Consumer Reports

BEST BUY DRUGS™

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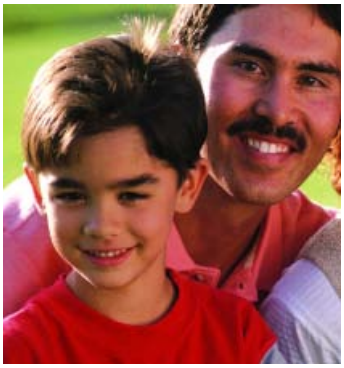
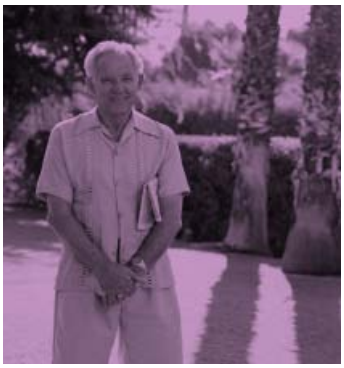
Evaluating Steroid Inhalers Used to Treat:

Asthma and Chronic Lung Disease

Comparing Effectiveness, Safety, and Price





Our Recommendations

Inhaled steroids are effective and safe medicines used to treat people with asthma and chronic obstructive pulmonary (lung) disease, or COPD. They reduce and can help prevent inflammation, swelling, and mucus build-up in airways and lungs. By doing so, they keep you breathing easier.

Not everyone with asthma or COPD needs an inhaled steroid. Sometimes, lifestyle adjustments (and especially quitting smoking) work well enough that you won't need one. On the other hand, far too many people who could benefit from an inhaled steroid are not using one of these medicines. If your asthma symptoms are persistent and you have frequent asthma attacks, you should be using an inhaled steroid.

Taking effectiveness, safety, dosing convenience, and cost into account, we have chosen the following steroid inhalers as *Consumer Reports Best Buy Drugs* for treating adult and childhood asthma and adult COPD:

- *Beclomethasone (QVAR) 80mcg* – for adults and children aged 5 and over with asthma
- *Budesonide (Pulmicort Turbuhaler) 200mcg* – for adults with asthma who may prefer a dry powder inhaler and for children with asthma aged 6 and over
- *Fluticasone (Flovent HFA) 110mcg* – for children with asthma aged 12 and over
- *Fluticasone (Flovent HFA) 220mcg* – for children aged 12 and over and adults with asthma, and adults with moderate to severe COPD
- *Mometasone (Asmanex Twisthaler) 220mcg* – for adults with asthma

All of these medicines at the specified doses are as effective and safe as other inhaled steroids, and well-priced compared to them. None are currently available as generics, so they can be pricey. For example, if you need a high dose – usually because your asthma or COPD is severe – the cost can be over $200 or even $300 a month. In this case, talking with your doctor about the most affordable inhaled steroid becomes even more important.

This report was last updated in April 2006.

Welcome

This report compares the effectiveness, safety, and cost of medicines called inhaled corticosteroids, or just inhaled steroids. These medicines are primarily used to treat people with asthma. But they also are prescribed for people with a condition called chronic obstructive pulmonary (lung) disease, or COPD.

Inhaled steroids are favored over steroid pills because they act directly on the airways. This enhances their effectiveness and lowers the risk of side effects.

This report is part of a Consumers Union and *Consumer Reports* project to help you find medicines that are safe and effective and give you the most value for your health care dollar. To learn more about the project, other drugs we've evaluated, and to get price updates, please visit www.CRBestBuyDrugs.org.

Asthma is a chronic disease that affects the tubes that carry the air you breathe (and most importantly the oxygen) into your lungs. People who have asthma have airways that are very sensitive to common allergens (such as pollen, dust mites, and animal dander) and irritants (such as certain chemicals, tobacco or wood smoke, and cold air). Strenuous exercise, respiratory illness (such as the flu), certain drugs, and stress can also trigger asthma attacks.

Not surprisingly, most people who have asthma also have underlying allergies. But the two conditions are distinct, and many people who suffer from common allergies (hay fever) don't have asthma. Allergies involve that mix of symptoms that includes nasal congestion, a runny nose, sneezing, itchy and watery eyes, and skin rashes. In contrast, asthma involves inflammation and narrowing of the airways in the lungs, and excessive mucus in the airways.

Specifically, during normal breathing, the bands of muscle surrounding your airways are relaxed. For people with asthma, exposures to allergens and irritants cause those muscles to spasm, constricting the airways and causing increased mucus production. Both of those factors make it more difficult for air to move in and out of the lungs. The resulting symptoms are wheezing (noisy breathing), coughing, shortness of breath, and a sensation of tightness in the chest. Those symptoms range from mild to severe and doctors often classify people with asthma according to the frequency and severity of their symptoms. (See Table 1 on page 4.)

