

## Pamphlet #5: GETTING THE MOST FROM YOUR INHALED MEDICATIONS

Many of the medications that we use to treat asthma are given in the form of sprays, powders, or mists that must be inhaled to have an effect. Taking the medication by inhalation means that more medication gets to where the problem is in asthma—the air passageways (bronchial tubes) of the lungs—and fewer unpleasant medication side effects are likely to occur compared to medications that are swallowed. However, getting the medication from a device held in one's hand to the surface of thousands of bronchial tubes in the lungs is not always easy. In many cases, it requires a coordinated hand and breathing action that can be tricky to master. In this pamphlet we review how to get the most medication—and the most benefit—from the inhaled route of delivery.

### **Metered-Dose Inhalers (My “Puffer”)**

We begin with a discussion of medication delivered from a metered-dose inhaler, often called a “pump spray” or a “puffer.” The medication is contained within a metal canister that sits inside a plastic holder. To deliver the medication, one presses down (and then releases) the canister in its holder. From its nozzle is delivered a spray containing each time the same amount of medication (hence, a “metered dose”). Before pressing the canister to release the medication, it is important to give it one or two shakes so that the medication is evenly mixed within the canister; and, of course, be sure to remove the cap that covers the mouthpiece. When properly holding the device, the mouthpiece is at the bottom. Most people find it easiest to grip the device between forefinger and thumb, one on top of the metal canister, the other beneath the plastic holder just behind the mouthpiece.

The key to proper use of these inhalers is drawing the spray released from the mouthpiece of the inhaler deep into the lungs and onto the bronchial tubes. We recommend that you put your lips and teeth tightly around the mouthpiece of the inhaler.

### **A Three-Step Approach**

First, press the inhaler and then start breathing in as soon as the spray has been made. Breathe through your mouth, not your nose. If you wait too long to breathe in after pressing the inhaler, you lose a lot of medication that settles onto your tongue and mouth rather than being drawn onto your breathing tubes. At the other extreme, if you breathe in deeply before the spray is made, you will not have enough breath left to pull the medicine onto the bronchial tubes. So, to do it just right, at the same time that you are pressing down on the canister, begin to breathe in.

Second, breathe in slowly. It takes time to distribute the medication to the thousands of bronchial tubes. Too fast a breath puts most of the medicine onto the back of the throat and the upper breathing passageways only. Try not to rush as you breathe in; it should take about 3-4 seconds to pull in a slow, full breath.

Third, hold your breath for a few seconds at the end of the slow, deep breath. If you breathe out immediately, you lose some of the medication in what you exhale. Give the medicine a chance to settle onto the breathing tubes by holding your breath for about 5 seconds before exhaling.

There is no need to wait one minute between puffs. As soon as you have completed the careful inhalation of one puff, you are ready to proceed with the next.

## Using Inhalational Aids or "Spacers"

Your medical provider may recommend that you use a simple device, called a "spacer," with your metered-dose inhaler. They generally come in the shape of a hollow tube, with a mouthpiece at one end and a place to insert your metered-dose inhaler (with its mouthpiece cover removed) snugly at the other end. Spacers are known in medical literature as "valved holding chambers," the concept being that the medication will be held suspended in the chamber for a second or two, awaiting you to calmly inhale the medication from the chamber.

Spacers have two advantages: they often improve coordination between delivery of the medication from the inhaler and breathing it onto the bronchial tubes; and they reduce the amount of medication that settles in your mouth and throat. A variety of brand name devices are available, including *Aerochamber*<sup>®</sup>, *Optichamber*<sup>®</sup>, and *Vortex*<sup>®</sup>.

We particularly encourage you to use a spacer if you are receiving an inhaled steroid medication from your metered-dose inhaler (see the Mass General Brigham Asthma Center pamphlet, [Asthma and Inhaled Steroids](#)). It turns out that when using a spacer, the part of the medication spray that would normally settle on your tongue and back of your throat now settles in the chamber, while the medication targeting your bronchial tube still makes its way deep into your lungs. By minimizing steroid medication depositing in your mouth and throat, you decrease your risk of side effects, particularly the yeast (candida) infection called "thrush."

