneca [Asthma, COPD]; Novartis [COPD]; Boehringer [COPD]; Chiesi [Asthma, COPD]. Consultant/Advisory Board: AstraZeneca [Asthma, COPD]; Novartis [COPD]; Boehringer [COPD]; Teva [COPD]; Pieris [Asthma]. Speaker's Bureau: AstraZeneca [Asthma]; Novartis [COPD]; Boehringer [COPD]; Chiesi [Asthma]. **Helen Hollingsworth, MD** Nothing to disclose

Contributor disclosures are reviewed for conflicts of interest by the editorial group. When found, these are addressed by vetting through a multi-level review process, and through requirements for references to be provided to support the content. Appropriately referenced content is required of all authors and must conform to UpToDate standards of evidence.

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