The symptoms of COPD can be very similar to those of asthma. But while asthma strikes children and adults and is to a large degree a result of your generic inheritance, COPD is caused by progressive damage to your lungs over many years. Smoking is far and away the most common cause (though COPD can be caused as well by exposure over time – usually in the workplace – to chemical fumes or organic dusts, or air pollution).

With COPD, the airways and the sacs at the end of your airways lose their elasticity. There are two forms of COPD: emphysema and chronic bronchitis. With emphysema, the walls between the air sacs are eventually destroyed. In bronchitis, the airways are inflamed and swollen, often leading to recurrent infections and excessive sputum production. Many people with COPD have both emphysema and chronic bronchitis.

Both asthma and COPD are quite common, and – as a result – the medicines we evaluate in this report are used by millions of people everyday. About 20 million Americans have asthma. Over five million are children. The disease usually first appears in childhood but adults can also develop it. Symptoms

Table 1. Gradations of Asthma

Mild Intermittent	Your asthma comes and goes, with symptoms either during the day or night, occurring twice a week or less. In between, you have no symptoms and your lung function is normal.
Mild Persistent	You have symptoms more than twice a week, but not every day. Symptoms at night usually occur more than twice a month and asthma attacks might affect your activity.
Moderate Persistent	You have symptoms every day and/or you have night symptoms more than once a week. The attacks often affect your activity.
Severe Persistent	You have symptoms throughout the day, most days. Symptoms often come at night as well. Activity is limited.

Source: National Heart, Lung, and Blood Institute

Table 2. Stages of COPD

At Risk	Normal breathing test, but mild signs include chronic cough and sputum production.
Mild COPD	Mild airflow limitation on breathing test. Chronic cough and sputum production, but no awareness that breathing is limited.
Moderate COPD	Worsening airflow limitation on breathing test. Shortness of breath when working hard, walking fast, or during other brisk activities.
Severe COPD	Severe airflow limitation on breathing test. Shortness of breath after very little activity. Complications may include respiratory failure and heart failure.

Source: National Heart, Lung, and Blood Institute

and frequency of attacks often decline as a person ages. But asthma can be dangerous at any age and time. Each year, about two million people visit a hospital emergency room because of an asthma attack, and about 4,500 die.

At least 12 million adults have COPD. But it is widely under-diagnosed and experts believe that as many as 24 million people in the U.S. may have the condition. COPD directly causes or contributes to about 120,000 deaths per year, making it the fourth leading cause of death in the U.S.

Asthma and COPD differ in one important respect. Although asthma is a chronic disease, it is highly manageable. With the right treatment, most people with asthma lead normal active lives and their lives are not shortened by their disease. In contrast, COPD is an irreversible disease that often gets worse over time. It shortens the lives of most people who have it, sometimes by many years. But that does not mean that it is not treatable and that people with COPD – especially in the early stages – can not lead active, meaningful lives.

Six inhaled steroid medicines are available by prescription in the U.S. They are:

Generic Name	Brand Name(s)	Available as a Generic Drug?
Beclomethasone	QVAR	No
Budesonide	Pulmicort Turbuhaler	No
	Pulmicort Respules	No
Flunisolide	AeroBid, AeroBid-M	No
Fluticasone	Flovent	No
Mometasone	Asmanex Twisthaler	No
Triamcinolone	Azmacort	No

Other medicines and approaches are used to treat both asthma and COPD. In particular, people with either condition may have to use so-called "quick relief" inhalers. This is a class of medicines used primarily when a person is in the middle of an asthma or COPD attack, when breathing is very difficult. The drugs act rapidly – within minutes – to open breathing passages, and provide relief for up to six hours. They are only used when you are having an attack, and not – like inhaled steroids – everyday to keep symptoms and attacks at bay and your airways open.

Among the quick-acting relievers (also called bronchodilators) are albuterol (Ventolin, Proventil), bitolterol (Tornalate), metaproterenol (Alupent), and pirbuterol (Maxair).

Two longer-acting non-steroid bronchodilators are also available. One is salmeterol (Serevent) and the other is formoterol (Foradil). Also, two other

drugs combine these long-acting relievers with inhaled steroids. One is Advair (a combination of salmeterol and fluticasone) and the other is Symbicort (a combination of budesonide and formoterol). Symbicort is not yet available in the U.S.

Important safety and risk issues have been raised in the last several years about the long-acting bronchodilators. Some studies have linked them to a higher risk of death during asthma attacks, although a cause and effect relationship has not yet been confirmed. For this reason, the FDA in November 2005 issued an advisory saying that the long-acting bronchodilators and the combination drugs should *only be used in people whose asthma is not adequately controlled by inhaled steroids alone.*

Advair has been widely advertised to consumers. If your doctor has prescribed Advair, we would urge you to discuss with him or her the safety issues that have been raised about this medicine.

