UNIVERSITY STUDENT HEALTH SERVICES • Fact Sheet

ASTHMA

WHAT IS ASTHMA?

Asthma is a chronic inflammatory disease of the lungs, where the airways are extra sensitive to certain stimuli, such as airborne allergens, exercise, and cold air. Most adults with asthma have allergies that aggravate symptoms. Classic asthma symptoms include <u>cough</u>, <u>wheezing</u>, <u>chest tightness</u>, <u>and/or</u> <u>shortness of breath</u>.

WHAT HAPPENS DURING AN ATTACK?

During an asthma attack, symptoms increase above baseline and interfere with normal activities. Exposure to a characteristic trigger activates two primary physiologic responses, bronchospasm and inflammation of the airways, which leads to symptoms that can build up over a few days or start suddenly:

- <u>Bronchospasm</u> refers to the tightening of smooth muscle within the small airways that causes narrowing of the airways.
- Inflammation causes the lining of the airways to swell and secrete more mucus, which further obstructs the airways.

HOW CAN I CONTROL MY ASTHMA?

- Identifying and avoiding asthma triggers are key components to asthma management. It's also
 important to anticipate triggers and take preventative steps (eg. take allergy medication before an
 exposure) when possible.
- <u>Take your asthma medication(s)</u> as prescribed by your healthcare provider. It is important to know the difference between rescue and controller medications and when and how to use them.
- <u>Monitor your symptoms</u> and use the <u>"Rules of Two"</u> to help you recognize when you may be getting into trouble. An <u>asthma action plan</u> is commonly used to provide written instructions about when to step up treatment, call your doctor, and/or seek emergency care.
- Stay up-to-date with vaccines!
 - <u>Get your flu vaccine yearly</u>. Patients with asthma are at higher risk for complications from the flu, including pneumonia and even death. Flu season typically runs from November to March. Free flu vaccine is usually available at Student Health by mid-October of each year.
 - It is also strongly recommended to stay up-to-date with the latest COVID-19 vaccine.
- See your medical provider regularly.
 - For well-controlled asthma, you may only need to be seen once or twice a year.
 - More frequent visits will be necessary for persistent or worsening symptoms. Once symptoms are controlled for at least 3-6 months, your medical provider will work with you to simplify your treatment regimen and decrease the number of medications needed to keep your lungs healthy.

ASTHMA TRIGGERS

Each person with asthma reacts to a different set of triggers. Identifying your own triggers is a major step toward learning to control your asthma.

Common triggers include:

- <u>Allergens</u>, such as pollen, dust, mold, cockroaches, feathers, and animal dander (small scales from animal hair or feathers).
 - Foods, food dyes, and sulfites (a preservative found in red wine, beer, dried fruit, processed potatoes, sauerkraut, and dehydrated soups) are less common triggers and usually present simultaneously with other allergy symptoms (stomach upset, hives, etc).
- Irritants in the air, such as dirt, air pollution, smoke, gases, perfumes, and other odors.
- Respiratory infections, such as the common cold, flu, and Covid-19.
- Physical exertion, such as running or carrying heaving loads.
- Weather, such as extreme heat or cold, high humidity, and sudden changes in weather.
- <u>GERD</u> (gastroesophageal reflux disease) or heartburn, where stomach acid backs up into the esophagus.
- <u>Medications</u>, such as aspirin or related drugs (eg. ibuprofen, naproxen), some blood pressure medications (beta blockers), and some drugs used to treat glaucoma.
- Emotional stress, such as excessive fear or excitement.

EXERCISE-INDUCED BRONCHOSPASM (EIB)

A smaller percentage of asthma sufferers are not affected by allergens. Instead, they experience asthma symptoms only during physical exercise.

- Symptoms generally peak 10-15 minutes after starting exercise and resolve 30-60 minutes after stopping the activity.
- Treatment options include:
 - Taking a fast-acting bronchodilator, such as albuterol or Symbicort, 5-15 minutes before exercise.
 - An alternative option is to take Singulair (montelukast) by mouth at least 2 hours before exercise; however, you should always carry a rescue inhaler with you in case symptoms develop.
- Other preventative measures include:
- Avoiding exercise in cold or dry air, which can intensify symptoms.
- Starting new exercise regimens slowly.
- Warming up gradually at the beginning of each exercise session.

