

Like a fish out





1.5
ANCC
CONTACT HOURS

of water

Asthma is one of the most common chronic diseases of childhood. Educating parents and children about an asthma action plan can save young lives.

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Courtney, 11, is brought to the ED complaining of chest tightness. Several years before this occurrence, Courtney had been diagnosed with exercise-induced asthma. She was prescribed a short-acting inhaler to use before exercise; however, she rarely used it and her parents stopped refilling the prescription.



Asthma is a primary cause of school absences, accounting for 14 million lost school days each year.

Upon examination, Courtney is pale, tachycardic, and has an expiratory wheeze in both lobes. Her oxygen saturation is 90% on room air. She's immediately given levosalbutamol 0.63 mcg via nebulizer, which provides some relief, but a second treatment is deemed necessary by the attending physician. She's discharged 2 hours later and instructed to follow up with a pulmonologist and her primary care physician.

Could this ED visit have been prevented? In this article, we'll teach you how to educate parents and children about following an asthma action plan to prevent acute exacerbations from escalating.

By the numbers

It's estimated that 20 million people have asthma in the United States; 9 million are

children. According to the CDC, 1 in 11 children has asthma. On average, in a classroom of 30 children, about 3 are likely to have asthma. Asthma is a primary cause of school absences, accounting for 14 million lost school days each year, according to the CDC. And it's the third leading cause of hospitalizations in children under age 15.

Although the onset of asthma can occur at any age, 80% to 90% of children experience their first symptoms before age 4. Low-income populations, minorities, and children living in inner cities experience more ED visits, hospitalizations, and deaths due to asthma than the general population. These statistics are alarming—that's why we must remain vigilant and empower both patients and their families about the disease and its serious consequences.

Asthma 101

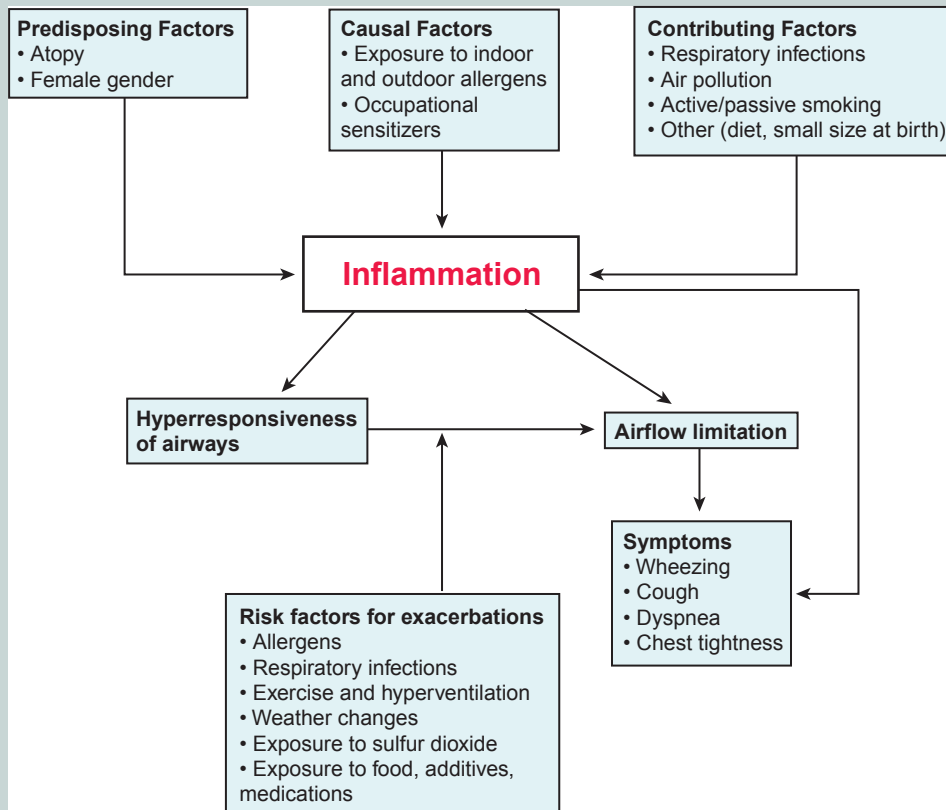
An asthma attack can be very scary for a child who experiences it. Patients describe trying to breathe in through a straw and not being able to exhale, likening it to feeling like a fish out of water. This feeling comes when the bronchioles swell, making the airway narrower. Mucous cells that line the bronchioles increase, making it even more difficult to breathe. Basically, when a person is experiencing an asthma attack, there are two things happening: airway constriction and airway inflammation (see *Pathophysiology of asthma*).