Some nonprescription quick-acting relievers are also available. Two common ones are Bronkaid and Primatene Mist. These drugs may be useful to some people with mild asthma but *they should not be taken at all by people with diabetes, thyroid or heart disease, or high blood pressure. And they should not be used by people with COPD.* If you are taking one of these over-the-counter medicines on a regular basis, you should talk with your doctor. They are not meant to be taken for a long period of time. And if you require that much help, it means your asthma or COPD requires more serious medical attention.

One other inhaled medicine is sometimes used to treat asthma. It's called cromolyn (Intal). A recent analysis of the scientific evidence found that inhaled steroids provided significantly better control of attacks and symptoms than cromolyn.

People with asthma or COPD may also take pills to help relieve their symptoms. For example, if you have asthma your doctor may prescribe a drug called montelukast (Singulair) or one called zafirlukast (Accolate). There's pretty good evidence these drugs work, but they are not considered to be as effective as inhaled steroids at reducing the severity of symptoms or the frequency of asthma attacks (the exception may be in obese people).

If you have COPD, you doctor may prescribe an older drug called theophylline (Theo-24, Uniphyl) or an oral steroid (such as prednisone, prednisolone or methylprednisolone.) The evidence supporting use of theophylline or steroid pills in people who have COPD is not particularly strong, but these medicines may help certain people.

Lifestyle Changes and Non-Drug Treatment

Your physician is very likely to talk with you about ways to prevent asthma attacks or to reduce their frequency. Likewise, people with COPD can make changes that will reduce their breathing difficulties and slow the progression of their disease.

Experts agree that non-drug approaches can significantly improve your quality of life and reduce breathing difficulties if you have asthma or COPD.

Most importantly, if you have either of these conditions and you smoke cigarettes, you will be strongly urged to quit. Your insurance may pay for medications to help you quit, and/or a smoking cessation program. If you have asthma, you should find out what your asthma "triggers" are and avoid them. If you have COPD, a pulmonary rehab program at your local hospital may help.

You may also be advised to use an air conditioner and dehumidifier to reduce exposure to airborne irritants like pollen. Both can help keep humidity down, which lowers the threat of mold and mites, common allergens that trigger asthma. You may also be told to clean frequently to reduce dust accumulation, and to avoid pets. Since cold air can spark asthma, wearing a scarf over your nose and mouth in the winter is a good idea.

Exercise can be helpful. Because it can trigger an attack if too strenuous, however, your doctor will advise you to increase your activity level gradually to strengthen your heart and lungs, and use less oxygen. People with asthma should take their quick-acting inhaler medicine before exercise.

People with COPD are usually strongly urged to get a flu shot every year and be sure they are up to date on the pneumonia vaccine.

Many people try alternative therapies for asthma, such as changing their diet, taking herbs or vitamins, homeopathic remedies, or receiving acupuncture. Very little research has been done on these treatments but most studies have found them ineffective. Some – such as herbal ephedra – can be dangerous. The FDA has now banned ephedra.

To recap, there are three main categories of inhaled asthma and COPD drugs, which are the medicines most used to treat these conditions. They are:

- *The steroid anti-inflammatories, also called preventers or long-term control medicines*
- *The fast-acting bronchodilators, also called relievers or rescue drugs*
- *Combination drugs, which combine a steroid anti-inflammatory and a bronchodilator*

This report focuses on the steroid anti-inflammatory preventers. In addition, there are three main types of inhalers – the metered dose inhalers, also known as "puffers;" the dry powder inhalers; and the nebulizers, which are used mostly for children. Your doctor can explain the differences and the pros and cons of each. It is very important that you learn to use your inhaler properly. Studies have shown that many people don't learn this and, as a result, don't get optimal asthma control.

This report was last updated in April 2006.

What Are Inhaled Steroids and Who Needs Them?

Inhaled steroids reduce and prevent inflammation, swelling, and mucus build-up in your airways and lungs. By doing so, they help prevent asthma attacks and keep you breathing easier, allowing the proper amount of oxygen to get into your lungs and then your bloodstream.

Not everyone with asthma or COPD needs an inhaled steroid drug, or for that matter any medicine to help them breathe. Sometimes, prevention (especially quitting smoking) and lifestyle adjustments work well enough that you won't need to take a medicine. But most people with these conditions – including children with asthma – probably will need some kind of medicine, and an inhaled steroid drug in particular.

If you or your child have persistent asthma, your doctor is very likely to prescribe an inhaled steroid. Persistent means you have attacks or symptoms more than twice a week, or attacks that interfere with normal activity. Even if the attacks or symptoms are mild, your doctor is likely to advise that you try to prevent them by using an inhaled steroid.

