



Official reprint from UpToDate®

[www.uptodate.com](http://www.uptodate.com) ©2021 UpToDate, Inc. and/or its affiliates. All Rights Reserved.

Wolters Kluwer

The content on the UpToDate website is not intended nor recommended as a substitute for medical advice, diagnosis, or treatment. Always seek the advice of your own physician or other qualified health care professional regarding any medical questions or conditions. The use of UpToDate content is governed by the [UpToDate Terms of Use](#). ©2021 UpToDate, Inc. All rights reserved.

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

**Author:** [Robert H Moore, MD](#)

**Section Editors:** [George B Mallory, MD](#), [Robert A Wood, MD](#)

**Deputy Editor:** [Elizabeth TePas, MD, MS](#)

All topics are updated as new evidence becomes available and our [peer review process](#) is complete.

**Literature review current through:** Feb 2021. | **This topic last updated:** Jan 10, 2020.

### ASTHMA INHALER OVERVIEW

Inhaled medications are vital in the treatment of childhood asthma, although they are only effective if they are used properly. Using an inhaler correctly delivers the medication to the lungs and leads to a better response. If the medication is used incorrectly, little or none of it reaches the lungs.

Unfortunately, many people with asthma do not use the best inhaler technique. Almost everyone, including children, can learn proper inhaler technique with training and practice.

This article discusses the use of asthma inhalers in children. Other topics about asthma in children are available separately. (See "[Patient education: Asthma symptoms and diagnosis in children \(Beyond the Basics\)](#)" and "[Patient education: Asthma treatment 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 \(Beyond the Basics\)](#)".)

Articles are also available for adults with asthma. (See "[Patient education: Asthma treatment in adolescents and adults \(Beyond the Basics\)](#)" and "[Patient education: How to use a peak flow meter \(Beyond the Basics\)](#)" and "[Patient education: Inhaler techniques in adults \(Beyond the Basics\)](#)" and "[Patient education: Asthma and pregnancy \(Beyond the Basics\)](#)".)

---

## METERED DOSE ASTHMA INHALERS

Metered dose inhalers (MDIs) are used to deliver a variety of inhaled medications. An MDI consists of a pressurized canister, a metering valve and stem, and a mouthpiece actuator ([picture 1](#)).

The inhaler canister contains the medicine and other chemicals that help to deliver the medication to the lungs. Previously, inhalers contained a chemical known to damage the ozone layer. As a result, most inhalers in the United States were reformulated after December 2008. The new inhalers use a chemical called hydrofluoroalkane (HFA) to deliver the medication to the lungs. HFA devices may have a different taste compared with the previous inhalers, and the spray may feel softer. However, this does not mean that the medicine is not reaching your lungs.

In addition, HFA inhalers need to be cleaned and primed to prevent medication build up and blockage. Each manufacturer will provide instructions about how to use their inhaler. These instructions should be reviewed carefully. (See '[How to use an MDI](#)' below.)

HFA inhalers may be more expensive than the older inhaler. Talk to your health care provider if you have difficulty paying for your medications because assistance programs may be available.

**How to use an MDI** — Each metered dose inhaler (MDI) 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 or valved holding chamber), prepare the inhaler first:

- Shake the inhaler for five seconds.
- Prime the inhaler by pressing down the canister with the index finger to release the medication. Hold away from the face to prevent medication from getting into the eyes. Press the canister down again three times.

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

When using a facemask, it is important to hold the mask snugly against the child's face; even a small leak can significantly reduce the amount of medication that reaches the lungs. Flexible masks appear to provide a better seal than rigid masks.

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

**Cleaning the MDI** — HFA 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. To clean:

- 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.
- 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 the canister, and test spray two times (away from the face).

**Spacer devices** — Using a spacer device with an inhaler can help to deliver more medication to the lungs and dramatically decrease the amount of medicine deposited in the back of the mouth and the tongue. A spacer holds the medicine in a chamber after it has been released from the inhaler, allowing the child to inhale slowly and deeply once or twice ( [picture 2](#) and [figure 1](#)). For infants and children who cannot cooperate with a deep breath or hold their breath, five to six normal breaths are recommended to fully empty the chamber.

