

# Breath of Fresh Air

January 2025

Information, news and advice for improving asthma well-being

Happy New Year!

## Asthma Inhalers and Global Warming

You may recall a remarkable scientific and international cooperative achievement of the 1970's and '80s. First, it was discovered that the protective layer of ozone in our upper atmosphere was thinning, with a hole opening that exposed humans (as well as plants and animals) to excessive amounts of harmful ultraviolet light (think skin cancers and cataracts). Next, scientists determined that man-made chemicals, such as refrigerants, propellants, and foam-blowing agents – including the chlorofluorocarbon (CFC) propellants used to power our asthma inhalers – when released into the air were the cause of the widening ozone hole. Then, as the result of an international agreement called the Montreal Protocol signed in 1987, manufacture and use of these chemicals, including CFCs, was banned worldwide. Over the next 20-30 years, all the different in-



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halers that had used CFCs were required to switch to hydrofluoroalkanes (HFAs) as their new, ozone-safe propellant. Hence, our metered-dose inhalers came to be known as albuterol-HFA, fluticasone (*Flovent*®)-HFA, etc. Because of these actions, the atmospheric ozone layer is growing again and the ozone hole shrinking. But

the story of inhaler propellants does not end there.

It turns out the HFAs contribute to global warming, in the same way that burning fossil fuels does, although to a far lesser extent overall.

No guilt here: use of our HFA “puffers” contributes less than 1/10 of 1% of human-made greenhouse gas emissions. Still, we would all like to do our part to protect Planet Earth from overheating, and it is estimated that if metered-dose inhalers using the current HFA propellants disappeared from use in the United States, the effect would be like taking 500,000 gas-driven automobiles off the road.



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What can be done? The answer is clearly **not** to stop using your HFA metered-dose inhaler. In fact, two highly recommended inhalers that offer both a quick-relief bronchodilator and an anti-inflammatory steroid in one device -- *Breyna*® or *Symbicort*® (formoterol + budesonide) and *Airsupra*® (albuterol + budesonide) – are sold in the U.S. only as metered-dose inhaler preparations. If you are prescribed these medications, there are no equivalent alternatives to consider. However, occasionally you will have an option. Dry-powder inhalers (examples include the following brand-name devices: *Digihaler*, *Diskus*, *Elliпта*, *Flexhaler*, *Respiclick*, and *Twisthaler*) do not use HFA propellants; medication is delivered using the force of one’s breath in. If the price and availability were the same, you might work with your medical provider to choose the same or equivalent medication, in a comparable dose, delivered by dry-powder inhaler rather than metered-dose inhaler. Admittedly, these are big “ifs.” Another, easier substitution is occasionally available: the same HFA metered-dose inhaler with the same number of puffs made available using canisters of 2 different sizes. For example, the smaller albuterol inhaler (8.5-gm size) contains the same number of doses or “puffs” of albuterol as the 18-gm size, but has less propellant.



*Two inhalers with the same number of medication doses but less HFA propellant in the smaller device..*

You may decide that your best option is to wait for the medical/scientific community to develop propellants for metered-dose inhalers that are safer for our environment. Propellants with far less greenhouse gas footprint are available and will likely be incorporated into metered-dose inhalers in the future. Exactly when that will happen is hard to determine. Also, if as a society we had a system for safe disposal of metered-dose inhalers, which even when empty of medication typically have some residual propellant inside, we could decrease release of current HFA propellants into the environment.

As residents of this world, we are all being called upon to consider the future health of the planet – for the sake of our children, grandchildren, and all future generations – and HFA inhalers have come into focus as one more “actionable item.”

## **Breath of Fresh Air**

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**Breath of Fresh Air** is to be published quarterly by Mass General Brigham Asthma Center, 75 Francis Street, Boston, MA 02115.

We welcome your comments, questions, suggestions, and personal asthma stories. Email them to us as [asthma@mgb.org](mailto:asthma@mgb.org).

## New Treatment for Asthma Is in the AIR

Virtually everyone with asthma has been prescribed a quick-acting bronchodilator (sometimes called “rescue” or “emergency” inhalers), such as albuterol or levalbuterol (brand names: *ProAir*®, *Proventil*®, *Ventolin*®, and *Xopenex*®). When inhaled onto the breathing tubes, the medication works quickly by relaxing the muscles that can tighten around the airways (bronchial tubes) and opening the air passages wider. Breathing typically improves within less than 5 minutes. The relief that these inhalers provide is a blessing, essential to our well-being, BUT ....

