Asthma:
Breathtaking Facts

FactPack P-139

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Asthma

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FactPack - PUB 139

September 2012

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Mentoring a Movement

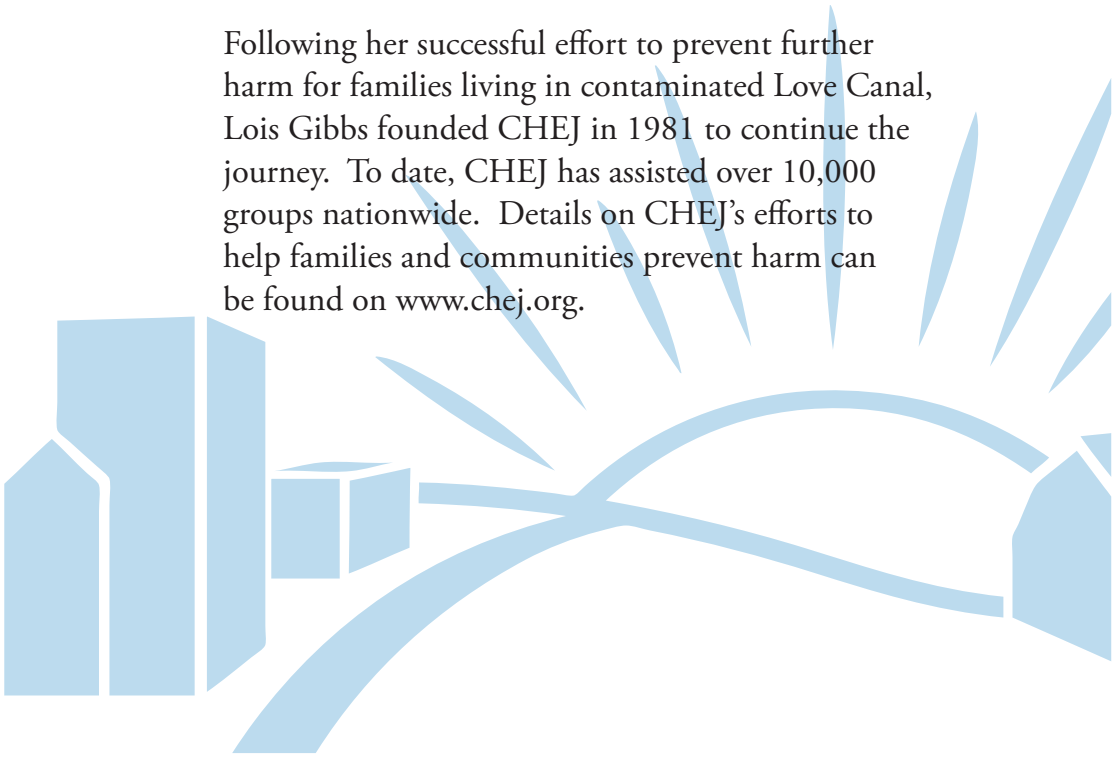
Empowering People

Preventing Harm

About the Center for Health, Environment & Justice

CHEJ mentors the movement to build healthier communities by empowering people to prevent the harm caused by chemical and toxic threats. We accomplish our work by connecting local community groups to national initiatives and corporate campaigns. CHEJ works with communities to empower groups by providing the tools, strategic vision, and encouragement they need to advocate for human health and the prevention of harm.

Following her successful effort to prevent further harm for families living in contaminated Love Canal, Lois Gibbs founded CHEJ in 1981 to continue the journey. To date, CHEJ has assisted over 10,000 groups nationwide. Details on CHEJ's efforts to help families and communities prevent harm can be found on www.chej.org.



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Introduction

The Center for Health Environment and Justice has developed this fact pack on Asthma in response to the numerous requests for information that we have had on this topic. This demand for information has occurred due to an increase in the asthma cases around the nation, and the severity of the issue. We have included information from non-profit organizations, government agencies, newspapers, scientists, experts, and journals in an effort to provide a thorough introduction to asthma. This fact pack includes the following information:

1. An Asthma Overview
2. Controlling and Preventing Asthma
3. Asthma and Environmental Health Issues
4. Asthma in Children and in Schools
5. Asthma in the Workplace

This fact pack is intended to be used as a tool to educate yourself and others. This fact pack can provide you with a basic level of understanding, and opportunity for in depth research and knowledge of the Asthma epidemic. We hope that this helps to provide you with information to make you more familiar with the issues that surround asthma so that you will be able to continue to update yourself and others in the future. Most of these sources are always available for further information, as are we.

CHEJ is dedicated in protect communities from environmental health threats, these environmental health threats are of importance to the Asthma discussion. Our hope is that reading this fact pack will be the first step in the process of empowering your community to protect itself from environmental health threats. CHEJ can help with this process. Through experience, we have learned that there are four basic steps that should be taken in order to push your community towards success:

1. Form a democratic organization and open it to anyone in the community facing the problem
2. Define your organizational goals and objectives
3. Indentify who can give you what you need to achieve your goals and objectives. Who has to the power to shut down the landfill? Demand the cleanup of a contaminated school site? Perform an in depth health study? Get more testing done? It may be the head of the state regulating agency, city council members, or other elected officials.
4. Develop strategies that focus your activities on the decision makers, the people or person who has to the power to give you what you are asking for.

CHEJ Can help with each of these steps. Our mission is to help communities join together to achieve their goals. We can provide guidance on forming a group, mobilizing a community, defining a strategic plan, and involving the media. We can refer you to other groups that are fighting the same problems. We can provide assistance to help you understand scientific and technical data and show you how you can use this information to help you obtain your goals.

If you want to protect yourself, your family, and your community, you need information. This information can only be used for your benefit if you organize your community and those around you who share these concerns.

Thank you for contacting us.

Vital Signs

CDC Vitalsigns™

May 2011

Asthma in the US

Growing every year

Asthma is a lifelong disease that causes wheezing, breathlessness, chest tightness, and coughing. It can limit a person's quality of life. While we don't know why asthma rates are rising, we do know that most people with asthma can control their symptoms and prevent asthma attacks by avoiding asthma triggers and correctly using prescribed medicines, such as inhaled corticosteroids.

The number of people diagnosed with asthma grew by 4.3 million from 2001 to 2009. From 2001 through 2009 asthma rates rose the most among black children, almost a 50% increase. Asthma was linked to 3,447 deaths (about 9 per day) in 2007. Asthma costs in the US grew from about $53 billion in 2002 to about $56 billion in 2007, about a 6% increase. Greater access to medical care is needed for the growing number of people with asthma.

Latest Findings

Asthma is increasing every year in the US.

Too many people have asthma.

- The number of people with asthma continues to grow. One in 12 people (about 25 million, or 8% of the population) had asthma in 2009, compared with 1 in 14 (about 20 million, or 7%) in 2001.
- More than half (53%) of people with asthma had an asthma attack in 2008. More children (57%) than adults (51%) had an attack. 185 children and 3,262 adults died from asthma in 2007.
- About 1 in 10 children (10%) had asthma and 1 in 12 adults (8%) had asthma in 2009. Women were more likely than men and boys more likely than girls to have asthma.
- About 1 in 9 (11%) non-Hispanic blacks of all ages and about 1 in 6 (17%) of non-Hispanic black children had asthma in 2009, the highest rate among racial/ethnic groups.
- The greatest rise in asthma rates was among black children (almost a 50% increase) from 2001 through 2009.

Asthma Action Plan Stages

Green Zone: Doing Well

No cough, wheeze, chest tightness, or shortness of breath; can do all usual activities. Take prescribed longterm control medicine such as inhaled corticosteroids.

Yellow Zone: Getting Worse

Cough, wheeze, chest tightness, or shortness of breath; waking at night; can do some, but not all, usual activities. Add quick-relief medicine.

Red Zone: Medical Alert!

Very short of breath; quick-relief medicines don't help; cannot do usual activities; symptoms no better after 24 hours in Yellow Zone. Get medical help NOW.

Full Action Plan:
http://www.cdc.gov/asthma/actionplan.html
(http://www.cdc.gov/asthma/actionplan.html)

Asthma has a high cost for individuals and the nation.

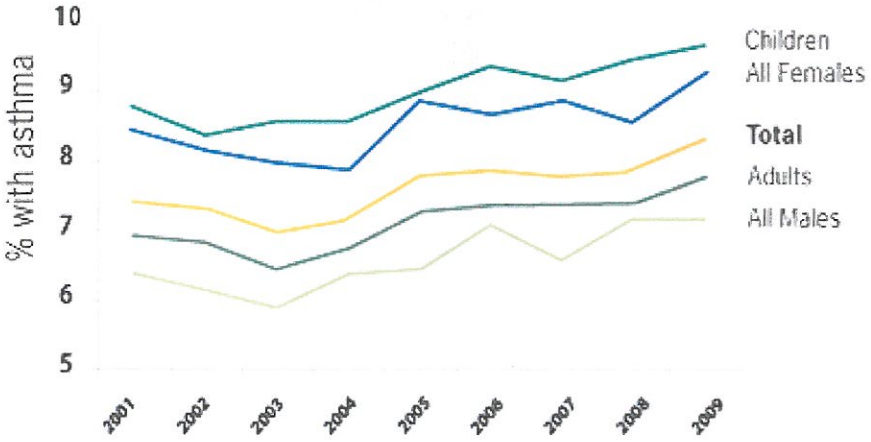
- Asthma cost the US about $3,300 per person with asthma each year from 2002 to 2007 in medical expenses.
- Medical expenses associated with asthma increased from $48.6 billion in 2002 to $50.1 billion in 2007. About 2 in 5 (40%) uninsured people with asthma could not afford their prescription medicines and about 1 in 9 (11%) insured people with asthma could not afford their prescription medicines.
- More than half (59%) of children and one-third (33%) of adults who had an asthma attack missed school or work because of asthma in 2008. On average, in 2008 children missed 4 days of school and adults missed 5 days of work because of asthma.

Better asthma education is needed.

- People with asthma can prevent asthma attacks if they are taught to use inhaled corticosteroids and other prescribed daily long-term control medicines correctly and to avoid asthma triggers. Triggers can include tobacco smoke, mold, outdoor air pollution, and colds and flu.
- In 2008 less than half of people with asthma reported being taught how to avoid triggers. Almost half (48%) of adults who were taught how to avoid triggers did not follow most of this advice.
- Doctors and patients can better manage asthma by creating a personal asthma action plan that the patient follows.

Who's At Risk?