A spacer is recommended for any child who has difficulty squeezing the canister and inhaling at the right time (particularly children less than five to six years). Spacers are recommended for all children who use inhaled glucocorticoids.

There are many spacers on the market, although little is known about the benefit of one type versus another. In general, larger-sized (100 to 700 mL) spacers appear to be more effective than smaller ones. Proper technique and frequent cleaning are important. (See '[Cleaning the spacer](#)' below.)

**Valved-holding chambers** — The valved-holding chamber is a specialized spacer that incorporates a one-way valve. This allows the child to breathe in and out of a mouthpiece or face mask. With traditional spacers, the child must breathe in through the spacer and breathe

out away from the spacer. The child often needs to take five to six breaths to inhale all of the medication.

Valved-holding chamber spacers are appropriate for infants and young children. However, this type of spacer may not be appropriate for newborns and very small infants, because they cannot reliably inhale with enough force to open the valves.

**Preparing a new spacer** — Before using a spacer for the first time, it should be treated to reduce the electrostatic charge. This can be done by washing the spacer in a dilute solution of dishwashing detergent and warm water. The device should be air dried without rinsing out the detergent. Some spacers (eg, the Pari Vortex) are electrostatic free, and no preparation is needed.

**Cleaning the spacer** — Although the powder residue that is deposited in the chamber is not harmful, the spacer should be cleaned periodically. Wash it with warm water and dishwashing detergent; washing with water alone causes an electrostatic charge to develop, reducing the effectiveness of the spacer.

**How to get the most out of an inhaler** — Several common mistakes can prevent inhaled medications from getting to the lungs. The following tips can help to get the most out of an MDI.

- Remember to take the cap off the mouthpiece.
- Be sure there is medication in the canister. (See '[Determine when an inhaler is empty](#)' below.)
- Inhale through the mouth, not the nose.
- Take a slow, deep breath at the same time you press down on the medication canister.
- If you have difficulty timing your breath while spraying the medication, there are inhalers that automatically release the medication when you take a breath. Another alternative is a dry powder inhaler (DPI). (See '[Dry powder asthma inhalers](#)' below.)

**Metered dose inhaler versus nebulizer** — Nebulizers use compressed air to change a medication from liquid form to a fine spray that can be inhaled through a mask or mouthpiece ([figure 1](#)). Nebulizers may be preferred to MDIs for some children who are too ill or too young to use a handheld device or in situations where large drug doses are necessary.

However, studies suggest that inhalers can be used to effectively deliver medications to the lungs, even in infants [1]. Therefore, young age and small size do not mean that a nebulizer is required. Giving one or more doses of a short-acting bronchodilator via inhaler with a spacer and facemask is at least as effective as, and possibly better than, giving the same medication by nebulizer in most infants and children [2]. (See '[Spacer devices](#)' above.)

---

## BREATH ACTUATED ASTHMA INHALER

For children who have difficulty timing their breath and spraying the medication, there are inhalers that automatically release the medication when the child breathes in. The disadvantage of this device is that some children may not be able to inhale forcefully enough to trigger the drug's release, especially during an asthma attack.

---

## DRY POWDER ASTHMA INHALERS

An alternative to metered dose inhalers (MDIs) is a dry powder inhaler (DPI). DPIs eliminate the need to coordinate taking a breath and squeezing the canister. There are different types of DPI available; they work by delivering a fine powder to the lungs when the child breathes in. Children who use DPIs need to inhale more forcefully than with a traditional aerosol inhaler. Thus, DPIs may not be suitable for some children who are less than six years or older children with nerve or muscle weakness. Also, the child must not blow (exhale) directly into the device before breathing in, as this can scatter the medicine before it is inhaled.

Examples include the long-acting rescue medication Foradil; the controller medications Asmanex, Flovent, and Pulmicort Flexhaler; and the combination inhaler Advair. DPIs may contain tiny amounts of lactose, which is a type of sugar.

DPIs come in two main types:

- Multiple-dose devices, which contain up to 200 doses.
- Single-dose devices (Spiriva Handihaler, TOBI Podhaler), which require the person to place a capsule in the device immediately before each treatment. DPI capsules should NOT be swallowed.