If you have only intermittent and/or mild attacks that don't really interfere with leading a normal life, your doctor may suggest you try to control the symptoms with a fast-acting reliever as needed and not take an inhaled steroid unless your symptoms worsen. One sign of that would be if you find that you are using your quick-relief inhaler more than three or four times a week.

Children usually need lower doses of all asthma drugs. It's important therefore to know the dose of an inhaled steroid that is right for your child. Notably, recent studies show that inhaled steroids do not actually affect the underlying disease in children. Asthma persists despite treatment, though symptoms are reduced. Most importantly, when treatment is stopped, symptoms can worsen.

Regular use of inhaled steroids by people with COPD (and especially those with emphysema) is more controversial than use by people with asthma. There is simply less evidence that the drugs provide enough of a benefit for people with COPD. In addition, the FDA has not specifically approved treatment with inhaled steroids for COPD. Still, studies indicate that these medicines help many people with COPD – yielding better health status overall and fewer attacks of mucus build-up and labored breathing.

If you have mild COPD, your doctor may discourage regular use of an inhaled steroid. If you have moder-

Steroids? Aren't They Dangerous?

The inhaled steroids used to treat asthma and COPD are not the same as the anabolic steroids that athletes take to enhance performance or strength. So you don't need to worry that the drugs will cause the side effects linked to anabolic steroids.

You may also have heard that taking steroids can stunt your child's growth. Recent long-term studies show that inhaled steroids can slow growth in children in the first year of treatment but their final adult height is not affected. Your child's growth can be stunted if their asthma is poorly controlled. So, effectively, your child probably has a greater chance of not reaching their full potential height if they *don't* use a steroid inhaler than if they do.

Likewise, there's no evidence that inhaled steroids can affect your behavior or make you more aggressive. Again, aggressive behavior has been linked to anabolic steroids but not to the steroids used in inhaled medicines for asthma or COPD.

All that said, doctors advise that children always use the lowest dose of inhaled steroids that helps them.

At the other end of the age spectrum, inhaled steroids have been linked in some studies to an increased risk of osteoporosis, or weakening of the bones. But experts continue to debate whether this research is valid and many studies have found no link between using inhaled steroids and loss of bone density or a higher risk of bone fractures.

Still, if you are over 50 and use inhaled steroids, you may want to take calcium and vitamin D supplements and have occasional bone density measurements as a precaution.

Possible Side Effects of Inhaled Steroids

Relatively Minor:
Usually go away in time or are short-lived

- Mouth or throat irritation
- Mouth or throat infection
- Cough
- Hoarseness, sore throat
- Headache
- Nausea or vomiting

Not so Minor:
These are quite rare but can be dangerous

- Eye problems (associated with very high doses)
- Thinning of skin
- Bruising
- Bone thinning

ate to severe COPD, however, your doctor could advise trying one for several months to see if it helps. He or she may also prescribe a short-acting relief medicine, and well as other drugs.

Correct Diagnosis is Important

Diagnosing asthma and COPD is pretty straightforward. Your doctor will first want to rule out other causes of your symptoms and then assess how severely you are affected. That will in turn determine your treatment, including the drugs you may need.

In addition to questions about your medical history, symptoms, and lifestyle habits, you will likely undergo tests of your lung function. For example, a spirometry test measures lung capacity by assessing how much and how fast you can blow air out of your lungs after you take a deep breath. During the test, the doctor may also give you an inhaled bronchodilator to see if it helps your lungs function better. If it does, that's an indication that you have asthma.

To diagnose COPD, in addition to the spirometry test, your doctor may order a chest X-ray and others tests that will measure the oxygen and carbon dioxide levels in your blood and other aspects of your lung function.

If you are an adult who never suffered from asthma or allergies – and you are not a smoker – a doctor will want to determine if your symptoms are the result of other causes. It's uncommon, but non-smokers do develop COPD.

Side Effects

Like most medicines, the inhaled steroids can cause side effects. The most common are mouth and throat irritation, cough, and hoarseness. These side effects are quite common but are usually minor and tolerable. Rarer are mouth or throat infections, which can be prevented by using a spacer device and thoroughly rinsing your mouth with water after each inhaler use.

One inhaled corticosteroid, triamcinolone (Azmacort), carries a special "black box" warning. The FDA added the warning to make physicians aware that it can be dangerous to switch patients who have been on large doses of oral steroids to triamcinolone (or possibly any inhaled steroid). In some rare cases, patients who have been switched have died due to a condition called adrenal insufficiency. Make sure to tell your doctor if you've been taking steroid pills.

Finally, if you are pregnant and have asthma you should continue to take your inhaled steroid. If your asthma is not well controlled, the oxygen level in your blood may be lower and your baby would also be getting less oxygen.

Choosing an Inhaled Steroid – Our *Best Buy* Picks

For the treatment of asthma, the effectiveness of the six inhaled steroids we evaluate is quite similar. Each reduces symptoms and prevents attacks by roughly the same amount, and none have been shown to be consistently better than the others in treating asthma in adults or children, based on the results of 24 studies and one large-scale review.