The process for inhaling medication using a spacer is simple. Plug the mouthpiece of your inhaler into one end. Remove the cover of the spacer's mouthpiece. Grip your inhaler as usual, between thumb and index finger. Now, with your lips and teeth sealed around the mouthpiece of the spacer, having sprayed the medication into the chamber, you can slowly breathe in the air (and medication) from the chamber. Many spacers have a built-in whistle that sounds when you breathe in too fast – a slow, steady deep breath is best.

Although it is tempting to fill your spacer with two or more medication doses and then take one big breath in, this method does not work well. Use one breath in for each puff of your medication.

## Dry-Powder Inhalers

An alternative delivery system for asthma medications is the dry-powder inhaler. Dry-powder inhalers do not involve any pressurized spray. The medication, in the form of a very fine powder, is pulled into the lungs by the force of one's breath. One advantage over metered-dose inhalers, therefore, is that there is no need to coordinate timing of medication release with breathing in. When the mouthpiece of the plastic device is opened and the medication release prepared, one simply seals one's lips and teeth around the mouthpiece and gives a strong, steady breath in, pulling the powder from the device deep into the lungs. As with metered-dose inhalers, take a long, steady breath in, then hold your breath for about 5 seconds to let the medication settle on the airways before exhaling.

Unlike metered-dose inhalers, dry-powder inhalers do not need to be shaken before each use, and they cannot be used with spacer devices.

Dry-powder inhalers come in a variety of different shapes and designs. Some are made ready to release the next dose of medication simply by pulling the mouthpiece cover to one side or twisting off a plastic cover. Others require an additional step of sliding a lever to one side or twisting a wheel at its base one way and then back the other way. Your medical provider, asthma educator, or pharmacist can show you how to use your specific dry-powder device; or if you have internet access, there is a video demonstration readily available.

Medications available as dry-powder formulations include the bronchodilator, albuterol (ProAir®); several inhaled steroids (*Armonair*®, *Arnuity*®, *Asmanex*®, *Flovent*®, and *Pulmicort*®); inhaled steroids combined with a long-acting beta-agonist bronchodilator (*Advair*®, *AirDuo*®, *Breo*®, and *Wixela*®); and the three-in-one inhaler that combines an inhaled steroid, a long-acting beta-agonist bronchodilator, and a long-acting muscarinic antagonist bronchodilator (*Trelegy*®).

One device seems like a hybrid between a metered-dose inhaler and a dry-powder inhaler. The inhaled steroid beclomethasone (*Qvar*®) is a metered-dose inhaler, but the spray is released not by pressing the canister in its holder. Rather, like a dry-powder inhaler, the medication is released only when you have your lips and teeth around the mouthpiece and take a breath in. The device senses your breath in and only then releases the spray. It is called a "breath-actuated" metered-dose inhaler.

## Soft-Mist Inhalers

A third type of inhaler exists, called a soft-mist inhaler. When activated, the medicine to be inhaled is released as a mist over the course of about one-and-a-half seconds. The medications

available as soft-mist formulations, such as the long-acting muscarinic antagonist bronchodilator tiotropium (*Spiriva*<sup>®</sup>), are used to treat chronic obstructive pulmonary disease (COPD) and are not currently recommended in the routine treatment of asthma.

## **Knowing When Your Inhaler Is Empty**

All modern inhalers have a built-in dose counter. The dose counter starts with the number of “puffs” or sprays in a full device and counts down to empty. Some are numeric, giving you the precise number of puffs left in your device. Others have an indicator arrow pointing somewhat approximately to the number of doses left. It is important that you identify the dose counter on your inhaler device and keep an eye on it over time. You may have the sense that you are getting a spray even when the indicator reads zero, but most likely you are receiving only spray without any medication in it. When the dose counter indicates zero doses left, the device is empty of medication. Time for a refill!