Instructions for using a DPI are included in the table ( [table 3](#)).

**Cleaning the DPI** — Most dry powder inhalers (DPIs) should not be washed with soap and water. The mouthpiece can be cleaned with a dry cloth approximately once per week. Consult

the instructions with your inhaler for further information.

---

## ASTHMA ATTACK CARE AND PREVENTION

Patients with asthma should work with their health care provider to develop an asthma action plan that is successful in treating and preventing asthma attacks. Depending upon the severity of your child's asthma, the treatment regimen may include regular visits with the provider, use of one or more medications, avoiding asthma triggers, and home symptom monitoring. At each visit, the child and/or parent should demonstrate how they use an inhaler to ensure that the correct technique is used.

**Keep an adequate supply of medication** — A child should always have an adequate supply of his or her medication(s). This includes verifying that medication is not expired and that an inhaler is available at home, at school, in the car, and when out with family or friends.

**Determine when an inhaler is empty** — It is not always possible to determine when an inhaler is empty by shaking it, because some propellant remains in the canister after all of the medication has been used. Many inhalers now have dose counters to accurately track the amount of medication remaining ( [picture 3](#)). Ask your health care provider if a counter is available on your inhaler.

If you do not have a counter but you use your inhaler on a regular basis (eg, two puffs once per day), you should refill your prescription once per month and throw away the old inhaler.

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 even an empty inhaler will continue to spray.

---

## WHERE TO GET MORE INFORMATION

Your child's health care provider is the best source of information for questions and concerns related to your child's medical problem.

This article will be updated as needed on our website ([www.uptodate.com/patients](http://www.uptodate.com/patients)). Related topics for patients, as well as selected articles written for health care 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 children \(The Basics\)](#)

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

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

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

**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 symptoms and diagnosis in children \(Beyond the Basics\)](#)

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

[Patient education: Inhaler techniques in adults \(Beyond the Basics\)](#)

[Patient education: Asthma and pregnancy \(Beyond the Basics\)](#)

**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.

[Acute asthma exacerbations in children younger than 12 years: Inpatient management](#)

[Acute asthma exacerbations in children younger than 12 years: Emergency department management](#)

[Acute severe asthma exacerbations in children younger than 12 years: Intensive care unit management](#)

[An overview of asthma management](#)

[Asthma in children younger than 12 years: Management of persistent asthma with controller therapies](#)

[Asthma in children younger than 12 years: Initial evaluation and diagnosis](#)

[Delivery of inhaled medication in children](#)

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

The following organizations also provide reliable health information.

- National Library of Medicine  
([www.nlm.nih.gov/medlineplus/healthtopics.html](http://www.nlm.nih.gov/medlineplus/healthtopics.html))
- National Heart, Lung, and Blood Institute  
([www.nhlbi.nih.gov/](http://www.nhlbi.nih.gov/))
- American Lung Association  
([www.lungusa.org](http://www.lungusa.org))
- 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))

[2-5]

Use of UpToDate is subject to the [Subscription and License Agreement](#).