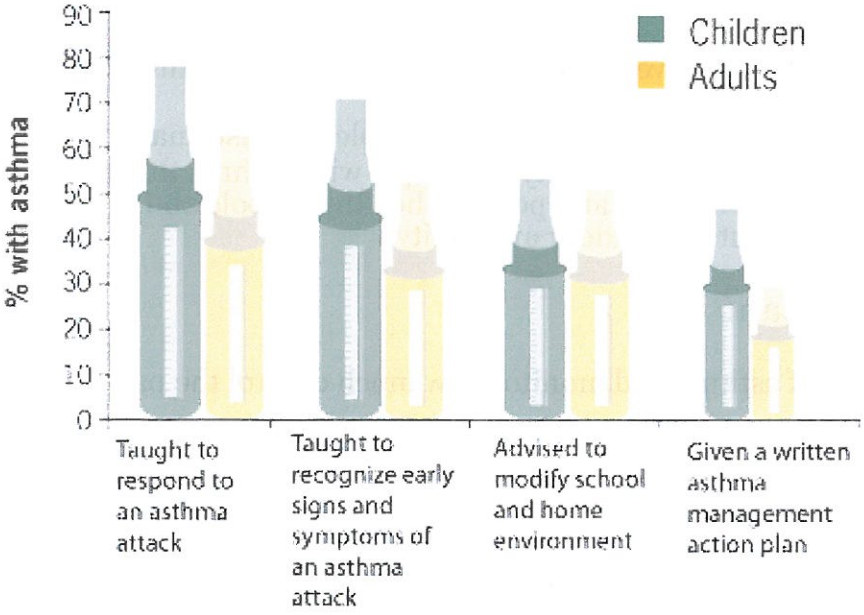
Asthma by age and sex US, 2001-2009



Percentages are age-adjusted

SOURCE: National Center for Health Statistics; 2010.

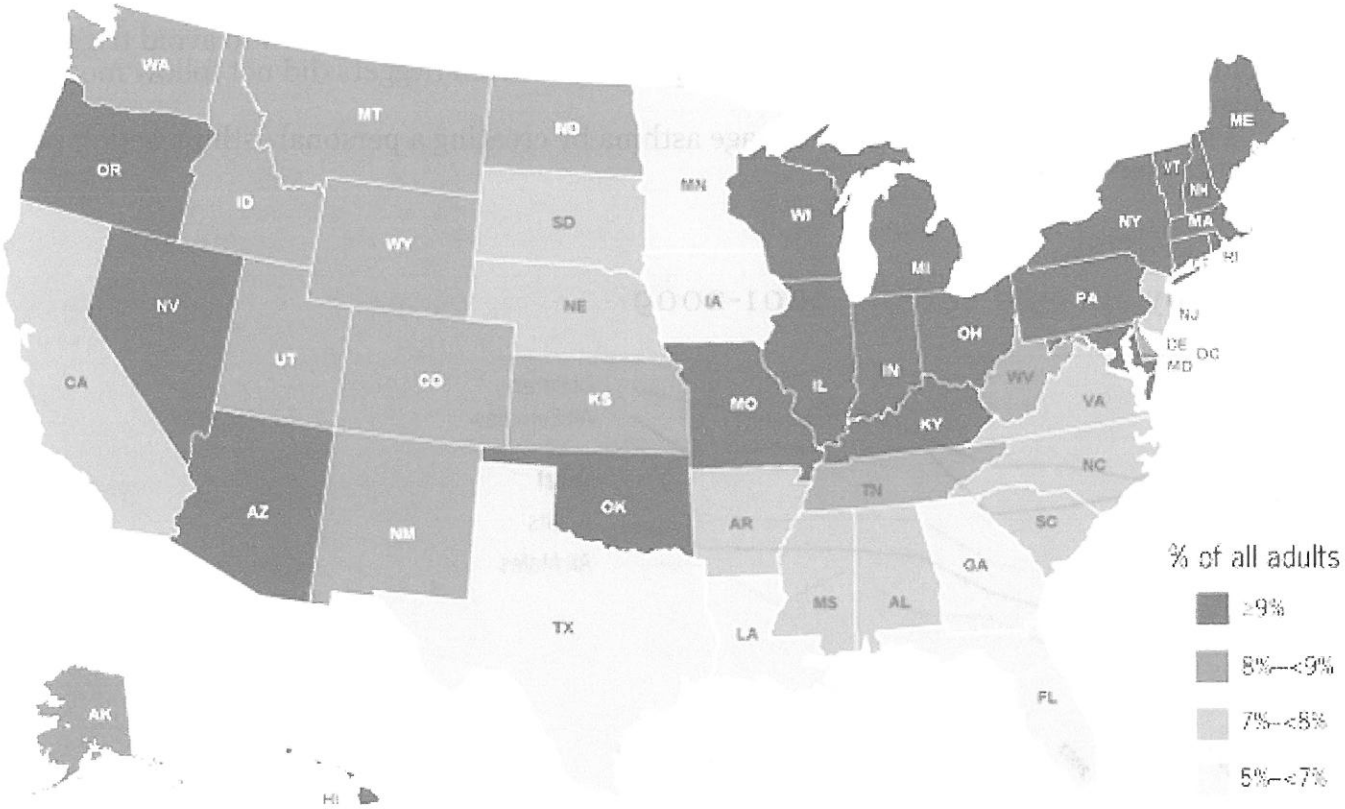
Asthma self-management education by age, US, 2008



SOURCE: National Health Interview Survey, 2008, asthma supplement.

U.S. State Info

Adults with asthma in the US, 2009



SOURCE: Behavioral Risk Factor Surveillance System, 2009

What Can Be Done

Federal, state, and local health officials can:

- Track asthma rates and the effectiveness of control measures so continuous improvements can be made in prevention efforts.
- Promote influenza and pneumonia vaccination for people with asthma.
- Promote improvements in indoor air quality for people with asthma through measures such as smoke-free air laws and policies, healthy schools and workplaces, and improvements in outdoor air quality.

Health care providers can:

- Determine the severity of asthma and monitor how much control the patient has over it.
- Make an asthma action plan for patients. Use this to teach them how to use inhaled corticosteroids and other prescribed medicines correctly and how to avoid asthma triggers such as tobacco smoke, mold, pet dander, and outdoor air pollution.
- Prescribe inhaled corticosteroids for all patients with persistent asthma.

People with asthma and parents of children with asthma can:

- Receive ongoing appropriate medical care.
- Be empowered through education to manage their asthma and asthma attacks.
- Avoid asthma triggers at school, work, home, and outdoors. Parents of children with asthma should not smoke, or if they do, smoke only outdoors and not in their cars.
- Use inhaled corticosteroids and other prescribed medicines correctly.

Schools and school nurses can:

- Use student asthma action plans to guide use of inhaled corticosteroids and other prescribed asthma medicines correctly and to avoid asthma triggers.
- Make students' quick-relief inhalers readily available for them to use at school as needed.
- Take steps to fix indoor air quality problems like mold and outdoor air quality problems such as idling school buses.

Employers and insurers can:

- Promote healthy workplaces by reducing or eliminating known asthma triggers.
- Promote measures that prevent asthma attacks such as eliminating co-payments for inhaled corticosteroids and other prescribed medicines.
- Provide reimbursement for educational sessions conducted by clinicians, health educators, and other health professionals both within and outside of the clinical setting.
- Provide reimbursement for long-term control medicines, education, and services to reduce asthma triggers that are often not covered by health insurers.

Related Pages

- Vital Signs Issue details: Morbidity and Mortality Weekly Report (MMWR) (http://www.cdc.gov/mmwr/)
- Asthma – What You Need to Know [PODCAST - 01:19 minutes] (http://www2c.cdc.gov/podcasts/player.asp?f=6715692)
- Asthma – What You Need to Know [PSA - 0:60 seconds] (http://www2c.cdc.gov/podcasts/player.asp?f=6715693)

On Other Web Sites

- The Community Guide - Asthma Control (http://www.thecommunityguide.org/asthma/index.html)
- MedlinePlus - Asthma (http://www.nlm.nih.gov/medlineplus/asthma.html)
- MedlinePlus - Asthma in Children (http://www.nlm.nih.gov/medlineplus/asthmainchildren.html)
- Living With Asthma: CDC Vital Signs [VIDEO - 02:08 minutes] (http://www.youtube.com/watch?v=NJCWahZFKJI)
- CDC Medscape Commentary: Asthma Control During Travel [VIDEO - 3:46 minutes] (http://www.medscape.com/viewarticle/741288)

AMERICAN LUNG ASSOCIATION.
Fighting for Air

Asthma in Adults Fact Sheet

November 2011

Asthma is a reversible obstructive lung disease, caused by increased reaction of the airways to various stimuli. It is a chronic inflammatory condition with acute exacerbations. Asthma can be a life-threatening disease if not properly managed.

- In 2009, it was estimated that 24.6 million Americans currently have asthma. Of these, 12.8 million Americans (4.1 million children under 18) had an asthma attack.[1]
- Current asthma prevalence in adults ranged from 6.3% in Louisiana to 11.0% in Oregon.[2]
- Since 1999, mortality and hospitalizations due to asthma have decreased and asthma prevalence had stabilized, although it now appears to be increasing. In 2007, there were 3,447 deaths attributed to asthma – an age-adjusted rate of 1.1 per 100,000. Approximately 63% of these deaths occurred in women.[3]
- The number and rate of hospital discharges for asthma peaked in 1995. Since that time, the number of discharges has decreased by 13% and the discharge rate has declined 24%. During 2006, 444,000 discharges (14.9 per 10,000) were due to asthma.[4]
- Close to 1.7 million emergency room visits were attributed to asthma in 2006.[5]
- In 2008, asthma accounted for an estimated 14.2 million lost work days in adults.[6]
- The annual direct health care cost of asthma is approximately $50.1 billion; indirect costs (e.g. lost productivity) add another $5.9 billion, for a total of $56.0 billion dollars.[7]
- Asthma breathing problems usually happen in "episodes" or “attacks,” but the inflammation underlying asthma is continuous. An asthma episode is a series of events that result in narrowed airways. These include: swelling of the lining, tightening of the muscle, and increased secretion of mucus in the airway. The narrowed airway is responsible for the difficulty in breathing with the familiar "wheeze."
- Lung function declines faster than average in people with asthma, particularly in people who smoke and in those with excessive mucus production (an indicator of poor treatment control).
- Asthma medications help reduce underlying inflammation in the airways and relieve or prevent symptomatic airway narrowing. Control of inflammation should lead to reduction in airway sensitivity and help prevent airway obstruction.
- Two classes of medications have been used to treat asthma—anti-inflammatory or controller agents and bronchodilators or relievers. Anti-inflammatory drugs interrupt the development of bronchial inflammation and have a preventive action. They may also modify or terminate ongoing inflammatory reactions in the airways. These agents include corticosteroids, cromolyn sodium, and other anti-inflammatory compounds. A new class of anti-inflammatory medications known as leukotriene modifiers, which work in a different way by blocking the activity of chemicals called leukotrienes that are involved in airway inflammation have recently come on the market.
- Bronchodilators act principally to open the airways by relaxing bronchial muscle. They include beta-adrenergic agonists, methylxanthines, and anticholinergics.
- Asthma is characterized by excessive sensitivity of the lungs to various stimuli. Triggers range from viral infections to allergies, to irritating gases and particles in the air. Each person reacts differently to the factors that may trigger asthma, including:
  - respiratory infections and colds
  - cigarette smoke
  - allergic reactions to such allergens as pollen, mold, animal dander, feather, dust, food, and cockroaches
  - indoor and outdoor air pollutants, including ozone and particle pollution
  - exposure to cold air or sudden temperature change
  - excitement/stress
  - exercise
- Asthma may also be triggered by over the counter drugs. One study found that one adult asthmatic in five can

suffer an attack from taking aspirin.[8]

- A study by the American Lung Association Asthma Clinical Research Center (ACRC) found that the inactivated influenza vaccine is safe to administer to adults and children with asthma, including those with severe asthma.[9] Influenza causes substantial illness in adults and children with asthma requiring emergency room visits and hospitalization, and vaccination can mostly prevent influenza and its complications. Currently, 46.4% of adults with asthma receive the influenza vaccine.[10]

For more information on asthma, please review the Asthma Morbidity and Mortality Trend Report in the Trend Reports section of our website at www.lung.org or call the American Lung Association at 1-800-LUNG-USA (586-4872).