Notably, the inhaled steroids differ with respect to their use in children. Because of each drug's unique properties and potency and the populations in which they were studied, not all of the inhaled steroids can or should be used in children of all ages. Table 3 on this page and Table 5 on page 13 present this information.

The effectiveness of the inhaled steroids in treating COPD is not as clear cut. Fewer studies have compared the drugs in treating COPD and those that have are not definitive. Nevertheless, several studies indicate that two inhaled steroids – budesonide (Pulmicort Turbuhaler) and fluticasone (Flovent HFA) have benefited people with moderate to severe COPD, but not people with mild COPD. Table 3 presents information on the effectiveness of the inhaled steroids in people with COPD.

Of course, as with all medicines, you may respond better to one inhaled steroid than another, or experience fewer side effects with one. Only trying the medicines can determine this, and you and your doctor will be able to assess whether you are responding well or not.

The inhaled steroid drugs differ in their convenience of use, the inhaler device in which they are packaged, and their cost. Indeed, inhaled steroids come in a variety of doses and preparations – which is both an advantage and a burden in terms of choice. Your doctor and pharmacist can help guide you, but the more you know about your preferences the better off you'll be.

First, the strength and potency of each medicine is different. That means that the dose you may need

Table 3. The Effectiveness of Inhaled Steroids for Asthma and COPD

Generic Name (Brand Name)	Effective for Asthma Prevention in Adults	Effective for Asthma Prevention in Children	Effective for Mild COPD	Effective for Moderate to Severe COPD
Beclomethasone (QVAR)	Yes	Yes, in children 5 years and older	No evidence available	No evidence available
Budesonide (Pulmicort Turbuhaler)	Yes	Yes, in children 6 year and older	Probably not	Yes
Budesonide (Pulmicort Respules)[1]	No	Yes, in children 1 year and older	Probably not	No evidence available
Flunisolide (AeroBid)	Yes	Yes, in children 6 years and older	No evidence available	No evidence available
Fluticasone (Flovent HFA)	Yes	Yes, in children 12 years and older	Probably not	Yes
Mometasone (Asmanex Twisthaler)	Yes	Yes, in children 12 years and older	No evidence available	No evidence available
Triamcinolone (Azmacort)	Yes	Yes, in children 6 years and older	Probably not	No evidence available

1. This drug is packaged in a nebulizer, an alternative type of inhaler.

and the number of puffs you may have to take each day could vary quite widely from drug to drug.

For instance, triamcinolone (Azmacort) has a relatively low potency and, depending on the severity of your condition, it could take 7 to 25 puffs per day to get the required dose. By comparison, mometasone (Asmanex), which is more potent, requires only 1 to 3 puffs per day for an adult. (See Table 4 on page 12.)

For someone who needs a relatively high dose, a drug that requires you to take many puffs per day is inconvenient and may lower the benefit they can get from the drug.

Second, inhaler devices differ. You may prefer one over another. Your doctor may also. Two of the drugs, budesonide (Pulmicort Turbuhaler) and mometasone (Asmanex Twisthaler), are available in so-called dry powder inhalers rather than in metered dose inhalers.

Cost is the third criteria to consider in your choice of an inhaled steroid, especially if you are paying out of your own pocket but even if your drug costs are covered by insurance. Your insurer may have chosen one of the inhaled steroids as a preferred drug, which lowers the cost to them but to you as well. Unless your doctor advises a particular inhaled steroid for clinical or convenience reasons, you or your child may be best off using the one your health plan prefers if it will cost you less.

Tables 4 and 5 on pages 12 and 13 present the list of inhaled steroids, the dose strength options for each, the number of puffs you have to take depending on need and severity of your illness, and the average monthly cost of each drug at various typical uses. The dose calculations are based on information from the National Asthma Education and Prevention Program Expert Panel.

These tables should help you and your doctor make an appropriate choice. Taking effectiveness, safety, dosing convenience, and cost into account, we have chosen the following steroid inhalers as *Consumer Reports Best Buy Drugs* for treating adult and childhood asthma and adult COPD:

- *Beclomethasone (QVAR) 80mcg – for adults and children aged 5 and over with asthma*

- *Budesonide (Pulmicort Turbuhaler) 200mcg – for adults with asthma who may prefer a dry powder inhaler and for children with asthma aged 6 and over*
- *Fluticasone (Flovent HFA) 110mcg – for children with asthma aged 12 and over*
- *Fluticasone (Flovent HFA) 220mcg – for children aged 12 and over and adults with asthma, and for adults with moderate to severe COPD*
- *Mometasone (Asmanex Twisthaler) 220mcg – for adults with asthma*

As you can see in Tables 4 and 5, all four medicines at the specified doses are well priced at the low and medium number of puffs needed per day, which are the most common ones. In addition, at these doses, low- and medium-level use requires fewer puffs per day. That assures better compliance and control of your symptoms over time.