MANAGING TRIGGERS

♦Pollen & Mold

- During allergy season, stay indoors, keep windows closed, and use air conditioning when possible. Start preventative treatment (eg. allergy medication, controller inhaler, etc) prior to the start of the season, and continue through the season.
- Consider staying indoors for a few hours after a thunderstorm, which can cause pollen grains to burst.
- If pollen/mold counts are high, bathe after being outside to wash away allergens. If needed, cleanse your nasal passages with saline sprays or rinses.
- Close your windows and use the air conditioner when it's hot outside.
- Change the filter on your heating and cooling systems frequently.
- Fix leaky plumbing or clogged drains.
- Remove house plants.
- Keep mold under control by cleaning and airing out bathrooms, kitchens, and basements often.
- Keep humidity in your home under 50% with an air conditioner or dehumidifier. Inexpensive humidity monitors can be purchased at hardware stores.

♦ Dust Mites

- The highest concentration of dust mites is in mattresses. To decrease exposure:
 - Use airtight dust-proof covers on mattresses and pillows. Note that cotton covers are not effective in containing dust mites.
- Wash bed linen weekly in hot water and dry on a hot setting.
- Minimize the number of items that catch dust, especially in the bedroom. This includes carpets, rugs, drapes, upholstered items, stuffed animals, dried flowers, small knick-knacks, etc.
- Vacuum carpets, rugs, and upholstery once a week. Mop or vacuum instead of sweeping with a broom to avoid aerosolizing dust particles.
- Clean the blinds regularly.
- Use a damp cloth weekly to wipe down surfaces where dust can collect (shelves, windowsills, etc).
- Control humidity. Mites love humidity, so avoid the use of humidifiers. Open your windows in dry climates, and use air conditioning in humid ones.

*Animals

- Consider pets without feathers or fur, as they are less likely to cause allergies.
- If you are allergic to your pet, the most effective option is to remove the pet from the home (keep it outside/in the garage, or find it a new home), then clean your home thoroughly. Cat allergens are especially "sticky", so it may take months for levels to drop and symptoms to improve.
- If you cannot remove your pet from your home,
 - Use an air filter with a HEPA filter to remove allergens from the air. However, this may only be partially helpful since most animal allergens are not floating in the air.
 - Remove rugs, curtains, and upholstered furniture to limit areas where allergens can build up.
 - Clean weekly with a vacuum that has a HEPA filter.
 - It may be helpful to wash your dog every 2 weeks; bathing a cat, however, is unlikely to be helpful.
 - Allergy shots (desensitization) may be an option if you have health insurance.
- If you will be visiting someone who has a pet that you are allergic to, take allergy medication ahead of time and/or meet in a neutral "no pet" location.

*Air Pollution

- Use the EPA's Air Quality Index (AQI) to determine when pollution is high. An AQI over 100 (code orange) indicates unhealthy air conditions for sensitive groups, like asthmatics.
- Avoid outside activity when air pollution levels are high.
- If you must be outside, limit activities to the early morning or after sunset.

Smoking

Avoid smoking, vaping, and JUULing, as well as inhaling second-hand smoke from these products. ♦ Respiratory Illnesses

- Reduce your exposure by frequent hand washing & avoiding close contact with people who are sick.
- Stav up-to-date with flu and Covid-19 vaccines.
- Call your medical provider at the first sign of an infection.

A Note about Air Filters: Studies have shown mixed results regarding the effectiveness of air filters in improving asthma symptoms.

- Air filters with HEPA filters are preferred. Avoid air filters that produce ozone (eq. ionizers).
- Air filters are effective in removing allergens that are light and airborne, such as pollen and pet dander. However, far more allergens are present in other reservoirs that will continuously release allergens into the air. Therefore, air filters are less likely to be effective in rooms containing such reservoirs, like rugs, curtains, upholstery, pets, access to outside air, etc.

MONITORING YOUR ASTHMA

It is important to know when asthma is considered uncontrolled (the "Rules of Two"), as well as your own pattern of symptoms and early warning signs, so you can take action before symptoms become severe. Another useful tool is periodically checking your lung function at home with a peak flow meter.

♦ KNOW THE "RULES OF TWO"!