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Centers for Disease Control and Prevention
CDC 24/7: Saving Lives, Protecting People, Saving Money through Prevention

Asthma

Important Asthma Triggers

If you have asthma your airways always have some irritation. When you have an asthma attack this irritation gets worse and your airways close part way and get blocked with mucus. Asthma attacks may include coughing, chest tightness, wheezing, and trouble breathing.

An asthma attack can occur when you are exposed to things in the environment, such as house dust mites and tobacco smoke. These are called *asthma triggers*.

Your personal triggers can be very different from those of another person with asthma. Try to avoid your triggers. Some of the most important triggers are listed below:

Environmental Tobacco Smoke (Secondhand Smoke)

Environmental tobacco smoke is often called *secondhand smoke* because the smoke created by a smoker is breathed in by a second person nearby. Parents, friends, and relatives of children with asthma should try to stop smoking and should never smoke around a person with asthma. They should only smoke outdoors and not in the family home or car. They should not allow others to smoke in the home, and they should make sure their child's school is smoke-free.

Dust Mites

Dust mites are in almost everybody's homes, but they don't cause everybody to have asthma attacks. If you have asthma, dust mites may be a trigger for an attack. To help prevent asthma attacks, use mattress covers and pillowcase covers to make a barrier between dust mites and yourself. Don't use down-filled pillows, quilts, or comforters. Remove stuffed animals and clutter from your bedroom.

Outdoor Air Pollution

Pollution caused by industrial emissions and automobile exhaust can cause an asthma attack. Pay attention to air quality forecasts on radio, television, and Internet and plan your activities for when air pollution levels will be low if air pollution aggravates your asthma. A good source of air quality information is EnviroFlash (http://www.enviroflash.info/).

Cockroach Allergen

Cockroaches and their droppings may trigger an asthma attack. Get rid of cockroaches in your home and keep them from coming back by taking away their food and water. Cockroaches are usually found where food is eaten and crumbs are left behind. Remove as many water and food sources as you can because cockroaches need food and water to survive. At least every 2 to 3 days, vacuum or sweep areas that might attract cockroaches. You can also use roach traps or gels to decrease the number of cockroaches in your home.

Centers for Disease Control and Prevention's (CDC)
National Asthma Control Program

Asthma FAST FACTS

MORTALITY

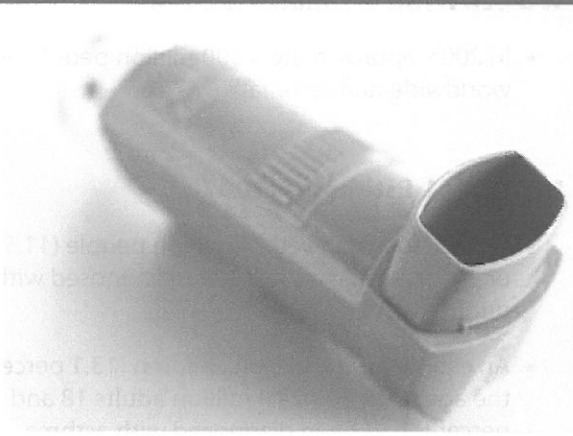
- In 2004, approximately 255,000 people worldwide died of asthma.[1]
- In 2007, asthma accounted for 3,447 deaths. In the United States, that's more than 9 people every day.

  Asthma deaths were

  > higher among adults than among children, and

  > higher among women (2,173) than among men (1,274).[2]

- Although the rate of asthma deaths increased during 1980-1995, since 2000 the death rate has decreased each year.[3]



ASTHMA-RELATED COSTS and EXPENDITURES (2007)

- Asthma costs the United States more than $30 billion every year. These costs include the direct expenditure of treating asthma.[4]

HEALTH CARE USE (2006 data)

- An estimated 444,000 hospital discharges related to asthma were recorded in 2006, with an average length of stay of 3.2 days. [5]
- Asthma accounted for 1.1 million hospital outpatient visits and 1.6 million emergency department visits.[5]
- An estimated 10.6 million asthma-related visits were made to physician offices.[6]

ASTHMA ATTACKS

- In 2007, a CDC study showed 34 million people had been diagnosed with asthma during their lifetimes.[7] Of that 34 million, 12.3 million had experienced an asthma attack in the previous year.[8]

In 2007, a CDC study showed 34 million people had been diagnosed with asthma during their lifetimes.

National Center for Environmental Health
Division of Environmental Hazards and Health Effects

CDC

CS213280

Asthma Prevalence

WORLDWIDE Estimates (2004):

- In 2004, approximately 300 million people of all ages worldwide had asthma.[1]

NATIONAL Estimates (2007):

- A CDC study showed 34 million people (11.5 percent) or 1 in 9 Americans had been diagnosed with asthma during their lifetimes.[7,9,10]
- An estimated 9.6 million children (13.1 percent) under the age of 18 and 24.4 million adults 18 and older (10.9 percent) had been diagnosed with asthma during their lifetimes.[7,9]
- An estimated 22.9 million people (7.7 percent) of the population have current asthma.[11,12]
- Current asthma prevalence is higher among females (8.9 percent) than males (6.5 percent).[11]
- Current asthma prevalence is higher among children ages 17 years and younger (9.1 percent) than adults (7.3 percent).[11]
- Current asthma prevalence is highest among Blacks (10.2 percent), followed by Whites (7.6 percent), and Hispanics (6.8 percent) including Puerto Ricans (14.1 percent) and Mexican/Mexican-American (5.8 percent).[11]

STATE Estimates (Current Asthma Prevalence 2008):

- State asthma estimates varied widely, ranging from 6.6 percent in Florida to 7.0 percent in Mississippi, to 10.4 percent in New Hampshire and 10.6 percent in Rhode Island.[13]
- Highest estimates among men were in Wisconsin (8.2 percent) and Arizona (8.8 percent); the lowest estimates were in Illinois (5.2 percent) and South Carolina (5.2 percent).[14]
- Highest estimates among women were in Maine (13.2 percent) and New Hampshire (14.3 percent); the lowest estimates were in Florida (7.6 percent) and Nebraska (7.9 percent).[14]

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10. Centers for Disease Control and Prevention. National Center for Health Statistics. Health, United States, 2009: With Special Feature on Medical Technology. Hyattsville, MD: U.S. Department of Health and Human Services, CDC, 2010. Accessed June 1, 2010.
11. Centers for Disease Control and Prevention. 2007 National Health Interview Survey Data. Table 4-1Current Asthma Prevalence Percents by Age, United States: National Health Interview Survey, 2007. Atlanta, GA: U.S. Department of Health and Human Services, CDC, 2010. Accessed June 1, 2010.
12. Centers for Disease Control and Prevention. 2007 National Health Interview Survey Data. Table 3-1 Current Asthma Population Estimates -- in thousands by Age, United States: National Health Interview Survey, 2007. Atlanta, GA: U.S. Department of Health and Human Services, CDC, 2010. Accessed June 1, 2010.
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Note: The next update of this fact sheet is scheduled for June 2011. More recent information may be available at the CDC's Air Pollution and Respiratory Health Branch's Asthma Web site at http://www.cdc.gov/asthma.

Health News Articles

Health Magazine – Health Articles

Types of Asthma: Be Aware!

June 19, 2012

When the respiratory air passage is blocked or becomes narrow, it results in breathing problem. This further grows in to continuous coughing, panting for breath or other such problems. These signs should not be mixed with the regular ones as they have a pattern of their own.

For example, coughing at the extremities of day/night, wheezing, quickness of breath, tiredness, mood swings, and blocked nose all put together are signs of asthma.

These problems can be categorized into three types of asthma namely extrinsic, intrinsic or mixed one. Extrinsic type of asthma usually occurs to younger ones due to inhalation of larger allergens like dust mites, pollens or other particles. They may show the signs of hay fever, eczema or skin rashes. Their immune system can be brought in control through the help of medicines.

Apart from allergies, anything that affect the breathing process, like stress, infection or other factors like cold air, exercises etc denotes intrinsic asthma. A mixed one is, as the name suggests, combination of intrinsic and extrinsic asthma. They can be caused due to some allergens or other factors. Often they can trigger mild attacks that may cause serious complications.

Apart from these types, there are other types of asthma that are named after their impacts. Childhood asthma, as the name suggests, occurs during childhood due to hormonal changes in the growing body. Their treatment is similar to an adult asthma. Adult asthma targets adults of age group of above 20, especially females. They can start at any stage or due to any factor like pollution, plastics, dust, especially at work places.

Bronchial asthma affects the breathing process, as muscles are wrapped around the air passage, especially during winter season. A small allergen may even cause wheezing problem. Seasonal asthma, as per their name, arrives and vanishes with an onset of a particular season. Silent asthma types attacks the patient silently, without any warning that may be severe, in extreme cases, life-threatening too.

Nocturnal asthma attacks the patients during the middle of the night by short breath, wheezing or presence of allergens at home. Their diagnosis usually takes a long time, since they are absent during day times, delaying their treatment. Occupational asthma types trigger at work place due to presence of pollutants. They are not harmful and have a very short life span.

Allergy of asthma may result from running nose, burning sensation and itchy eyes or even through cough/sneeze. Keeping oneself away from the particular allergens and having an inhaler nearby may be of tremendous help. Steroid resistant asthma occurs due to inhaling of glucococrticoids during its steroid therapy.