As you can also see in the tables, if you need a low or medium amount of inhaled steroid, the cost is not too excessive – though it is not trivial. However, if you need a high dose – usually because your asthma or COPD is severe – the cost can be quite steep, over $200 or $300 a month. For some of the inhaled steroids for children, the cost is even higher. If you need this amount of any of a steroid inhaler, talking with your doctor about the most afforable one becomes even more important.

Table 4. Inhaled Steroid Choices and Cost Comparison – Adults

Generic Name and Stength	Brand Name	Use[1]	Puffs Per Day[2]	Average Monthly Cost[3]
Beclomethasone 40mcg	QVAR	Low	4	$87
		Medium	9	$196
		High[4]	16	$349
CR BEST BUY Beclomethasone 80mcg	QVAR	Low	2	$51
		Medium	4 to 5	$115
		High[4]	8	$204
CR BEST BUY Budesonide 200mcg	Pulmicort Turbuhaler	Low	2	$60
		Medium	4 to 5	$136
		High[4]	8	$241
Flunisolide 250mcg	AeroBid	Low	3	$86
		Medium	6	$172
		High[4]	11	$316
Flunisolide 250mcg	AeroBid-M (menthol flavored)	Low	3	$82
		Medium	6	$164
		High[4]	11	$302
Fluticasone 44mcg	Flovent HFA	Low	4	$92
		Medium	10 to 11	$241
		High[4]	19	$436
Fluticasone 110mcg	Flovent HFA	Low	1 to 2	$45
		Medium	4	$119
		High[4]	8	$239
CR BEST BUY Fluticasone 220mcg	Flovent HFA	Low	1	$46
		Medium	2	$92
		High[4]	4	$184
Mometasone 220mcg (30 puffs per inhaler)[5]	Asmanex Twisthaler	Low	1	$122
		Medium	2	$244
		High[4]	3	$366
Mometasone 220mcg (60 puffs per inhaler)[5]	Asmanex Twisthaler	Low	1	$61
		Medium	2	$121
		High[4]	3	$182
CR BEST BUY Mometasone 220mcg (120 puffs per inhaler)[5]	Asmanex Twisthaler	Low	1	$41
		Medium	2	$82
		High[4]	3	$124
Triamcinolone 100mcg	Azmacort	Low	7	$100
		Medium	15	$214
		High[4]	25	$357

1. The range of low to high use is from the National Asthma Education and Prevention Program (NAEPP) Expert Panel. We use the mid-point of low and medium dosing ranges and an approximation of a reasonable dose in the high dosing range to further classify the number of puffs per day and average monthly cost.
2. The number of puffs per day reflects the mid-point or a reasonable estimate based on the NAEPP dosing categories.
3. Prices reflect nationwide retail average for December 2005, rounded to the nearest dollar. This information is derived by *Consumer Reports Best Buy Drugs* from data provided by Wolters Kluwer Health, Pharmaceutical Audit Suite.
4. This dosing exceeds the manufacturer's highest recommend dose, but is consistent with the NAEPP Expert Panel's classification of a high dose.
5. This drug comes in an inhaler programmed to deliver a specified number of puffs.

Table 5. Inhaled Steroid Choices and Cost Comparison – Children

Generic Name and Strength (Approved Ages)[1]	Brand Name	Dose[2]	Puffs Per Day[3]	Average Monthly Cost[4]
Beclomethasone 40mcg (≥ 5 years)	QVAR	Low	3	$65
		Medium	6	$131
		High[6]	11	$240
CR BEST BUY Beclomethasone 80mcg (≥ 5 years)	QVAR	Low	1 to 2	$38
		Medium	3	$76
		High[6]	5 to 6	$140
CR BEST BUY Budesonide 200mcg (≥ 6 years)	Pulmicort Turbuhaler	Low	1 to 2	$45
		Medium	3	$90
		High[6]	5 to 6	$166
Budesonide 0.25mg/2ml (1-8 years)	Pulmicort Respules[5]	Low	2	$376
		Medium	4	$752
		High[6]	8	$1504
Budesonide 0.5mg/2ml (1-8 years)	Pulmicort Respules[5]	Low	1	$197
		Medium	2	$394
		High[6]	4	$789
Flunisolide 250mcg (≥ 6 years)	AeroBid	Low	2 to 3	$72
		Medium	4 to 5	$129
		High[6]	7 to 8	$215
Flunisolide 250mcg (≥ 6 years)	AeroBid-M (menthol flavored)	Low	2 to 3	$69
		Medium	4 to 5	$123
		High[6]	7 to 8	$206
Fluticasone 44mcg (≥ 12 years)	Flovent HFA	Low	3	$69
		Medium	7	$161
		High[6]	13	$298
CR BEST BUY Fluticasone 110mcg (≥ 12 years)	Flovent HFA	Low	1	$30
		Medium	2 to 3	$75
		High[6]	7	$209
CR BEST BUY Fluticasone 220mcg (≥ 12 years)	Flovent HFA	Low	-	-
		Medium	1 to 2	$69
		High[6]	3	$138
Triamcinolone 100mcg (≥ 6 years)	Azmacort	Low	6	$86
		Medium	10	$126
		High[6]	18	$228