Remember that asthma is more than contraction of the muscles that surround the bronchial tubes. A crucial part of asthma is a characteristic type of inflammation of the walls of the bronchial tubes. Everyone with asthma has a persistent inflammation of the walls of their air tubes that is present day and night, every day, chronically. It is this inflammation that likely contributes, at least in part, to making the airways in asthma “twitchy,” with the tendency of the bronchial muscles to contract too easily and too much (compared to normal). Many persons with asthma are asked to take an anti-inflammatory inhaler, containing corticosteroids (“steroids”), to suppress this inflammation, make the bronchial tubes less twitchy, and overall quiet asthma, with fewer symptoms and less need for the “rescue” bronchodilator inhaler. Still, when they have asthma symptoms like cough, shortness of breath, or chest tightness, they turn to their quick-acting bronchodilator for relief -- that quick-acting bronchodilator that does not further address the on-going inflammation in the walls of the bronchial tubes.

In recent years researchers studying asthma and clinicians treating asthma have asked the following question: WHAT IF whenever you reach for

your quick-acting bronchodilator to obtain relief from your asthma symptoms you inhaled, at the same time, an anti-inflammatory steroid. Relax the bronchial muscles *and* suppress the underlying airway inflammation both at once, whenever your symptoms tell you that you need to do so. If you are having a particularly difficult time and needing your rescue bronchodilator more often than usual, you would be appropriately increasing the amount of anti-inflammatory medication delivered during this period of heightened asthma activity. This strategy has been called “anti-inflammatory rescue” or AIR ... and it works! People using the AIR treatment strategy (anti-inflammatory steroid taken together with each dose of quick-acting bronchodilator) have fewer serious asthma attacks, and some patients with milder asthma can use this approach as their only treatment, no longer dependent on daily inhaled steroids. It is increasingly recommended for persons with mild asthma (as their only treatment) and for persons with more severe asthma (who, in addition to taking their daily suppressive medications, can use AIR for quick-relief of symptoms).

AIR can be achieved in several ways. You can continue with your albuterol or levalbuterol inhaler (or nebulizer) and, with each use, take 2 “puffs” from a separate steroid inhaler (or more “puffs” if you are using a nebulizer for quick relief). Alternatively, you can inquire with your physician about substituting a single inhaler containing albuterol combined with a steroid (budesonide) in each puff rather than continuing albuterol alone. The combination albuterol/budesonide inhaler is called *Airsupra*®. Some persons will already be using a combination formoterol/budesonide inhaler (*Breyna*® or *Sym-*

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*bicort*®). Because the bronchodilator in this medication acts quickly, as quickly as albuterol or levalbuterol, it too can be used for quick relief. The use of formoterol/budesonide inhaler for daily maintenance therapy and for quick-relief as part of the AIR treatment approach has been dubbed SMART for “single inhaler for maintenance and rescue therapy.” On-going studies, including one being conducted at the Asthma Research Center at Brigham and Women’s Hospital, will help to clarify which of these approaches to implementing AIR is best.

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## News About Asthma

### **Epinephrine Administered via the Nose**

For generations now, the treatment of severe and potentially life-threatening allergic reactions, particularly those characterized by throat closing or low blood pressure, has been the administration of epinephrine by injection. Patients and their care-givers, as well as emergency personnel, carry with them a pre-filled epinephrine syringe and needle, with medication automatically released upon firm application against the skin (or even through an overlying thin layer of clothing). The medication is quickly absorbed into the bloodstream and works within minutes to reduce swelling and raise blood pressure. But not everyone is comfortable giving an automated injection, especially to a child, and such hesitancy can lead to potentially dangerous delays in administration.

Now a new formulation of epinephrine (brand name = *neffy*®) is available to administer as a mist squirted into the nose. The nasal epinephrine spray, sold as a 2-pack -- where a second dose can be administered into the same nostril, if needed – has been shown to work equally effectively and rapidly as the injectable form. It can be used in persons with nasal allergies (“allergic rhinitis”), but its effectiveness in persons with nasal polyps or prior nasal surgery is uncertain. It is not approved for use in children weighing less than 66 lbs (30 kg).

### **News about MGB Asthma Center**

In 2024 our Asthma Center celebrated its 35<sup>th</sup> anniversary. We began as the Longwood Medical Area Adult Asthma Center in 1989, expanded to become the Partners Asthma Center in 1997, and morphed into the Mass General Brigham Asthma Center in 2019. Our Director is Elliot Israel, M.D., M.Sc. (Hon.), whom many of you know as your physician. He heads the Asthma Research Center at Brigham and Women’s Hospital and its Severe Asthma Program. He trained as both an allergist and pulmonologist and is Professor of Medicine at Harvard Medical School, where he holds the Gloria M. and Anthony C. Simboli Distinguished Chair in Asthma Research. His asthma research and related medical publications have shaped our understanding of asthma and the practice of asthma care worldwide.