Apart from the all these, sports/exercise induce asthma signals, danger after some time performing exercise and

cough variant asthma, as they are easily mixed with other conditions are hard to judge on time.

Filed under: Latest News

Almost Half of Asthma Sufferers Not Using Needed Controller Medications

Asthma is a serious disease, causing about 4,000 deaths each year

ARLINGTON HEIGHTS, Ill. (February 25, 2012) – Forty-nine percent of children and adults with persistent asthma are not using controller medications according to results of a first of its kind survey of 1,000 asthma sufferers. Results are published in the March 2012 issue of *Annals of Allergy, Asthma & Immunology*, the scientific journal of the American College of Allergy, Asthma and Immunology (ACAAI).

"According to survey results, 79 percent of these patients had persistent asthma and should have been on controllers," said lead author Gene Colice, MD, of George Washington University School of Medicine. "Of the 51 percent on controllers, 86 percent were inadequately treated as their asthma was not well or very poorly controlled."

The CHOICE (Comprehensive Survey of Healthcare Professionals and Asthma Patients Offering Insight on Current Treatment Gaps and Emerging Device Options) survey used standardized methods established in expert panel guidelines. Results demonstrate the current extent of poor asthma control in the United States. Asthma is a common illness, affecting 7 million, or 10 percent of children and 17.5 million or eight percent of adults. About 4,000 people die each year due to asthma.

The poorer the asthma control, the poorer the patients' quality of life and the higher the risk for emergency department visits and hospitalizations. Patients with severe persistent and uncontrolled asthma more frequently reported often feeling isolated, fearful, depressed and tired.

"Uncontrolled asthma is severely affecting patients' quality of life and increases the risk of emergency department visits and hospitalizations," said co-author and ACAAI past president Michael Blaiss, MD. "Asthma sufferers need to schedule regular office visits, talk with their allergists about preventative controller therapy and then use those medications regularly."

Research shows that asthma patients under the care of an allergist have better outcomes at less cost because of fewer emergency care visits, fewer hospitalizations, reduced lengths of hospital stays, fewer days missed from work or school, increased productivity in their work and personal lives, greater satisfaction with their care and an improved quality of life.

Consumers can take a relief self-test to gauge their asthma symptoms, find free community allergy screenings, obtain a personalized plan on how to get relief and find an allergist at www.AllergyAndAsthmaRelief.org.

About ACAAI

The ACAAI is a professional medical organization headquartered in Arlington Heights,

Ill., that promotes excellence in the practice of the subspecialty of allergy and immunology. The College, comprising more than 5,000 allergists-immunologists and related health care professionals, fosters a culture of collaboration and congeniality in which its members work together and with others toward the common goals of patient care, education, advocacy and research.

AMERICAN LUNG ASSOCIATION.
Fighting for Air

Reduce Asthma Triggers

An asthma trigger is a thing, activity or condition that makes asthma worse. When you come in contact with a trigger it can cause a sudden worsening of symptoms which is often called an asthma **attack**, **episode** or **flare-up**.

Common asthma triggers include respiratory infections, allergens, irritants, exercise, and emotions. Knowing what causes your asthma symptoms is an important step to controlling your asthma. Allergy testing may help you identify your triggers. Your health care provider can help you recognize what makes your asthma worse, and help find simple solutions to reduce and avoid asthma triggers.

The most common asthma triggers include:

Medical Conditions

Respiratory Infections, such as a **cold**, **flu**, or **sinus infection**, are the most common cause of asthma symptoms leading to an asthma flare-up. Frequent hand washing and avoiding people who are sick will help to reduce your exposure to cold and flu. But, the best way to prevent influenza is to get a flu vaccine every year. To find a flu vaccine near you, visit the Flu Vaccine Finder. Medical conditions such as **Acid Reflux** can also worsen asthma symptoms.

TRIGGER EXAMPLES
- Respiratory Infections *(colds, flu, sinus infections)*
- Pregnancy hormones
- Acid Reflux

Food & Medicines

Asthma can be triggered by food allergies as well as medicines. Discuss any over-the-counter or prescription medicines you take such as **aspirin, fever-reducers** or **anti-inflammatories** with your health care provider, along with any **alternative therapies** or **herbal remedies** that may have an impact on your asthma.

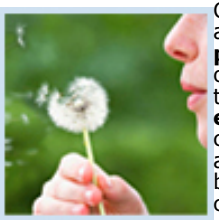
TRIGGER EXAMPLES
- Common food allergies *(peanuts and shellfish)*
- Aspirin
- Non-steroidal anti-inflammatory drugs

Smoke

All types of smoke can make it hard to breathe – including smoke from cigarettes, wood burning fireplaces, burning leaves. If you smoke, you should make a plan to quit. If you don't smoke, but live with someone who does, discuss ways to avoid or limit your exposure to tobacco smoke. The American Lung Association offers many ways to help smokers quit. Contact the **American Lung Association Lung HelpLine** at 1-800-586-4872 to speak with a smoking cessation&bsp;counselor.

TRIGGER EXAMPLES
- Cigarette, cigar or pipe smoke
- Fireplace, campfire or leaf burning smoke

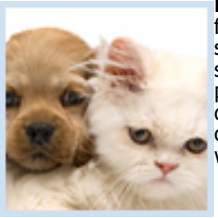
Weather, Pollen, & Air Pollution



Changes in the season can bring on an asthma episode due to increased **pollen** in the air. Limit your time outdoors during high pollen times of the year such as spring and fall. Also, **extreme temperatures** (hot and cold) can trigger symptoms of asthma. Be prepared for the weather before you leave your home by checking the pollen count and air quality index.

TRIGGER EXAMPLES
- Cold, windy, stormy weather
- Sudden or extreme temperature changes
- High humidity
- Weeds, trees, grass
- Air pollution, smog, vehicle exhaust and fumes

Animals

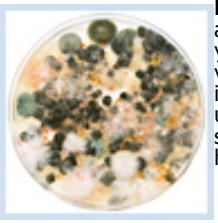


Dander and **saliva** from animals with fur or feathers can be an allergen for some and can cause asthma symptoms. Reduce your exposure to pet allergens by vacuuming and damp dusting weekly. Try to keep your pets out of the bedroom or other rooms where you spend a lot of time.

TRIGGER EXAMPLES

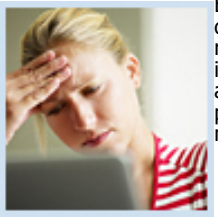
- Birds
- Cats, dogs, ferrets, hamsters, Guinea pigs, bunnies or mice

Mold



Mold is an allergen that can trigger asthma symptoms. You can reduce your exposure to mold by cleaning visible mold, throwing away moldy items, running a dehumidifier and using the exhaust fan when taking a shower. Clean mold with mild soap, how water and a strong brush.

Emotions



Every day comes with its ups and down emotionally. It's important to remember that **strong emotions** can increase rapid breathing and trigger asthma symptoms. **Stress**, both personal and work-related, can be a major trigger as well.

TRIGGER EXAMPLES

- Laughing or crying too hard
- Feeling stressed or anxious
- Anger
- Fear
- Yelling

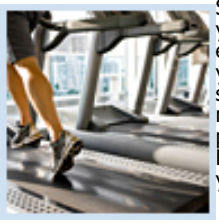
Pests

Pests in the home, workplace or school can impact your asthma. To reduce your exposure to these triggers, wash bedding regularly, fix leaks, store garbage outside, vacuum and dust weekly, as well as using allergen-proof pillow and mattress covers.

TRIGGER EXAMPLES

- Dust mites
- Cockroaches
- Rodents such as mice and rats

Exercise



Staying active is very important to your overall health and wellbeing, especially for those with asthma. If you have exercise causes asthma symptoms, use your quick-relief medicine 15 – 30 minutes before physical activity if prescribed. Remember to monitor the air quality if you plan to exercise outside.

TRIGGER EXAMPLES

- Walking, climbing stairs
- Intense exercise
- Sports
- Swimming

Strong Odors

Scents from **perfumes**, **deodorants** and **cleaning supplies** can affect a person with asthma. When possible, choose cleaning and personal care products that are odor and fragrance-free.

TRIGGER EXAMPLES

- Cleaning products
- Gas Stoves
- Scented candles and incense
- Hairspray
- Air fresheners
- Personal care products

American Lung Association
1301 Pennsylvania Ave. NW, Washington, DC 20004
T: 202 555 1212 | F: 202 555 1234 | E: webmaster@lung.org

ATTACK ASTHMA. LEARN MORE.

Outdoor Triggers

Air pollution can trigger your child's asthma. Even healthy people can have trouble breathing on high air pollution days. The main air pollution triggers are small particles (also known as particulate pollution) and ozone. These come from smoke, road dust, and emissions from cars, factories and power plants. In general, ozone levels are highest in the summer, but levels of particle pollution can be high any time of year and are higher near busy roads and where people burn wood.

Asthma attacks can occur the same day, but may also occur the day AFTER outdoor pollution levels are high. When the Air Quality Index (AQI) reports unhealthy levels, limit physical exertion outdoors.

What you can do

- Reschedule a high-energy outdoor activity to avoid the period when air pollution levels are high.
- Reduce the intensity of the activity so you are not breathing too hard.
- Spend less time engaged in high-energy activities.
- Postpone sports activities to another time when air quality is better.

DID YOU KNOW?

Burn Wise

Studies show that an estimated 70% of smoke from chimneys can actually reenter your home and your neighbor's home. If you're using a wood stove or fireplace and smell smoke in your home, it probably isn't working as it should. Contact a certified chimney sweep for help. **www.epa.gov/burnwise**

Many Asthmatic Kids Not Getting Preventative Treatments

May 07, 2002 02:12:01 PM PST, HealthScout News

By Serena Gordon
HealthScoutNews Reporter

TUESDAY, May 7 (HealthScoutNews) -- Black and Latino children are less likely to use preventative treatments for their asthma than white children. And their asthma symptoms are present more often than they are for white youngsters.

That's the finding of a new study published in the current issue of the journal *Pediatrics*. And it coincides with today's fourth annual observance of World Asthma Day.

As communities across the globe work to raise awareness of this chronic illness, the study highlights just how much work stil needs to be done. That's especially true when it comes to getting preventative asthma care to everyone who needs it -- particularly minorities and lower-income families.

Asthma is a chronic disease of the airways that causes periodic episodes of wheezing, coughing, shortness of breath and tightness in the chest. More than 26 million people have asthma in the United States, and 5 million of them are children, according to the U.S. Centers for Disease Control and Prevention. Death rates for African-Americans from asthma are three times higher than for whites, the CDC reports.

While the disease can be deadly, it can usually be managed with medications and by avoiding substances that trigger asth attacks. Common triggers include pet dander, dust mites, cockroaches, mold and tobacco smoke.