Children need to fully understand when they're experiencing an attack. You can use the mnemonic DREAD to teach the signs and symptoms of asthma:

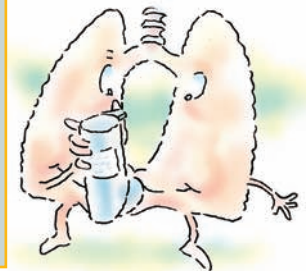
- diaphoresis
- reduction of breath sounds
- expiratory wheezing
- accessory muscle use
- dyspnea.

For children ages 4 to 11, you can teach them to recognize an attack by using the Childhood Asthma Control Test. This test is a way to detect if the child's asthma is

Pathophysiology of asthma



Source: Smeltzer SC, Bare BG, Hinkle JL, Cheever KH. *Brunner & Suddarth's Textbook of Medical-Surgical Nursing*. 12th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2010.



under control. Have the child answer the first four questions on his or her own. The child picks the face that describes how he or she feels. The caregiver can answer the last three questions without the child. Each answer corresponds with a number; if the score is less than 19, the child's asthma isn't being controlled properly. Medications may need to be changed to better control the asthma symptoms. Visit <http://www.asthma.com/resources/childhood-asthma-control-test.html> to access the test.

The importance of recognizing the severity of asthma is imperative. Every year, 200 American children die from asthma. These

deaths are preventable if asthma is properly treated in a timely fashion. Educating the child and family about the disease, establishing a medical regimen to control the asthma, and determining whether the child is at high risk for dying if an exacerbation occurs are paramount.

Itchy trigger finger

The etiology of asthma is unknown; however, it does tend to run in families and there are definite triggers that can set off attacks at certain times. Teaching children to know their triggers can help prevent problems that can influence

both the persistence and severity of the disease.

Triggers include:

- cigarette smoke
- climate changes (such as extreme hot or cold temperatures)
- dust mites
- mold
- environmental changes (such as outdoor air pollution; chemical fumes; combustions devices, such as improperly vented



An asthma action plan is a written plan that's developed with the family, child, and healthcare provider to prevent asthma attacks, recognize triggers, and reduce ED visits.

fireplaces, kerosene heaters, gas ranges, or gas space heaters; and exposure to motor traffic emissions)

- animals (such as dogs, cats, and rodents)
- food allergies
- medications (such as beta-blockers, aspirin, nonsteroidal anti-inflammatory drugs, and antibiotics)
- perfumes
- exercise
- strong emotions

- menses or pregnancy
- gastroesophageal reflux disease
- colds or infections.

Diagnosis underway

Asthma is diagnosed differently depending on the child's age. Diagnosis for children ages 5 and up is the same as for adults. The healthcare provider will start with a medical history, asking questions about prior medications the child has taken, known triggers, a family history of asthma, or a history of eczema. The healthcare provider will then complete a head-to-toe physical exam, concentrating on the lungs. Pulmonary function tests will be done to show how well the child can exhale, including the use of a peak flow meter.

The peak flow meter measures the rate that the child can force air out of his or her lungs. The lower the number, the worse the asthma is. Peak flow meters are used not only to diagnose asthma, but also at home to monitor daily asthma status, to make changes in the medication regimen accordingly, and to help decrease the number of asthma exacerbations.

Diagnosis in children under age 5 is difficult due to the fact that wheezing and coughing can occur in conditions other than asthma such as viral infections. Children under age 5 generally aren't able to complete certain lung function tests due to their age. The healthcare provider may prescribe a bronchodilator if asthma is suspected. If the bronchodilator improves the child's symptoms, then he or she may have asthma.

Tailored treatment

There's no cure for asthma, but it can be properly managed. After being diagnosed by a pulmonologist, a treatment plan can be instituted to manage symptoms and prevent exacerbations.

Treatment for asthma is very specific for children, including maintenance medications,

Sample asthma action plan

Asthma Action Plan

For: _____ Doctor: _____ Date: _____

Doctor's Phone Number _____ Hospital/Emergency Department Phone Number _____

Doing Well

GREEN ZONE

Take these long-term control medicines each day (include an anti-inflammatory).