The "Rules of Two" helps you know when you might be getting into trouble. Your asthma may NOT be well-controlled if you:

- Have daytime symptoms more than 2 times a week.
- Need to use your rescue inhaler more than 2 times a week (not counting before exercise).
- Have nighttime symptoms more than 2 times a month.
- Use <u>2 albuterol canisters a month</u>. (Ideally, you should be using no more than 2 albuterol canisters a year!)

If any of these apply to you, it is important to see your healthcare provider to adjust your treatment reaimen.

***MEASURING PEAK EXPIRATORY FLOW (PEF).**

- Your peak expiratory flow (PEF) is how fast you can blow air out of your lungs. Monitoring your PEF regularly can help you tell when your asthma is getting worse (often before symptoms develop) and how well it's responding to treatment. PEF is especially useful in patients who have difficulty controlling their symptoms or difficulty recognizing early warning signs.
- PEF is easily measured at home with an inexpensive hand-held plastic device known as a peak flow meter. To measure your peak flow:
 - Set the pointer on the meter to zero.
 - Stand up straight, take a deep breath, seal your lips around the mouthpiece, then blow as hard and fast as you can. Reset the pointer to zero and repeat.
 - Record the best of 3 PEF values as your final measurement.
- Determine your <u>"personal best" PEF</u> by measuring your PEF twice a day (in the morning before taking medications and at bedtime) over a 2-week period when your asthma is under good control. Your personal best is the highest reading over this 2-week period. Ignore any unusually high or low readings. Remeasure your personal best PEF once a year.
- To monitor asthma control, check your PEF once daily, usually in the morning. Record the best of 3.
- A drop in your PEF can serve as an early warning sign, allowing you to start or alter treatment before an attack becomes severe.
 - A persistent drop in PEF below 80% of your personal best indicates the need for additional medications.
 - A persistent drop in PEF below 50% signals the need for immediate medical attention!
 - A return of your PEF to baseline with treatment changes can also be used to determine when to decrease or stop medication.

WHAT MEDICATIONS ARE USED FOR ASTHMA?

Asthma medications work by decreasing bronchospasm and/or inflammation in the airways. They are generally divided into 2 groups:

- Rescue medications that are used to treat asthma attacks, and
- Controller medications that are used to prevent attacks.

*RESCUE MEDICATIONS

These medications are used to <u>provide quick relief</u> during an asthma attack. Most rescue meds are known as bronchodilators because they help the muscles around the airways relax, thereby <u>decreasing</u> <u>bronchospasm</u> and increasing airflow. Always carry a rescue inhaler on your person in case symptoms develop.

- Short-acting beta agonist (SABA) inhaled bronchodilators are the most commonly used asthma medications. They begin to work within minutes and can last up to 2-4 hours.
 - Examples of SABA inhalers include <u>albuterol (Proventil, Ventolin, ProAir)</u> and <u>levalbuterol</u> (Xopenex). The usual dose is <u>2 puffs inhaled every 4-6 hours as needed</u>.
 - Albuterol is also available in a liquid form for use with a <u>nebulizer</u>. A nebulizer machine turns liquid albuterol into an aerosol that you breathe in through your mouth/nose. Nebulizer treatments are typically reserved for more severe symptoms. 4-6 puffs of an albuterol inhaler is equivalent to one albuterol nebulizer treatment.
 - These medicines should only be used for asthma attacks. They should not be taken on a regular basis except by those who need them prior to exercise.
- Symbicort is a combination inhaler that contains <u>budesonide</u>, an inhaled steroid, plus <u>formoterol</u>, a long-acting beta agonist (LABA) bronchodilator.
 - It is most commonly used as a <u>controller medication but can also be used for quick relief</u> of symptoms because formoterol is fasting-acting (like albuterol), as well as long-lasting.
 - Symbicort is a convenient option for patients requiring a controller medication because only one inhaler is needed.
- Atrovent (ipratropium) is an inhaled anticholinergic agent also used to treat bronchospasm. It is most commonly used in the emergency room if a patient is not responding to a beta-agonist bronchodilator.
- Corticosteroid pills or injections are strong anti-inflammatory medications used to treat asthma
 attacks that are not responding well to rescue inhalers. These medications do not belong to the class
 of steroids used to build muscles in athletes.
 - Unlike bronchodilators, steroid pills/injections take several hours to work.
 - Steroid pills are typically taken with food once daily for 5-10 days.
 - Steroids are very effective but used only when necessary because long-term use can lead to serious <u>side effects</u>, including stomach ulcers, high blood pressure, elevated blood sugars, osteoporosis, muscle weakness, and decreased resistance to infections.