Medications for asthma include those that open up the airways, and others that treat the underlying inflammation of the airways. Moderate-to-severe asthma should generally be treated preventatively with anti-inflammatory medications such as cromolyn sodium or inhaled steroids, according to the U.S. National Heart Lung and Blood Institute (NHLBI).

Because asthma remains a serious public health concern, the World Health Organization and the NHLBI are sponsoring the fourth annual World Asthma Day. These organizations hope to raise awareness of the condition and its symptoms, encoura asthma education and help asthmatics learn to manage the disease more effectively.

The new study looked at 1,658 Medicaid-insured children from California, Washington and Massachusetts. All of the childre had been diagnosed with asthma and were between the ages of 2 and 16 years old.

Thirty-eight percent of the youngsters were black, 19 percent were Latino and 31 percent were white. Almost two-thirds of th children lived in homes with a family income of $20,000 a year or less.

Parents of the children were interviewed by phone about their children's asthma symptoms for the past six months. Question focused on the youngsters' physical health, emotional health and activities, and about the type of medical treatment and service they'd received for asthma during that time.

The researchers found that black children had the worst asthma of the three groups, scoring six points lower on the America

Academy of Pediatrics' asthma rating scale than white or Latino children. Latino children reported fewer days of asthma symptoms than white or black children, but their parents reported their children having more severe asthma than the other groups did.

Black and Latino children were less likely to be using inhaled anti-inflammatory medications than white children.

Conversely, black and Latino children were as likely or more likely than white kids to visit a specialist for their asthma, make preventative care visits to their physicians and follow home asthma management practices, according to the study.

The authors aren't sure what accounts for less use of preventative medications in black and Latino youngsters. Because all children in the study were on Medicaid, health insurance is probably not a factor, they say.

They do suggest that perhaps different physicians may not prescribe all of the medications, and that differences in beliefs about the value of prevention, fear of side effects and cultural factors may all play a role.

Dr. Marianne Frieri, director of Allergy and Immunology at Nassau University Medical Center in East Meadow, N.Y., agrees that cultural factors may play a role in these differences, but adds that environmental factors may also be at work. Overcrowding, exposure to tobacco smoke, cockroaches and city air all can trigger asthma, she says.

Also, communication problems could be a factor as well. She says large asthma-treatment centers, like the one in her hospital, should have translators present to explain the importance of taking the medication and reducing triggers in the hom But not all do.

Frieri says the underuse of anti-inflammatory medication isn't limited to blacks and Latinos, however.

"Anti-inflammatory medications are underused because primary care physicians are often a little more reluctant to use them because they're concerned about the side effects of steroids," she says.

But, she says, studies have shown that the side effects aren't serious and anti-inflammatory medication is an important part treatment for moderate-to-severe asthma.

What to Do: For more information on managing asthma, visit the National Heart Lung and Blood Institute. And check out the Asthma Society of Canada's new Web site for kids with asthma.

Los Angeles Times | ARTICLE COLLECTIONS

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With asthma rates on the rise, here's how to manage symptoms

BOOSTER SHOTS: Oddities, musings and news from the health world

May 04, 2011|By Marissa Cevallos, HealthKey

The rise in asthma rates has researchers a bit baffled. But while they focus on figuring out the reason, people with asthma have more practical concerns: preventing and controlling asthma attacks.

Data released Tuesday from the Centers for Disease Control and Prevention show an increase in the number of Americans with asthma despite better air quality and a marked decline in smoking rates, as reported in the Los Angeles Times.

Doctors don't know how to prevent asthma because it's not clear what causes the disease — it may be caused partly by genetics and partly by exposure to irritants such as pollution and tobacco smoke. And there isn't a cure either.

But doctors know a lot about preventing asthma attacks — unpleasant, sometimes life-threatening bouts of coughing, wheezing and difficulty breathing.

One of the first steps is to clean the house of common triggers, according to the Asthma and Allergy Foundation of America.

The CDC offers this list:

--Second-hand tobacco smoke
--Dust mites
--Air pollution (check how clean your ZIP Code is)
--Cockroaches
--Pets
--Mold
--The flu (get a flu shot annually, the CDC advises)
--Stress

But that's just for starters. People with asthma also need an action plan for controlling their disease, long term. That includes, among other things, detailed instructions on when to use medication and how much to use. This can prevent asthma attacks and help the ones that do occur from getting worse.

The National Heart Lung and Blood Institute and the American Academy of Allergy, Asthma and Immunology offers sample plans.

Now consider these facts from the Asthma and Allergy Foundation of America:

Every day in the U.S.:

--40,000 people miss school or work due to asthma.

--30,000 people have an asthma attack.

--5,000 people visit the emergency room due to asthma.

--1,000 people are admitted to the hospital due to asthma.

--11 people die from asthma.

Scientists will be sorting out what causes asthma and why more people are getting the disease, but the new report stresses the need for asthma sufferers to control the condition.

healthkey@tribune.com

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Los Angeles Times

get the **facts**

Asthma and Complementary Health Practices

Asthma is a chronic lung disease that affects people of all ages. It causes episodes of wheezing, coughing, shortness of breath, and chest tightness. Although there is no cure, most people with asthma are able to manage the disease with medications and behavioral changes.

Researchers also are studying various complementary health approaches for asthma relief. This fact sheet provides basic information about asthma, summarizes scientific research on the effectiveness and safety of complementary health practices for asthma, and suggests sources for additional information.

Key Points

- Conventional medical treatments are very effective for managing asthma symptoms. See your health care provider to discuss a comprehensive medical treatment plan for your asthma.
- There is not enough evidence to support the use of any complementary health practices for the relief of asthma.

About Asthma

In asthma, the airways that carry air into and out of the lungs become irritated, inflamed, and narrowed. The muscles around the airways tighten and the cells in the airway produce more mucus than normal. This makes it difficult for air to flow into and out of the lungs and causes wheezing, shortness of breath, and other symptoms.

More than 24 million people in the United States have been diagnosed with asthma, including approximately 7 million children. It is not known why some people develop asthma, but the tendency runs in families and the chance of having the disease appears to be increasing, especially among children.

Conventional treatment for asthma focuses on preventing attacks and relieving symptoms once an attack is underway. Prevention may include avoiding “asthma triggers” (the things that can set off or worsen symptoms) or taking medicine every day to prevent symptoms.

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
National Institutes of Health
National Center for Complementary and Alternative Medicine

Once an asthma attack is underway, quick-relief medications may be used to relax muscles around the airways and open up airways so air can flow through them. Prevention techniques are generally preferred over quick-relief medications.

For more information about asthma, visit the National Heart, Lung, and Blood Institute Web site at www.nhlbi.nih.gov.

Complementary Health Practices Used for Asthma

Most people are able to control their asthma with conventional therapies and by avoiding the substances that can set off asthma attacks. Even so, some people turn to complementary health practices in their efforts to relieve symptoms. According to the 2002 National Health Interview Survey (NHIS), which included a comprehensive survey of the use of complementary health practices by Americans, asthma ranked 13th as a condition prompting use of complementary health approaches by adults; 1.1 percent of respondents (an estimated 788,000 adults) said they had used a complementary therapy for asthma in the past year. In the 2007 NHIS survey, which included adults and children, asthma ranked eighth among conditions prompting use of complementary health practices by children, but did not appear in a similar ranking for adults.

What the Science Says About Complementary Health Practices and Asthma

According to reviewers who have assessed the research, there is not enough evidence to support the use of any complementary health practices for the relief of asthma.

- There have been several studies that have looked at **acupuncture**—stimulation of specific points on the body with thin metal needles—for asthma. Although a few studies showed some reduction in medication use and improvements in symptoms and quality of life, the majority showed no difference between active acupuncture and sham acupuncture on asthma symptoms. At this point, there is little evidence that acupuncture is an effective treatment for asthma.

- There has been renewed patient interest in **breathing exercises** or **retraining** to reduce hyperventilation, regulate breathing, and achieve a better balance of carbon dioxide and oxygen in the blood. A review of seven randomized controlled trials found a trend toward improvement in symptoms with breathing techniques but not enough evidence for firm conclusions.

- A 2011 study examined the placebo response in patients with chronic asthma and found that patients receiving placebo treatments (i.e., placebo inhaler and sham acupuncture) reported significant improvement in symptoms such as chest tightness and perception of difficulty breathing. However, lung function did not improve in these patients. This is an important distinction because although the patients felt better, their risk for potentially serious or life-threatening consequences of untreated asthma was not lessened.

NCCAM-Funded Research

NCCAM is currently funding studies to determine whether:

- Mindfulness meditation practices might help manage symptoms or improve quality of life for people with asthma
- Vitamin E might reduce lung inflammation in mice and humans with allergic asthma
- Borage oil or *Ginkgo biloba* might reduce airway inflammation
- Vitamin C and vitamin E might reduce asthmatic response to allergens
- Under-the-tongue (sublingual) immunotherapy might build tolerance to substances that trigger allergic asthma.

If You Are Considering Complementary Health Practices for Asthma

- Conventional medical treatments are very effective for managing asthma symptoms. See your health care provider to discuss a comprehensive medical treatment plan for your asthma. Do not use any complementary health practices as a reason to postpone seeing your health care provider about asthma-like symptoms or any medical problem. Do not replace scientifically proven treatments for asthma with unproven treatments.

- If you are considering dietary supplements, keep in mind that they can act in the same way as drugs. They can cause medical problems if not used correctly or if used in large amounts, and some may interact with medications you take. Your health care provider can advise you. If you are pregnant or nursing a child, or if you are considering giving a child a dietary supplement, it is especially important to consult your or your child's health care provider. To learn more, see the NCCAM fact sheet *Using Dietary Supplements Wisely* at nccam.nih.gov/health/supplements/wiseuse.htm.

- Tell all your health care providers about any complementary health practices you use or are considering. Give them a full picture of what you do to manage your health. This will help ensure coordinated and safe care. For tips about talking with your health care providers about complementary and alternative medicine, see NCCAM's Time to Talk campaign at nccam.nih.gov/timetotalk.

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For More Information

NCCAM Clearinghouse

The NCCAM Clearinghouse provides information on NCCAM and complementary health practices, including publications and searches of Federal databases of scientific and medical literature. The Clearinghouse does not provide medical advice, treatment recommendations, or referrals to practitioners.