## REFERENCES

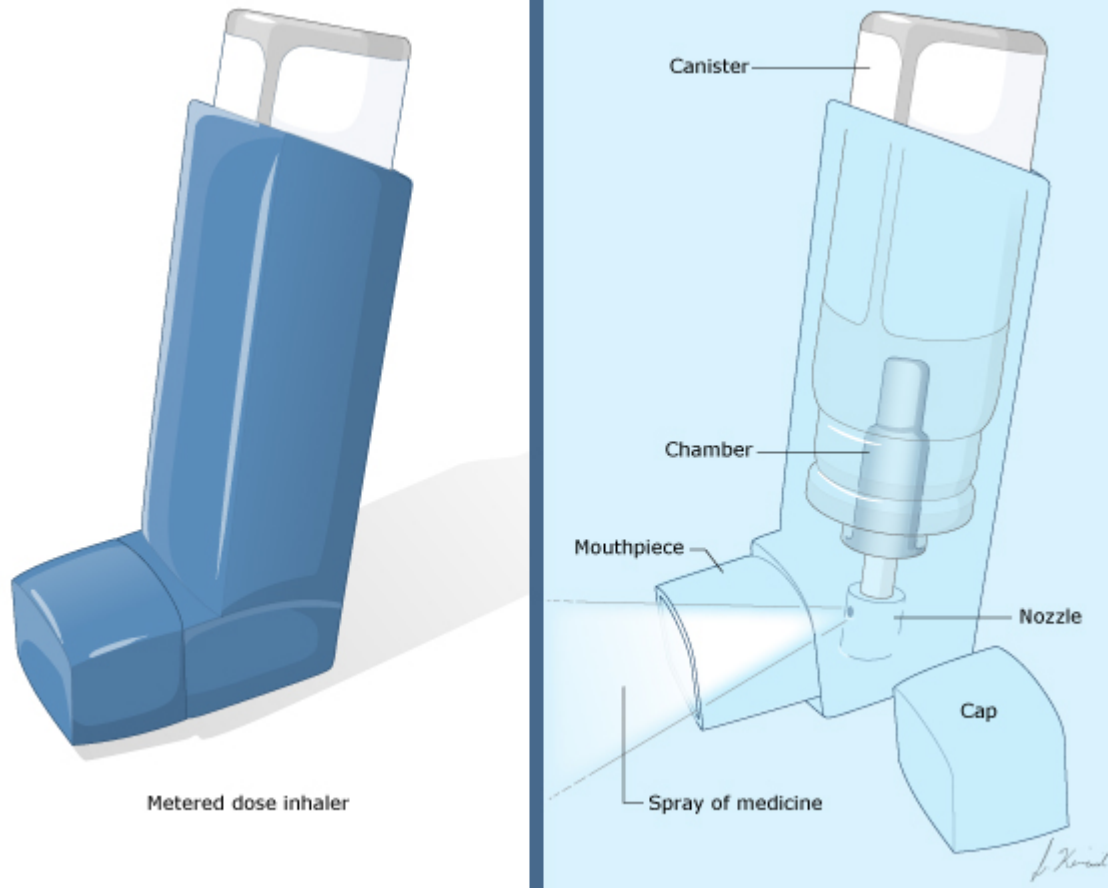
1. [Leversha AM, Campanella SG, Aickin RP, Asher MI. Costs and effectiveness of spacer versus nebulizer in young children with moderate and severe acute asthma. J Pediatr 2000; 136:497.](#)
2. [Cates CJ, Crilly JA, Rowe BH. Holding chambers \(spacers\) versus nebulisers for beta-agonist treatment of acute asthma. Cochrane Database Syst Rev 2006; :CD000052.](#)
3. [Wildhaber JH, Janssens HM, Piérart F, et al. High-percentage lung delivery in children from detergent-treated spacers. Pediatr Pulmonol 2000; 29:389.](#)
4. [Amirav I, Newhouse MT. Aerosol therapy with valved holding chambers in young children: importance of the facemask seal. Pediatrics 2001; 108:389.](#)
5. [Marguet C, Couderc L, Le Roux P, et al. Inhalation treatment: errors in application and difficulties in acceptance of the devices are frequent in wheezy infants and young children. Pediatr Allergy Immunol 2001; 12:224.](#)

Topic 1173 Version 23.0



## 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 <b>not</b> 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