1. Ages approved by the Food and Drug Administration.
2. The range of low to high use is from the National Asthma Education and Prevention Program (NAEPP) Expert Panel. We use the mid-point of low and medium dosing ranges and an approximation of a reasonable dose in the high dosing range to further classify the number of puffs per day and average monthly cost.
3. The number of puffs per day reflects the mid-point or a reasonable estimate for the NAEPP dosing categories.
4. Prices reflect nationwide retail average for December 2005, rounded to the nearest dollar. This information is derived by *Consumer Reports Best Buy Drugs* from data provided by Wolters Kluwer Health, Pharmaceutical Audit Suite.
5. This drug is packaged in a nebulizer, an alternative type of inhaler.
6. This dosing exceeds the manufacturer's highest recommend dose, but is consistent with the NAEPP Expert Panel's classification of a high dose.

The Evidence

This section presents more information on the effectiveness and safety of inhaled steroids.

This report is based on an analysis of the scientific evidence on inhaled steroids. Overall, 1,286 studies and research articles were screened. From these, the analysis focused on 78 studies and the following criteria:

- Improvement in symptoms
- Reduction in attacks
- Reduction in the need for short-acting medications or oral steroids
- Improvement in lung function
- Improvement in quality of life

Overall, inhaled steroids work well in reducing asthma symptoms and preventing asthma attacks, based on these measures.

All six inhaled steroids have been compared to each other, and the evidence to date is not conclusive on whether any one is more or less effective than the others. Specifically, the drugs have been pitted against each other in 24 trials and one large overview of the literature, called a systematic review. Most of the studies found no differences in people taking one drug versus another.

Some studies found statistically significant differences for some of the above criteria. When there was a difference, fluticasone (Flovent) was usually found to be somewhat more effective. But in some of these studies, Flovent was given in a stronger dose.

There is less data available on the effectiveness of inhaled corticosteroids for COPD. Some studies have been conducted with budesonide (Pulmicort) and fluticasone (Flovent) that show these drugs are useful.

In the studies that have been done in people with COPD, inhaled steroids have helped reduce sudden worsening of symptoms (called exacerbations), but only in people with moderate to severe COPD. In people with the mild, early form of COPD, inhaled steroid treatment does not appear to slow progression of the disease or reduce sysmptoms.

Drug Interactions

Inhaled steroids are generally safe and have few known interactions with other drugs or dietary supplements. But even so, be sure to tell your doctor about all other medications you take.

Also, seniors with asthma need special attention. Some high blood pressure and glaucoma medications or aspirin can interfere with asthma drugs or possibly cause asthma attacks.

Age, Race, Gender, and Other Conditions

The effectiveness of inhaled steroids in treating asthma does not appear to differ based on age, gender, or race, or in patients who have other diseases.

Most of the studies conducted in people with COPD have been in older patients. So their effect on COPD in younger people (under age 60) is unknown.

In five asthma studies in children and teens that compared inhaled steroids, the effectiveness was the same as in adults. There have been no studies in children younger than 6 months old. Most studies conducted in younger children – under age four – only compared budesonide to placebo, so there is little data on other inhaled steroids in young children. Budesonide is the only inhaled steroid that has been proven effective in children younger than five.

Inhaled steroids do present some risks during pregnancy, but the beneficial effects are believed to outweigh potential harms. Poorly controlled asthma during pregnancy has been associated with higher rates of premature birth, lower birth weight, and perinatal death. Proper use of inhaled steroids is thought to reduce the potential for these events.

Talking With Your Doctor

It's important for you to know that the information we present here is not meant to substitute for a doctor's judgment. But we hope it will help your doctor and you arrive at a decision about whether you need an inhaled steroid and, if so, which one is best for you.

Bear in mind that many people are reluctant to discuss the cost of medicines with their doctors and that studies show doctors do not routinely take price into account when prescribing medicines. Unless you bring it up, your doctors may assume that cost is not a factor for you.

Many people (including many physicians) also believe that newer drugs are always or almost always better. While that's a natural assumption to make, the fact is that it's not true. Studies consistently show that many older medicines are as good as, and in some cases better than, newer medicines. Think of them as "tried and true," particularly when it comes to their safety record. Newer drugs have not yet met the test of time, and unexpected problems can and do crop up once they hit the market.