Toll-free in the U.S.: 1-888-644-6226
TTY (for deaf and hard-of-hearing callers): 1-866-464-3615
Web site: nccam.nih.gov
E-mail: info@nccam.nih.gov

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Journal of Urban Health: Bulletin of the New York Academy of Medicine, Vol. 88, Suppl. 1
doi:10.1007/s11524-010-9480-2

Assessing Community-Based Approaches to Asthma Control: The Controlling Asthma in American Cities Project

Elizabeth J. Herman, Paul L. Garbe,
and Michael A. McGeehin

More than 30 million people in the USA have been diagnosed with asthma during their lifetime. Of the 20 million US residents who currently have asthma, 12 million have had an asthma episode or attack during the past year. Asthma affects people of all races, both sexes, and all ages, and in every region of the USA. However, asthma occurs more often among children, women and girls, African Americans, Puerto Ricans, people in the Northeast, those living below the federal poverty level, and those with particular work-related exposures. Asthma death rates rose between 1980 and 1996 among both sexes and most age and ethnic groups, but have declined since 2000. Women and girls account for nearly 64% of asthma deaths overall, although, among children, more boys than girls die each year. Many of the 4,000 asthma-related deaths that occur annually could be avoided with proper treatment and care.[1]

The burden of asthma in the USA has increased greatly over the last 25 years and affects our nation and health system in more ways than limited and lost lives. Asthma leads to almost 13 million outpatient physician visits and two million emergency department visits each year. Asthma is a leading cause of school absenteeism with children missing almost 14 million school days per year due to asthma.[2] Asthma is the fourth leading cause of work absenteeism and diminished work productivity among adults, resulting in nearly 12 million missed or less productive workdays each year.[2] The estimated annual cost of asthma for 2006 was over $32 billion, including nearly $28 billion in direct health care costs and $4.5 billion for indirect costs such as lost earnings due to illness or death.[3]

Although, with the exception of limited cases of work-related exposure to chemicals, the causes, prevention, and cure of asthma are unknown, asthma can be treated and controlled. In 2007, the National Asthma Education and Prevention Program of the National Heart, Lung, and Blood Institute issued revised guidelines, known as EPR-3, for the diagnosis and management of asthma.[4] These guidelines translate advances in scientific and clinical research into practical advice for people with asthma, the health care providers who look after them, and the communities where they live. The guidelines include the best scientific evidence for comprehensive, long-term strategies to prevent and reverse airway inflammation and manage

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asthma episodes. They provide standard methods for doctors to gauge the severity of a patient's asthma and monitor treatment progress. The guidelines also recommend that people with asthma use a written action plan with treatment instructions to control their illness and handle worsening symptoms. They encourage partnerships among individuals with asthma, families, and clinicians, and prescribe measures to avoid or eliminate environmental factors that cause asthma symptoms.

While caring for individual patients is crucial, decreasing the burden of asthma also demands a comprehensive, coordinated public health approach. Although there have been important clinical advances in the care of individuals with asthma, the Centers for Disease Control and Prevention's (CDC) National Asthma Control Program recognized that delivering those interventions at the community level had been less successful, particularly for the racial and ethnic minorities who experience a disproportionate burden of the illness. There was clearly a need to integrate clinical asthma care and community health. CDC's focus on public health, improving health at a population level, presented an opportunity to address that need.

The Controlling Asthma in American Cities Project (CAACP) was designed to fund the translation of "bench and bedside" success to community- and household-level interventions in underserved communities with a high asthma burden. The project's intent was to create inner-city laboratories where evidence-based or promising asthma interventions could be applied in a culturally appropriate, integrated way to improve the health of children with asthma. Although improving access to quality asthma care and asthma self-management training was a primary concern, the project's other objectives focused on broader, more ambitious outcomes that reflect a public health approach including:

- Assessing the effectiveness of a comprehensive, community-based collaborative approach in achieving population-based outcomes and building community resources and trust
- Developing (and possibly packaging and disseminating) innovative asthma-control interventions for application in other communities
- Establishing or strengthening relationships among institutions and individuals in each CAACP community
- Developing the capacity of community-based organizations, academic professionals, community leaders, etc., to address public health problems
- Establishing or promoting asthma-related policy changes
- Increasing sharing and collaboration between communities and their health departments

CDC selected as implementation sites seven inner-city communities with racial and ethnic minorities who had a high asthma burden and used community-based coalitions with representation from a wide range of organizations, including academic institutions. Site locations, target-area size, demographic characteristics, and the agency receiving the award are summarized in Table 1.

CDC monitored and evaluated the project on multiple levels. At the process level, CDC confirmed through site visits, reports, and regular phone calls that coalitions were formed and functioning, and that quality services were provided to children with asthma, their families, their primary care providers, and other individuals involved with asthma management. The two core interventions implemented at the sites were training primary care providers in EPR-3 asthma

TABLE 1 Characteristics of the Controlling Asthma in American Cities sites

Location	Size of target population (Census 2000)	Target community	Managing agency
Chicago, Illinois	450,000	Region 4, Chicago Public School System	University of Illinois at Chicago, School of Public Health
Minneapolis/St Paul, Minnesota	670,000	Minneapolis and St Paul metropolitan areas	American Lung Association of Minnesota
Northern Manhattan, New York	530,000	Washington Heights and Harlem	Columbia University, Mailman School of Public Health
Philadelphia, Pennsylvania	300.000	North Philadelphia and Germantown	The Children's Hospital of Philadelphia
Oakland, California	400,000	Oakland City	University of California, Berkeley
Richmond, Virginia	720,000	Richmond metropolitan areas: Richmond City, Chesterfield and Henrico Counties	Bon Secours Richmond Health Care Foundation
St Louis, Missouri	450,00	St Louis City and three bordering zip codes to the north	St. Louis Regional Asthma Consortium

guideline implementation[4] and providing asthma self-management training to children and families of children with asthma. Over the course of the project, approximately 1,256 primary care physicians participated in training classes based either on the Physician Asthma Care Education curriculum[5] or the Zeitz problem-based learning curriculum.[6] Academic detailing reached 135 additional providers, and 115 primary care practices engaged in systems-change initiatives. Nearly 11,000 children and 6,600 parents or guardians attended asthma self-management classes. Course structure varied from single- to multi-session training; the training venues included community organizations, local health departments, faith-based settings, schools, and daycare centers. Some sites used existing educational materials such as You Can Control Asthma,[7] Open Airways,[8] and Wee Wheezers,[9] while others adapted or created materials to meet the needs of their communities.

In addition to group training sessions, the sites provided personalized, home-based services or care coordination to approximately 2,800 families. The scope and intensity of services varied by site, with some sites emphasizing indoor-trigger reduction and remediation, and others focusing on social services provision to meet urgent, basic family needs.[10] All of the home-based interventions, however, had strong asthma-education and trigger-reduction components.

These core interventions were supplemented and supported by: training teachers, coaches, school nurses, and other school-based staff in asthma management and trigger reduction; creating asthma-friendly pharmacies to monitor medication use and communicate with primary care providers; introducing improved asthma-care pathways in hospital and emergency departments; developing peer educators and advocates; and numerous other awareness-raising and skill-building interventions. The main interventions listed in the sites' final reports are summarized in Table 2. Several interventions have been packaged and disseminated widely. The Asthma Basics for Children handbooks for parents and early-childhood educators have been copyrighted and are now distributed through the Asthma and

TABLE 2 Interventions implemented by CAAC sites in addition to the core package

Site	Venue	Intervention description
Chicago	Schools	Case identification
		Asthma- and smoking-prevention classes
		Referrals to school-based asthma mobile vans
		Training of school staff
	Community	Asthma classes
	Medical offices	Academic detailing to individual providers
	Other	Training of school personnel, childcare staff, and social agencies on Safer Pest Control to reduce asthma triggers
Minneapolis/St. Paul	Schools	Asthma added to Early Childhood Screening
		Training for staff of before /after school care
		Comprehensive school-based asthma case management
	Daycare	Childcare-provider training
	Community	Group parent-education classes
	Medical offices	Clinic-based systems change
	Other	Asthma-educator certificate course
		Asthma education in the emergency department
		Pharmacist education and training
Northern Manhattan	Schools and daycare	Case identification
		Asthma self-management training classes for students and parents
		Staff training in trigger reduction and asthma management
	Community	Asthma self-management training classes in faith-based organizations and shelters
	Medical offices	Practice-based quality improvements
North Philadelphia	Schools	Asthma self-management classes
		School staff/nurse education
	Community	Community classes
	Medical offices	Practice-based quality improvement
Oakland	Schools	Case identification
		Asthma self-management training classes
		Comprehensive district asthma policy
	Community	Asthma camp
	Medical offices	Hospital-affiliated asthma clinics
		Practice-based quality improvement
	Other	Inpatient asthma education
		Emergency department post-discharge clinic
Richmond	Schools and daycare	School nurse and day care staff training on asthma management and trigger remediation
		Asthma workshops for students with asthma and parents
		"Asthma-fit" to promote physical activity
	Medical offices	Office-based quality improvement
	Other	Asthma educator certificate course
		Asthma education through pharmacists
St. Louis	Schools	Consulting physician services
		School nurse protocols
		Integrated asthma-awareness curriculum
	Medical offices	Practice-based quality improvement
	Other	Asthma-friendly pharmacy intervention

The core package common to all sites included family and home-based trigger reduction and training, and group training of primary care providers

Allergy Foundation of America.[11] Oakland's ***Kickin'Asthma*** curriculum[12] was designated as an American Lung Association "best practice" program, was copyrighted, and went on sale nationally in 2008.[13] Other training materials, forms, and products available from these sites are listed in Appendix B of the supplement.

Institutional changes occurred at multiple levels. For example, in Oakland, Northern Manhattan, and Minneapolis/St. Paul, revision of the standard intake and re-enrollment medical forms made it easier to identify children with asthma or symptoms consistent with asthma and to obtain information about asthma medications. The St. Louis and Minneapolis/St. Paul school systems institutionalized new procedures authorizing nurses and their delegates to assess breathing-related problems and administer medications. In Philadelphia, 11 community- and faith-based organizations integrated asthma self-management training classes into their services. The leads on Richmond's health-care-provider quality-improvement intervention received a grant from the National Asthma Control Initiative[14] to adapt their intervention to meet pediatrician certification maintenance requirements. Moreover, all of the sites' coalitions continue to be active, with some expanding their scope to address other respiratory problems and age groups.

Through their core and supplemental interventions, all of the sites reached large numbers of individuals and achieved impressive intervention-related outcomes, some of which are reported in this supplement, and others of which have been described in previous publications listed in Appendix A of this supplement. At the population level CDC, in coordination with the sites, is currently analyzing trends in hospitalization rates in the seven catchment areas to determine whether the impact of the interventions was large enough to affect those rates. Due to the lag in the availability of hospitalization data, those trends will be published at a later date.