## Accessory devices used with metered dose inhalers

---

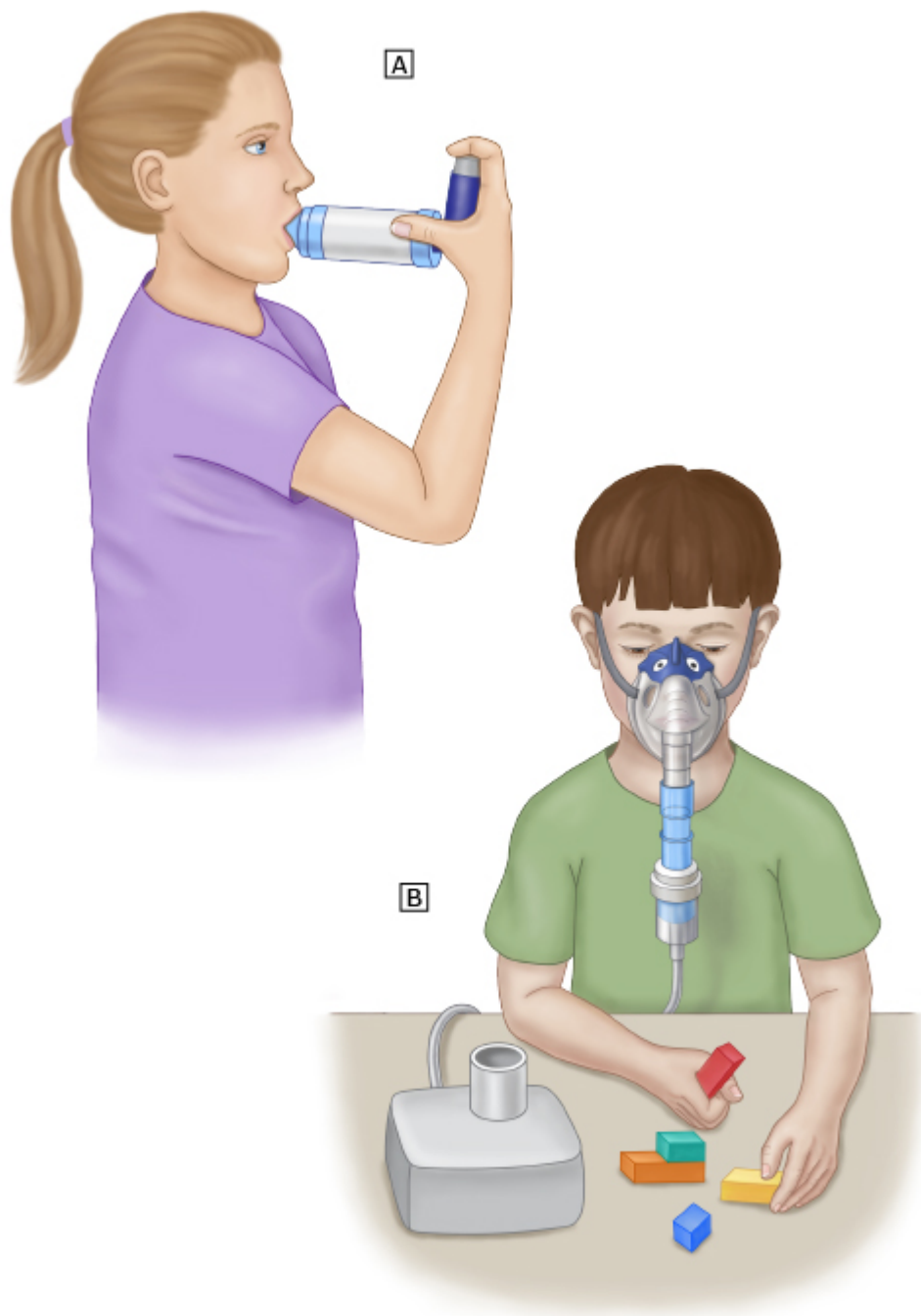


These pictures show different types of spacers, with and without a face mask. A spacer makes it easier to use an inhaler and helps more of the medicine reach the lungs. Picture A shows an AeroChamber spacer. Picture B shows an AeroChamber spacer with a face mask. Picture C shows an InspirEase spacer.

Graphic 56533 Version 4.0

## Using a spacer or a nebulizer

---



(A) This child is using a spacer with her inhaler. When she presses down on the canister, a puff of medicine is released into the spacer and sits there until the child breathes it in.

(B) This child is using a nebulizer. This is a machine that turns the medicine into a fine mist. The child then breathes in the medicine through a mask.

Graphic 75577 Version 9.0

## Technique for use of various dry powder inhalers

### Diskhaler (available in Canada)

- Remove the mouthpiece cover and pull tray out from device.
- Place disk on wheel with numbers facing up.
- Rotate the disk by sliding tray out and in.
- Lift the back of the lid until fully upright, so the needle pierces both sides of the blister.
- Keep the device level while inhaling the dose with a rapid and steady flow.
- Breathe in rapidly and steadily, as deeply as possible, then hold your breath.
- Remove the device from your mouth and exhale outside the device.
- Brush off any powder remaining within the device once every week. Store the device in a cool, dry place.