*CONTROLLER MEDICATIONS

Controller medications are <u>used to keep asthma attacks from occurring</u>. They work by <u>decreasing</u> <u>airway inflammation</u>, which is responsible for swelling of the airways and mucus plugging.

- Controller medications are typically needed if you meet any criteria in the "Rules of Two".
- Controller medications <u>must be taken every day</u> (whether or not you are having symptoms!) in order to be effective.
- In general, they will NOT provide immediate relief during an asthma attack.
- Inhaled corticosteroids (ICS) are the most commonly used controller medications. They are strong anti-inflammatory agents that can prevent long-term "remodeling" of lung tissue, in which the microscopic layers of the airways become disorganized and damaged. Regular ICS treatment decreases the frequency of symptoms and the risk of serious asthma attacks.
 - Common examples of ICS include Flovent, Qvar, Asmanex, Arnuity Ellipta, and Pulmicort.
 - ICS are not meant for rescue because they take hours to days to start to work, up to 2 weeks to see an improvement in symptoms, and several months to reach their maximum effects.
 - Because ICS deliver steroids directly to the airways, they have very few of the serious <u>side effects</u> associated with steroid pills/injections. However, cataract formation can occur with long-term highdose use. Thrush may also develop but is preventable with mouth rinsing and the use of a device known as a spacer, which helps to decrease steroid deposition in the mouth.
- Symbicort, Advair, Breo, and Dulera are combination medications commonly prescribed to control moderate to severe asthma.
 - These inhalers contain both an inhaled steroid (ICS) and a long-acting bronchodilator (LABA) that relaxes airways for up to 12 hours. They are used primarily to prevent asthma attacks.
 - <u>Only Symbicort may be used to treat acute asthma attacks</u> because it contains formoterol, a longacting bronchodilator (LABA) that takes effect as quickly as a SABA, like albuterol.
- **Spiriva** (tiotropium) is a long-acting bronchodilator that is reserved for use in patients not responding to other controller medications. This medication is more commonly used for treating COPD (chronic obstructive pulmonary disease).

- **Singulair** is an anti-inflammatory pill that works by blocking leukotriene receptors in the allergy pathway.
 - It is usually taken by mouth once daily at bedtime and has few side effects.
 - It is often used as a less potent alternative to inhaled steroids in patients with mild asthma. In patients with more severe asthma, Singulair may be used in combination with inhaled steroids.
 - It is also a treatment option for <u>exercise-induced bronchospasm</u> in patients who require daily albuterol use. It must be taken at least 2 hours in advance of the exposure.
- **Biologic medications** are reserved for those with severe asthma and are usually prescribed by a specialist. They are called "biologics" because they contain antibodies that target different parts of the immune system, making it less reactive to allergic triggers. **Xolair** is a biologic medication given by injection every 2-4 weeks. Other biologic agents are also available.

OVER-THE-COUNTER (OTC) MEDICATIONS

OTC meds are <u>NOT recommended</u> for the treatment of asthma. Examples include **Primatene Mist** and **Asthmanefrin.**

- They may relieve symptoms temporarily; however, in the long run, they do not provide adequate control and may mask symptoms requiring medical attention.
- They can also cause dangerous side effects, especially if overused.
- The only effective drug treatments for asthma are those that are prescribed, monitored, and adjusted by a medical provider.

HOW DO I TREAT AN ASTHMA ATTACK?

Work with your medical provider to create an <u>asthma action plan</u>, which provides written instructions on how to treat your asthma symptoms and when to seek emergency care. Plans are specific to each patient and may change over time. One example of an asthma action plan is available on the next page. General treatment recommendations are as follows:

1. Use your rescue inhaler for quick relief. Treat symptoms early and frequently.

• Use one of the following inhalers for rescue:

- Albuterol (Proair, Ventolin, Proventil): <u>2 puffs every 4 hours as needed</u>. Increase to 4 puffs at a time if you are short of breath at rest.
- Levalbuterol (Xopenex): Same dosing as albuterol.
- Budesonide-formoterol (Symbicort): <u>1-2 puffs every 4 hours as needed.</u>
- For persistent symptoms, you may increase inhaler use to every 20 minutes for up to an hour (3 doses).
- <u>Side effects</u> may include jitteriness or racing heart. If side effects are bothersome:
 - Decrease the dose to 1 puff (instead of 2 puffs), and rinse your mouth well after use.
 - Xopenex may be preferred because it is less likely to cause these side effects.