This special supplement aims to sample sites' successes and experiences that extend beyond individual interventions, including alternative ways of implementing similar interventions in different difficult settings; the added value of a community-based approach; institutional or systems change; working across agencies or domains; creating linkages to health plans or HMOs; and innovative approaches to evaluating complex interventions. Thus, this supplement is part of a larger effort to summarize, in a very broad sense, what this large, well-funded, and relatively long project has developed, taught, and accomplished during two years of planning and five years of implementation. In addition to determining how many individuals were reached and engaged, ascertaining whether the project met expectations at the community, institutional, and policy levels is central. Additional questions include: Does the project as a whole add to the knowledge base about translating effective clinical and educational interventions into the real world of underserved and overburdened communities? Are resulting lessons, strategies, or tools applicable to state asthma programs and other settings? Do the evaluation processes of the sites or the project as a whole contribute to the field of evaluation, particularly the evaluation of complex community-based interventions?

This supplement reflects CDC's commitment to addressing these questions, and its papers are part of that process. Accountability requires documentation of the outcomes and impacts of this large investment of federal funds, which will occur in a separate publication. Beyond that task, however, is the responsibility to maximize what has been learned from this project to avoid the repetition of deficient or ineffective approaches in future projects, promote sharing successful strategies and interventions, and inform CDC and other implementing organizations how to

"do it better" next time. The critical, thoughtful summary of the CAACP provided in this supplement can guide not only asthma-control programs, but also other comprehensive, community-based efforts.

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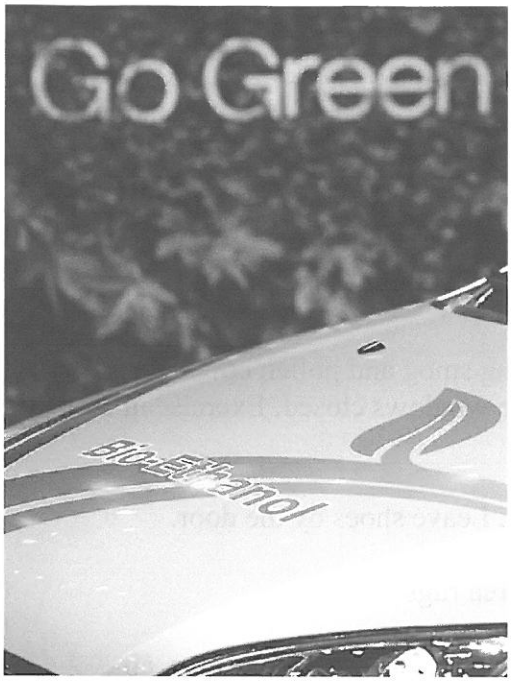
Global Warming: Ready for Your Carbon Close-Up?



A Ford car proudly displays its clean technology credentials on media day at the 2007 Geneva Motor Show in Switzerland. Biodiesel is made from renewable sources like soybean oil, mustard seed oil, or waste vegetable oil, which are mixed with an alcohol and a catalyst.

Photograph by Fabrice Coffrini/Getty Images

Mindy Pennybacker

Republished from the pages of *The Green Guide*

In the last 100 years, the Earth's average surface temperature has risen by about 1 degree Fahrenheit (0.6 degrees Celsius), and it may climb 2.5 to 10 degrees Fahrenheit (1.5 to 6 degrees Celsius) higher by 2100, the Intergovernmental Panel on Climate Change (IPCC) predicts.

Associate Director of the Center for Health and the Global Environment at Harvard Medical School Paul Epstein, M.D., M.PH., has just completed a study on how increased CO2 accelerates and increases pollen production in ragweed, which is common throughout the U.S. and Canada.

Based on this study, Epstein believes this warming, and the increased CO2 production it could cause, may mean more frequent and intense symptoms for the estimated 50 million Americans who suffer from allergies and the approximately 18 million with asthma, which is frequently

triggered by allergens. According to the U.S. Centers for Disease Control and Prevention, in 1998, at least 5,438 people died of asthma in this country, and 423,000 were hospitalized for it.

Breathing Problems: "Hotter weather means more ozone, or smog, is produced from the burning of fossil fuels, and that will cause more respiratory effects," says Dr. Rosenzweig. Already, approximately half of all Americans live in areas with unhealthy ozone levels, the American Lung Association reported in May 2002.

What You Can Do

To reduce exposure to allergens and lung irritants:

• Check your local weather reports for air quality, including smog and pollen counts, before spending time out of doors. If outdoor air is polluted, keep windows closed. Exercise in early morning, before smog and pollen rise with the day's heat.

• Use a doormat to reduce tracking-in of dirt and particles. Leave shoes by the door.

• Remove carpets, in which pollutants collect, and wash area rugs.

• Use HEPA filters, which remove microscopic pollen particles, in vacuum cleaners, air-purifying machines, and air conditioners.

• Take refuge in air-conditioned bookstores, museums, cafés, or movie theaters when air is bad.

To help reduce global-warming gases:

• Choose energy-efficient electrical appliances.

• Drive less. Walk, bike, skate, or take public transportation. You'll also burn more calories (30 percent of Americans are obese).

• Ask Congress and the White House to preserve and enforce the Clean Air Act.

(12)

Environmental Air Toxics: Role in Asthma Occurrence?

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The National Urban Air Toxics Research Center (NUATRC) hosted its first scientific workshop in 1994 that focused on possible relationships between air toxics and asthma. From that meeting came recommendations for future research including a need for more complete individual personal exposure assessments so that determinations of personal exposures to pollutants could be made. In the spring of 2001, NUATRC held a second such workshop to review progress made in this area during the intervening 7 years. Peer-reviewed articles from the workshop are published in this issue of *Environmental Health Perspectives Supplements*. As in 1994, academic, government, and industry scientists participated. Dave Guinnup of the Environmental Protection Agency discussed the nature of air toxics, their definition, and the basis for federal regulation. George Leikauf from the University of Cincinnati reviewed the 1994 workshop and subsequent research in this field. Current research funded by NUATRC that is addressing individual personal exposure was presented by Clifford Weisel (Environmental and Occupational Health Sciences Institute, University of Medicine and Dentistry of New Jersey), Patrick Kinney (Columbia University) and Candis Claiborn (Washington State University). David Corry from Baylor College of Medicine highlighted new insights into asthma pathogenesis while Stephen Redd from the Centers for Disease Control presented an overview of asthma epidemiology as well as the societal costs of the disease. Mary White (Agency for Toxic Substances and Disease Registry) discussed recent epidemiologic investigations by public health agencies into community concerns about asthma and hazardous air pollutants. David Peden (University of North Carolina) reviewed scientific studies into the links between asthma and air toxics as well as criteria air pollutants. In a session on occupational asthma, Lee Petsonk (National Institute for Occupational Safety and Health) discussed risk factors for work-related asthma, whereas Ralph Delfino (University of California, Irvine) addressed limitations of extrapolating from occupational asthma to asthma in the general population. These presentations were followed by panel discussions focusing on future research programs, both for NUATRC and similar research institutions. Recommendations for future research included improved assessments of personal exposure to air toxics as well as research focused on specific hazardous air pollutants. The latter recommendation was based on medical literature that suggests certain pollutants from the list of 188 air toxics are most likely to adversely affect respiratory health. *Key words:* air toxics, asthma, hazardous air pollutants. *Environ Health Perspect* 110(suppl 4):501–504 (2002). *http://ehpnet1.niehs.nih.gov/docs/2002/suppl-4/501-504larsen/abstract.html*

The Mickey Leland National Urban Air Toxics Research Center (NUATRC) in Houston, Texas, USA, was established by the Clean Air Act Amendments of 1990 (*1*). The mission of the organization is to support research in the environmental health science disciplines on possible health risks posed by ambient levels of air toxics in urban atmospheres. The NUATRC has a Board of Directors appointed by the President of the United States, the Speaker of the House of Representatives, and the Senate Majority Leader. This organization is funded cooperatively by the federal government through the U.S. Environmental Protection Agency (U.S. EPA) and by private corporations and foundations. Working through a Scientific Advisory Panel selected by a Board of Directors, NUATRC has developed and supported peer-reviewed research to assess the residual risk to public health from air toxics.

The NUATRC first hosted a medical/scientific workshop in 1994 that focused on possible relationships between air toxics and asthma. From that meeting came recommendations for future research directions, including the need for more complete individual personal exposure assessments so that determinations of personal exposures to various pollutants could be made (*2*). In the spring of 2001, NUATRC held the "Symposium on Environmental Air Toxics: Role in Asthma Occurrence?" held 30–31 May 2001 in Houston, Texas, USA. Peer-reviewed papers from this symposium are published in this issue of *Environmental Health Perspectives Supplements*. A major goal of the symposium was to review progress made in the area of air toxics and asthma research during the intervening 7 years. To accomplish this, speakers reviewed current hypotheses regarding the immunopathogenesis of asthma. Information on air toxics concentrations and individual personal exposures from studies supported by the Leland Center and other organizations was highlighted. The science of air toxics and occupational asthma was addressed in detail. From this information conclusions regarding the relationship between air toxics and asthma in the general population were to be drawn. As part of this process, gaps in knowledge were identified, which then led to recommendations for new research programs. As in 1994, academic, government, and industry scientists participated in the presentations and discussions. A major outcome of the meeting was the identification of areas in which future research should be focused.

Presentations

The tone of the symposium was set in the Keynote Address by Phillip Lewis, Vice President for Safety, Health and Environment at the Rohm and Haas Company (Philadelphia, Pennsylvania). Dr. Lewis is a member of the Board of Directors of the Leland Center, and in this position has been involved in developing research priorities for this organization. His remarks (*3*) stressed the importance to public as well as private concerns of addressing the relationship between air toxics and asthma and emphasized this should be done in an environment of cooperation among the many interests represented at the symposium. He also noted there may or may not be a cause and effect relationship between personal exposure to air toxics and asthma symptoms. However, Dr. Lewis pointed out that it is in everyone's interest to address this issue with scientifically sound approaches.

Dave Guinnup from the Office of Air Quality Planning and Standards at the Environmental Protection Agency (U.S. EPA, Research Triangle Park, North Carolina) then discussed the nature of air toxics, their definition, and the basis for regulation (*4*). As part of his presentation, he also reviewed the U.S. EPA national regulatory-based program where the goal is to characterize, prioritize, and equitably address the serious impacts of hazardous air pollutants on public health and the environment. There are four major components of the U.S. EPA program and they include *a*) source-specific and source sector-specific regulations, *b*) partnerships and initiatives that focus on

This article is part of the monograph *Environmental Air Toxics: Role in Asthma Occurrence?*

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Received 5 December 2001; accepted 10 December 2001.

multimedia impacts and cumulative risks, *c*) ongoing research and assessment activities, and *d*) education and outreach activities. Integration of the four components of the total program is especially important as the program evolves from a focus on technology-based regulatory development into one in which the focus is directed toward reducing or eliminating health and ecologic risks from exposure to air toxics.