### Diskus

- Open the device and slide the lever until it clicks.
- Keep the device level while inhaling the dose.
- Breathe in rapidly and steadily, as deeply as possible, then hold your breath.
- Remove the device from your mouth and exhale outside device. Store the device in a cool, dry place.

### Ellipta

- Remove the inhaler from the foil tray. Do not open the cover of the inhaler until you are ready to use it.
- Write the "Tray opened" and "Discard" dates on the inhaler label. The "Discard" date should be 6 weeks from the date you open the tray.
- Check the dose counter on the inhaler. Before you use the inhaler for the first time, the counter should show the number 30. This is the number of doses in the inhaler.
- Open the cover of the inhaler. Each time you fully open the cover it should produce a clicking sound, and the number on the counter should go down by one. This means a dose is ready to be inhaled. (If you open and close the cover without inhaling the medicine, you will lose the dose. The lost dose will be held in the inhaler, but it will no longer be available to be inhaled. It is not possible to accidentally take a double dose or an extra dose in 1 inhalation.)
- If the counter does not count down as you hear the click, the inhaler will not deliver the medicine. Call your healthcare provider or pharmacist if this happens.
- While holding the inhaler away from your mouth, breathe out (exhale) fully. Do not exhale into the mouthpiece.
- Hold the inhaler in a horizontal position. You do not need to shake it. Do not block the air vent in the inhaler with your fingers.
- Put the mouthpiece between your lips, and close your lips tightly around it. Your lips should fit over the curved shape of the mouthpiece.
- Take one long, steady, deep breath in through your mouth. Do not breathe in through your nose. You might not taste or feel the medicine, even when you are using the inhaler correctly.
- Remove the mouthpiece from your mouth and hold your breath for about 3 to 4 seconds (or as long as you comfortably can).
- Breathe out slowly and gently.
- Slide the cover up and over the mouthpiece as far as it will go to close the inhaler.
- Clean the mouthpiece if needed, using a dry tissue, before you close the cover. Regular cleaning is not required.

- When you have less than 10 doses remaining in your inhaler, the left half of the counter shows red as a reminder to get a refill. After you have inhaled the last dose, the counter will show "0" and the inhaler should be thrown away.

### HandiHaler

- Capsules should be stored in sealed blisters and only removed immediately before use.
- Peel back the foil using the tab until one capsule is fully visible.
- Open the dust cap by pulling it upwards, then open the mouthpiece.
- Place the capsule in the center chamber. (It does not matter which end of the capsule is placed in the chamber.)
- Close the mouthpiece firmly until you hear a click, leaving the dust cap open.
- Hold the HandiHaler with the mouthpiece upwards, then press the piercing button completely in 1 time and release.
- Breathe out completely. Do not breathe into the mouthpiece at any time.
- Close your lips tightly around the mouthpiece.
- Breathe in rapidly and steadily, as deeply as possible, then hold your breath.
- To ensure you get the full dose, repeat the inhalation from the HandiHaler as described.
- After the dose, open the mouthpiece, tip out the used capsule, and throw it away. Do not handle used capsules.
- Close the mouthpiece and dust cap for storage. Store the device in a cool, dry place.

### Neohaler/Breezhaler

- Capsules should be stored in sealed blisters and removed immediately before use.
- Remove cap and tilt mouthpiece to open inhaler.
- Separate one blister from card, and peel away backing to expose the foil. Remove one capsule by pushing it through the foil.
- Place the capsule in the chamber.
- Close the mouthpiece firmly until you hear a click.
- Hold the inhaler with the mouthpiece upwards. Press the piercing buttons on both sides at the same time, then release. You should hear a click. Do not press the buttons more than once.
- Breathe out completely away from the mouthpiece.
- Hold the inhaler so the buttons are facing left and right, not up and down, and your fingers are not on the buttons. Close your lips tightly around the mouthpiece.
- Breathe in rapidly and steadily, and as deeply as possible. As you breathe, you should hear a whirring noise as the capsule spins. (If you do not hear this, open the inhaler and tap it on the bottom to loosen the capsule. Then repeat the steps of breathing out then inhaling the medicine.)
- Remove the inhaler from your mouth, and hold your breath for 5 to 10 seconds (or as long as you comfortably can). Then breathe out.
- Open the inhaler to make sure the capsule is empty. If there is still powder in the capsule, close the inhaler and repeat the steps above to breathe out and then inhale the medicine.
- Tip out the empty capsule, and throw it away.
- Replace the cap. Store the device in a cool, dry place.