Of course, some newer prescription drugs are indeed more effective and safer. Talk with your doctor about the pluses and minuses of newer versus older medicines, including generic drugs.

Prescription medicines go "generic" when a company's patents on a drug lapse, usually after about 12 to 15 years. At that point, other companies can make and sell the drug.

Generics are almost always much less expensive than newer brand name medicines, but they are not lesser quality drugs. Indeed, most generics remain useful medicines even many years after first being marketed. That is why today about half of all prescriptions in the U.S. are for generics.

Another important issue to talk with your doctor about is keeping a record of the drugs you are taking. There are several reasons for this:

- First, if you see several doctors, they may not always tell each other which drugs have been prescribed for you.
- Second, it is very common for doctors today to prescribe several medicines for you before finding one that works well or best, mostly because people vary in their response to prescription drugs.
- Third, more and more people today take several prescription medications, nonprescription drugs and supplements all at the same time. Many of these interact in ways that can be very dangerous.
- And fourth, the names of prescription drugs—both generic and brand—are often hard to pronounce and remember.

For all these reasons, it's important to keep a list of the drugs you are taking, both prescription and nonprescription and including dietary supplements.

Always be sure, too, that you understand the dose of the medicine being prescribed for you and how many pills you are expected to take each day. Your doctor should tell you this information. When you fill a prescription at the pharmacy, or if you get it by mail, you may want to check to see that the dose and the number of pills per day on the pill bottle match the amounts that your doctor told you.

How We Picked the *Best Buy* Drugs

Our evaluation is primarily based on an independent scientific review of the evidence on the effectiveness, safety, and adverse effects of the inhaled steroids. A team of physicians and researchers at Oregon Health & Science University Evidence-based Practice Center conducted the analysis as part of the Drug Effectiveness Review Project, or DERP. DERP is a first-of-its-kind 14-state initiative to evaluate the comparative effectiveness and safety of hundreds of prescription drugs.

A synopsis of DERP's analysis of the inhaled steroids forms the basis for this report. A consultant to *Consumer Reports Best Buy Drugs* is also a member of the Oregon-based research team, which has no financial interest in any pharmaceutical company or product.

The full DERP review of the inhaled steroids is available at http://www.ohsu.edu/drugeffectivness/reports/final.cfm. (This is a long and technical document written for physicians.)

Our analysis also relied on information about treatments for asthma and COPD presented by *Consumer Reports Medical Guide* (www.medicalguide.org). *Consumer Reports Medical Guide* is a new subscription Web site sponsored by Consumers Union and *Consumer Reports* magazine. It evaluates treatment options for over 100 conditions and illnesses. In addition, we used other resources, especially those of the National Heart, Lung, and Blood Institute of the National Institutes of Health.

The drug costs we cite were obtained from a health-care information company which tracks the sales of prescription drugs in the U.S. Prices for a drug can vary quite widely, even within a single city or town. All the prices in this report are national averages based on sales of prescription drugs in retail outlets. They reflect the cash price paid for a month's supply of each drug in December 2005.

Consumers Union and *Consumer Reports* selected the *Best Buys* using the following criteria. The drug had to:

- Be approved by the FDA for treating asthma
- Be as effective as other inhaled steroids
- Have a safety record equal to or better than other inhaled steroids
- Have an average price for a 30-day supply that was not higher than the other inhaled steroids

The *Consumers Reports Best Buy Drugs* methodology is described in more detail in the Methods section at www.CRBestBuyDrugs.org.

About Us

Consumers Union, publisher of *Consumer Reports* magazine, is an independent and non-profit organization whose mission since 1936 has been to provide consumers with unbiased information on goods and services and to create a fair marketplace. It is solely responsible for the content of this report. Its main Web sites are www.consumersunion.org and www.consumerreports.org.

Consumer Reports Best Buy Drugs is a public education project administered by Consumers Union. Two outside sources of generous funding made the project possible. They are a major grant from the Engelberg Foundation, a private philanthropy, and a supporting grant from the National Library of Medicine, part of the National Institutes of Health. A more detailed explanation of the project is available at www.CRBestBuyDrugs.org.

We followed a rigorous editorial process to ensure that the information in this report and on the *Consumer Reports Best Buy Drugs* Web site is accurate and describes generally accepted clinical practices. If we find, or are alerted to, an error we will correct this as soon as possible. However, *Consumer Reports* and its authors, editors, publishers, licensors and any suppliers cannot be responsible for medical errors or omissions, or any consequences from the use of the information on this site. Please refer to our user agreement at www.CRBestBuyDrugs.org for further information.

Consumer Reports Best Buy Drugs should not be viewed as a substitute for a consultation with a medical or health professional. This report and the information on www.CRBestBuyDrugs.org are provided to enhance communication with your doctor rather than to replace it.

Sharing this Report

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