Medicine	How much to take	When to take it
■ No cough, wheeze, chest tightness, or shortness of breath during the day or night		
■ Can do usual activities		
And, if a peak flow meter is used,		
Peak flow: more than _____ (80 percent or more of my best peak flow)		
My best peak flow is: _____		
Before exercise	□ _____ □ 2 or □ 4 puffs	5 minutes before exercise

Asthma Is Getting Worse

YELLOW ZONE

First  **Second** 

■ Cough, wheeze, chest tightness, or shortness of breath, or

■ Waking at night due to asthma, or

■ Can do some, but not all, usual activities

-Or-

Peak flow: _____ to _____ (50 to 79 percent of my best peak flow)

Add: quick-relief medicine—and keep taking your GREEN ZONE medicine.

□ _____ (short-acting beta₂-agonist) □ 2 or □ 4 puffs, every 20 minutes for up to 1 hour

□ Nebulizer, once

If your symptoms (and peak flow, if used) return to GREEN ZONE after 1 hour of above treatment:

□ Continue monitoring to be sure you stay in the green zone.

-Or-

If your symptoms (and peak flow, if used) do not return to GREEN ZONE after 1 hour of above treatment:

□ Take: _____ (short-acting beta₂-agonist) □ 2 or □ 4 puffs or □ Nebulizer

□ Add: _____ mg per day For _____ (3–10) days

□ Call the doctor □ before/ □ within _____ hours after taking the oral steroid.

Medical Alert!

RED ZONE

■ Very short of breath, or

■ Quick-relief medicines have not helped, or

■ Cannot do usual activities, or

■ Symptoms are same or get worse after 24 hours in Yellow Zone

-Or-

Peak flow: less than _____ (50 percent of my best peak flow)

Take this medicine:

□ _____ (short-acting beta₂-agonist) □ 4 or □ 6 puffs or □ Nebulizer

□ _____ (oral steroid) _____ mg

Then call your doctor NOW. Go to the hospital or call an ambulance if:

■ You are still in the red zone after 15 minutes AND

■ You have not reached your doctor.

DANGER SIGNS

■ Trouble walking and talking due to shortness of breath

■ Lips or fingernails are blue

■ Take □ 4 or □ 6 puffs of your quick-relief medicine AND

■ Go to the hospital or call for an ambulance (phone) _____ NOW!

See the reverse side for things you can do to avoid your asthma triggers.

Source: National Heart, Lung, and Blood Institute. Asthma action plan. http://www.nlm.nih.gov/health/public/lung/asthma/asthma_actplan.pdf.



memory jogger

Use the mnemonic **DREAD** to teach the signs and symptoms of asthma.

- **D**iaphoresis
- **R**eduction of breath sounds
- **E**xpiratory wheezing
- **A**ccessory muscle use
- **D**yspnea

rescue medications, and immunotherapy. Healthcare providers may use the stepwise approach to step up treatment by adding a medication if they feel that the child's asthma isn't under control. They may step down treatment by lowering medication dosages if they feel it's well controlled.

Long-term control medications, also known as maintenance medications, are generally taken every day even if the child isn't experiencing symptoms. They may also be used seasonally to control symptoms at certain times of the year. Examples of long-term medications include inhaled corticosteroids, leukotriene modifiers, combination inhalers that contain an inhaled corticosteroid plus a long-acting beta agonist, and theophylline (not often used).

Quick relief, or rescue, medications are short-acting bronchodilators that generally give immediate relief of asthma symptoms. The most common is albuterol. Others include levalbuterol and pirbuterol. These medications may relieve symptoms, but they don't prevent an attack from occurring.

Immunotherapy may also be used in which the child receives allergy desensitization shots to control triggers



on the web

- **American Academy of Allergy Asthma & Immunology:** <https://www.aaaai.org/conditions-and-treatments/library/at-a-glance/childhood-asthma.aspx>
- **American Lung Association:** <http://www.lung.org/lung-disease/asthma/resources/facts-and-figures/asthma-children-fact-sheet.html>
- **CDC:** <http://www.cdc.gov/asthma/children.htm>
- **KidsHealth:** http://kidshealth.org/kid/asthma_basics/what/asthma.html
- **Mayo Clinic:** <http://www.mayoclinic.org/diseases-conditions/childhood-asthma/in-depth/asthma/art-20044022>
- **MedlinePlus:** <http://www.nlm.nih.gov/medlineplus/asthmachildren.html>
- **National Heart, Lung, and Blood Institute:** <http://www.nhlbi.nih.gov/health/prof/lung/asthma/naci/naci-in-action/napnap.htm>

that are caused by certain allergies. These injections may be given once a week to once a month.