### Pressair/Genuair

- Remove the cap by gently squeezing the arrows on each side of cap.
- Hold the inhaler with the green button pointing up.

- Before you put the inhaler in your mouth, press the green button all the way down 1 time and release it.
- Look at the small window above the mouthpiece to see if the color changed from red to green. If it is still red, press and release green button again.
- Breathe out completely.
- Close your lips tightly around the mouthpiece.
- Breathe in rapidly and as deeply as possible.
- You will hear a click. This means you are inhaling correctly. Do not stop breathing until your lungs are full.
- Remove the inhaler from your mouth, and hold your breath for as long as is comfortable.
- The window above the mouthpiece should now be red. (If window is still green, you might not have inhaled correctly or might have forgotten to release the green button. Close your lips tightly around the mouthpiece and take another rapid, deep breath. Now the window should be red.)
- Once the window has turned red, replace the cap.

### RespiClick

- Make sure the cap is closed before use.
- Hold the inhaler upright and open the cap all the way, until you hear it click.
- Breathe out as much air as you can from your lungs.
- Close your lips tightly around the mouthpiece. Do not let your fingers or lips block the vents above the mouthpiece.
- Breathe in as deeply as possible, then hold your breath for about 10 seconds (or as long as you comfortably can).
- Remove the inhaler from your mouth.
- Close the cap. Repeat steps above if you need another dose.
- Keep inhaler clean and dry. If the mouthpiece needs cleaning, use a clean, dry cloth or tissue.

### Turbuhaler

- Twist and remove the cover.
- Hold the inhaler upright with mouthpiece facing up.
- Turn the grip right then left until it clicks.
- Inhaler may be held upright or horizontal.
- Breathe in rapidly and steadily, as deeply as possible, then hold your breath.
- Remove the device from your mouth and exhale outside the device.
- Replace the cover and twist to close. Store the device in a cool, dry place.

### Twisthaler

- Hold the inhaler straight up with the pink part (the base) on the bottom.
- Remove the cap while it is in the upright position to make sure you get the right amount of medicine with each dose.
- Hold the pink base and twist the cap in a counter-clockwise direction to remove it.
- As you lift off the cap, the dose counter on the base will count down by 1. This action loads the medicine that you are now ready to inhale.
- Make sure the indented arrow located on the white part (directly above the pink base) is pointing to the dose counter.
- Breathe out normally. Do not exhale into the device.
- Place the mouthpiece into your mouth, with the mouthpiece facing towards you, and close your lips tightly around it.



- Inhale dose with a rapid and steady flow while holding the Twisthaler horizontal.
- Remove the mouthpiece from your mouth and hold your breath for 5 to 10 seconds (or as long as you comfortably can).
- When you exhale, be sure that you are not exhaling into the device.
- Replace the cap right away, and turn it in a clockwise direction as you gently press down, until you hear a click.
- Firmly close the Twisthaler to assure that your next dose is properly loaded.
- Be sure that the arrow is in line with the dose-counter window.
- Store the device in a cool, dry place.
- The dose counter displays the number of doses remaining. When the unit reads 01, this indicates the last remaining dose. When the counter reads 00, the unit must then be discarded.

Graphic 51020 Version 8.0

## 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

## Contributor Disclosures

**Robert H Moore, MD** Nothing to disclose **George B Mallory, MD** Grant/Research/Clinical Trial Support: TOPP-2 [Pulmonary hypertension]. **Robert A Wood, MD** Grant/Research/Clinical Trial Support: NIAID; DBV Technologies; Aimmune; Astellas; HAL-Allergy; Sanofi; Regeneron [Food allergy]. **Elizabeth TePas, MD, MS** 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.

[Conflict of interest policy](#)

→