2.Steroid pills are commonly prescribed to treat an attack. They are usually recommended in patients who do not have a prompt and prolonged response to their rescue inhaler.

- A common regimen is prednisone 40-60mg taken once daily by mouth for 5-10 days.
- Steroid pills should be taken with food to avoid an upset stomach.
- Since steroids can be activating, <u>avoid taking these medications late in the day</u> due to the risk of insomnia.
- **3.**Your provider may recommend starting or increasing the dose of a **steroid inhaler** or other controller medication. For some patients with mild flares, steroid pills may not be necessary.
 - <u>It is best to use a spacer</u> with inhaled steroids. A spacer is a device that attaches to the inhaler to
 decrease the amount of medication deposited in the mouth, thereby increasing medication delivery to
 the lungs and decreasing side effects.
 - <u>Rinse your mouth thoroughly</u> (ideally with a mouthwash) or brush your teeth after using a steroid inhaler to prevent thrush (a yeast infection) from developing in your mouth and/or a hoarse voice.
- 4. Continue any other controller medications you are already taking for asthma.
- **5.Allergy and cold medications** can be used to treat associated symptoms, but they will not directly improve breathing. They are commonly used alongside asthma medications. Examples include antihistamines (Zyrtec is stronger than Claritin) and steroid nasal sprays (Flonase, Nasacort, etc).

ASTHMA ACTION PLAN

Name:

Date:

Medical Provider:

Green Zone: Doing Well	Do These Things Every Day!
 Breathing is easy. I can work, play, and sleep without asthma symptoms OR I use my rescue inhaler for mild symptoms 2 times a week or less (not counting regular use before exercise). Peak flow is 80-100% of personal best: 	 Take these medicines every day to prevent symptoms: Medicine Dose How Often How Often Carry your rescue inhaler with you. Use Carry your rescue inhaler with you. Use Carry your rescue inhaler with you. Use Duffs every 4-6 hours as needed. Use 5-15 minutes before exercise or any other strenuous activity: Avoid asthma triggers:
Yellow Zone: Symptoms Starting	Start Rescue Medication!
 Any of these are happening: First sign of a cold. Coughing a lot, wheezing, chest tightness Shortness of breath with activity but none at rest. Waking up at night from asthma. Needing my rescue inhaler more than 2 times a week (not counting regular use before exercise). Peak flow is 50-80% of personal best: 	 Use your rescue inhaler puffs every 4-6 hours as needed. Continue Green Zone medications. Increase Add
Orange Zone: In Trouble	Call the Clinic! 804-828-8828 for VCU Student Health.
 Rescue medicine is not lasting 4 hours. Needing more than 4 doses of rescue medicine in one day. Constant coughing and/or loud wheezing. May not be able to speak in complete sentences without taking a breath. Awake all night from asthma. Peak flow is 50-80% of personal best:	 Use your rescue inhaler puffs (or nebulizer) every 20 minutes as needed for up to one hour. If symptoms are not better (or peak flow is not in the Green Zone) after one hour, follow Red Zone instructions. If you cannot reach your doctor and symptoms continue, go to urgent care or the ER.
Red Zone: In Danger	GET HELP NOW!
 Hard to talk or walk. Gasping (breathing hard and fast). Ribs show when breathing. Neck or stomach caving in with breaths. Medicine is not helping. Peak flow is less than 50% of personal best:	 Call 911, or go to the closest ER. Do not drive yourself! On the way, use your rescue inhaler puffs (or nebulizer) every 15-20 minutes as needed.

Note on Peak Flow:

- Remeasure personal best peak flow once a year, over a 2-week period when asthma is doing well:
- ✓ Check peak flow twice a day: in the morning before taking meds and at bedtime.
 - ✓ Each time, record the best of 3 as the final measurement.
- ✓ Personal best is highest reading over this 2-week period. Ignore any unusually high or low readings. To monitor asthma control, <u>check peak flow once daily</u>, <u>usually in the morning</u>. Record the best of 3.
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