Action plan at the ready

A care plan can be taught to school children and parents to help manage their symptoms. According to the CDC, an asthma action plan (also called a management plan) is a written plan that's developed with the family, child, and healthcare provider (see *Sample asthma action plan*). The goal of the action plan is to prevent asthma attacks, recognize triggers, and, ultimately, reduce ED visits.

A daily log of results is imperative. Many action plans use the zone system, which uses the colors green, yellow, and red (similar to the peak flow meter). Just like a peak flow meter, the zones help recognize worsening symptoms, if medications are working, and whether other factors are making the asthma symptoms worse.

If the child is in the green, or safety, zone, he or she feels good and is managing asthma symptoms to maintain an optimal level of health. The yellow, or caution, zone may indicate worsening symptoms and medications may be needed to bring the child back to the green zone. The red, or danger, zone indicates a flare-up or emergent situation.

The zone system is easy to follow, but requires the parents and child to monitor the child's pulmonary function every day, even twice a day, and at the time of an attack. It's also important to review with the child prescribed medications and how and when it's necessary to use

them. By doing this, the symptoms of airway obstruction can be treated before they become acute.

The asthma action plan should also include:

- healthcare provider and ED phone numbers
- triggers that should be avoided
- all medications prescribed, when to use them, and the proper dosage of each one
- any actions necessary before certain activities or exercise.

This information should be shared with all people involved with the child, including teachers, school nurses, coaches, and healthcare providers. For example, if the child starts wheezing in gym class while playing a game, the coach or school nurse will know exactly what to do and treatment won't be delayed. The action plan should go everywhere with the child and be updated as the child grows and medication dosages change.

Another component of the action plan is educating the child's parents. Nurses can help by ensuring that parents understand the significance of reporting their child's asthma diagnosis to their school. The good news here is that federal and state legislation allows children to carry their own inhalers to school. However, parents need to sign a permission slip to allow their child to do so. Nurses can include this information when discharging patients to ensure parents make informed choices regarding their child's action plan.

Intervention mention

When a child who's experiencing an asthma attack is brought to the ED, he or she is treated without delay. If the child is wheezing, even slightly, treatment is started immediately. The child is placed on continuous pulse oximetry to keep a close eye on the oxygen saturation level. He or she is given nebulizer

treatments and, if necessary, I.V. methylprednisolone.

If the child continues to wheeze after several treatments, he or she is generally admitted. After being admitted, the child will receive nebulizer treatments as ordered, along with methylprednisolone every 6 hours.

When the child's asthma is under control, an action plan can be started or modified to keep an exacerbation from happening again.



Step up, educate, and continually reinforce all of the necessary steps needed to keep asthma under control.

Keeping kids happy and healthy!

Asthma can't be cured, but taking a proactive approach and having an asthma action plan can save lives. With a solid action plan and diligent documentation of daily results, we can help children stay healthy and manage their asthma. As nurses, we need to step up, educate, and continually reinforce all of the necessary steps needed to keep asthma under control so these children can live more active and healthier lives. ■

Learn more about it

Asthma.com. Childhood asthma control test. <http://www.asthma.com/resources/childhood-asthma-control-test.html>.

Asthma and Allergy Foundation of America. Asthma overview. <http://www.aafa.org/display.cfm?id=8&cont=7>.

CDC. Asthma action plan. <http://www.cdc.gov/asthma/actionplan.html>.

CDC. Asthma and schools. <http://www.cdc.gov/HealthyYouth/asthma>.

HealthDay. Some schools don't let kids carry asthma inhalers. <http://consumer.healthday.com/respiratory-and-allergy-information-2/food-allergy-news-16/some-schools-don-t-let-kids-carry-asthma-inhalers-664121.html>.

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National Heart, Lung, and Blood Institute. Guidelines for the diagnosis and management of asthma (EPR-3). <http://www.nhlbi.nih.gov/guidelines/asthma/index.htm>.

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Like a fish out of water

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