George Leikauf from the University of Cincinnati (Cincinnati, Ohio) reviewed the 1994 workshop (*2,5*) and subsequent research in this field. Before the 1994 meeting Dr. Leikauf was commissioned by NUATRC to research the role of air toxics in asthma incidence by conducting a review of existing literature. His presentation of the results of that review (*5*) was a focal point of the first meeting, and provided much of the framework for the recommendations that came from the initial meeting. In updating research relevant to this area in the intervening years, Dr. Leikauf noted that very large gaps in our knowledge still exist (*6*). He also noted that in considering air toxics and asthma, we must distinguish between the ability of an air toxic to exacerbate already established disease and the potential ability of at least some air toxics to cause asthma directly. Furthermore, once the disease is established, it is also possible that exposure to air toxics may lead to disease progression such that the frequency and severity of the process along with the associated morbidity are increased. During his presentation, Dr. Leikauf reminded the participants that many of the major components of environmental tobacco smoke (ETS) are urban air toxics. He noted the several studies suggesting a link between exposure to ETS and onset of asthama as well as exacerbations of asthma (*7,8*). Dr. Leikauf pointed to an important future research direction in noting the increasing use of microarrays to study gene–environment interactions. The ability of investigators to assess the effects of individual air toxics on gene activity should provide important insights into how hazardous air pollutants contribute at basic levels to several pathological processes within the respiratory tract including asthma.

Research funded by NUATRC to address individual personal exposure was presented by Clifford Weisel (Environmental and Occupational Health Sciences Institute, University of Medicine and Dentistry of New Jersey, Piscataway, New Jersey), Patrick Kinney (Columbia University, New York, New York), and Candis Claiborn, (Washington State University, Pullman, Washington). Dr. Weisel's program, Relationship of Indoor, Outdoor and Personal Air (RIOPA), is designed to assess the influence of ambient air toxics sources on both indoor and personal exposures (*9*). In this program, air samples have been collected from individuals and homes in close proximity to ambient air sources in three urban centers: Elizabeth, New Jersey; Houston, Texas; and Los Angeles, California. Preliminary results indicate that the correlation between outdoor air concentrations and either the indoor or personal air concentrations vary greatly with each air toxic. Even for compounds with overall indoor/outdoor ratios near unity (indicative of an outdoor source dominating the exposures for those compounds), individual homes or personal exposure samples at times had ratios in excess of one, indicating that sources other than ambient emissions were important contributors to the air toxic exposures for these individuals. Dr. Kinney's study, "Air Toxic Exposure Among Inner City High School Students in NYC and Los Angeles" or the "TEACH Study," involves assessing personal exposure to air toxics in high school students in two urban areas (*10*). In addition to personal exposures, both urban and nonurban fixed-site air toxic and criteria pollutant measurements are being collected. Preliminary results have shown that significantly higher volatile organic compound (VOC) concentrations can be found at the urban fixed-site location compared to a nonurban fixed-site location for several VOCs. In addition it appears that local sources can significantly influence VOC concentrations. Personal VOC data indicate a range of indoor and outdoor influences. Dr. Claiborn's study, "Testing the Metals Hypothesis in Spokane, Washington," is the most recently funded of this trio of studies (*11*). The objective is to test the hypothesis that particulate metals are associated with observed cardiovascular and respiratory health effects. In previous work that helps provide a base of data for this study, Dr. Claiborn and colleagues showed a statistically significant association between particulate measures taken at a central monitoring site and hospital admissions for asthma. The association between particulate metal species (Sb, As, Cr, Co, Mn, Hg, Se, Cd, Ni) and health outcomes (emergency department visits for asthma, hospital admission for respiratory or cardiovascular events, total respiratory mortality) is now being addressed.

David Corry from the Baylor College of Medicine (Houston, Texas) reviewed new insights into the pathogenesis of asthma (*12*). Since the workshop in 1994 when this topic was also reviewed (*13*), there have been several advances in knowledge. He highlighted recent findings demonstrating the importance of the interleukin (IL)-13/IL-4 receptor alpha (IL-4Rα)-dependent signaling pathway in determining airway hyperresponsiveness, mucus overproduction, IgE secretion, and other features of disease. In terms of insights into the genetic basis of the disease, he pointed out that perhaps the most interesting locus is 5q31, which contains several type 2 cytokine genes including the genes for IL-4 and IL-13. He also addressed recent studies suggesting that environmental factors such as tobacco smoke and diesel exhaust particles may exert adjuvant properties that increase the activity of T-helper cell type 2 (T_H2) cells that underlie the disease. Regarding other environmental factors, one of the most important may be the biochemical characteristics of the allergen including its protease activities. These biochemical features help dictate T-cell activation and recruitment to the lung.

Stephen Redd from the Centers for Disease Control and Prevention (CDC, Atlanta, Georgia) discussed the burden, costs, and possible causes of asthma in the United States (*14*). Dr. Redd noted that asthma has emerged as a major public health problem in this country over the last 20 years and that the number of asthma cases has more than doubled since 1980. Over the same time period, the rate of asthma deaths has also increased (approximately 5,500 asthmatics die from their disease each year). Racial differences exist in terms of the impact of asthma. The rates of death, hospitalization, and emergency department visits are 2 to 3 times higher among African Americans than among Caucasian Americans. Over the last decade, the direct and indirect costs of this disease have more than doubled. To explain the increase in asthma prevalence, both lifestyle and environmental hypotheses have been put forth. It appears that obesity predisposes to the development of asthma, as do environmental exposures to house dust mite allergen and ETS. Conversely, both day care attendance and having a larger number of siblings have been found in some studies to protect against developing asthma. The latter observation has led investigators to suggest that increased exposure to microbial agents may protect against asthma (hygiene hypothesis). Difficulties in identifying and measuring rates of incident cases of asthma continue to hinder understanding of the causes of disease onset.

Mary White of the Agency for Toxic Substances and Disease Registry (ATSDR, Atlanta, Georgia) discussed recent epidemiological investigations by public health agencies into community concerns about asthma and hazardous air pollutants (*15*). Some of the difficulties in investigations within a community were highlighted. They include a lack of data on asthma prevalence or incidence at the local level, limited information on the identification and concentration of air contaminants in residential areas, and major gaps in the scientific evidence

regarding the association between different air toxics and asthma. Still, the experiences gained through these investigations illustrate not only the challenges but also the opportunities associated with studying these relationships within individual communities.

David Peden from the University of North Carolina (Chapel Hill, North Carolina) reviewed several scientific studies that addressed links between asthma and both air toxics and criteria air pollutants (*16*). The latter includes ozone, particulate matter, nitrogen dioxide, and sulfur dioxide as well as carbon monoxide and lead. Dr. Peden again emphasized that asthma is characterized by a T_H2 eosinophilic inflammation within airways. The disease is also characterized by increased responses to a number of non-specific irritants including ozone, particulates, and endotoxin. Dr. Peden believes that T_H2 cytokines such as IL-4 and GM-CSF may modify the response to pollutants, but also noted that pollutants can change the response to allergen. For example, pollutants can modify both immediate and late-phase responses to allergen. The mechanisms via which this occurs are not well understood. Dr. Peden speculated that important primary and secondary targets of pollutants are epithelial cells as well as monocytes within airways.

Occupational asthma was a focus of discussion during the workshop held in 1994 (*17*) and was again highlighted in this symposium. In the first session devoted to occupational asthma, Lee Petsonk from the National Institute for Occupational Safety and Health (NIOSH, Cincinnati, Ohio) discussed work-related asthma and implications for the public at large (*18*). Dr. Petsonk noted that much can be learned about asthma in the general population through investigation of asthma onset in the workplace, since exposures are often qualitatively similar, although often more intense in the occupational environment. In reviewing this scientific literature, there were several conclusions drawn. First, there is a dose-related increase in sensitization and symptoms for exposures to both chemical and protein sensitizers, and a high proportion of highly exposed working groups can be affected. Second, sensitizing exposure to the skin may affect respiratory outcomes. Third, atopy increases the risk of sensitization and illness after workplace exposure to high molecular weight antigens but not to chemical sensitizers. Fourth, experimental and some clinical evidence suggests that irritant exposures may act as adjuvants among individuals exposed to sensitizing substances, increasing the proportion that become sensitized. Evidence also indicates that atopy may be a result of irritant exposures in some individuals. Fifth, occupational asthma resolves completely in a significant minority of subjects when exposures have been adequately controlled in a timely fashion.

Ralph Delfino from the University of California, Irvine also discussed occupational asthma but addressed the limitations of extrapolating from occupational asthma to asthma in the general population (*19*). Relevant confounding issues include the complexity of pollutant mixtures as well as the heterogeneity of asthma. The relevance of adult occupational asthma to pediatric asthma was also questioned. In addition Dr. Delfino pointed out other important issues concerning classes of air toxics and asthma within both occupational and nonwork-related settings. For example the types of compounds identified in associations between occupational asthma and VOCs are often not the same as those identified in community studies showing respiratory effects of VOC mixtures on adult and pediatric asthma. In terms of future studies Dr. Delfino highlighted the need for epidemiologic research on the relationship of asthma onset and exacerbation to air pollution with emphasis on disentangling the effects of air toxics from certain criteria air pollutants (ozone, particulate matter, nitrogen dioxide, sulfur dioxide). In addition he suggested that future studies should focus on air toxics identified as asthmogenic in occupational studies (e.g., certain metal compounds). He also believed that research should be initiated on air toxics expected to have adverse respiratory effects based on known biological mechanisms.

Panel Discussions

These formal presentations were followed by two panel discussions focused on current and future research programs at a national level that could be pursued by NUATRC and similar research institutions. The first discussion focused on federal programs and included panel members from the U.S. EPA (Hillel Koren), National Institutes of Environmental Health Sciences in the Research Triangle Park, North Carolina (J. Patrick Mastin and George Malindzak), NIOSH (Lee Petsonk), and CDC (Stephen Redd). The second panel again included Dr. Koren of the U.S. EPA but also included members from industry and academic institutions. Myron Harrison represented ExxonMobil Corporation (Irving, Texas) and Will Ollison represented the American Petroleum Institute (Washington, DC). Nathan Rabinovitch from the National Jewish Medical and Research Center (Denver, Colorado) also took part in the discussion, as did Dr. Stuart Abramson of Texas Children's Hospital and Baylor College of Medicine. In terms of future research directions, the consensus was that additional assessments of personal exposures to air toxics is needed to more accurately determine associated risks. There was also general agreement that research should focus on a subset of urban hazardous air pollutants that have been associated with asthma induction and/or exacerbation. One way of achieving this focus is for researchers to concentrate on compounds that appear on both Dr. Leikauf's list of 30 hazardous air pollutants most likely to impact asthma and respiratory health (*5*) and the U.S. EPA 1999 list of 33 hazardous air pollutants posing the greatest threat to public health in the largest number of urban areas. From these two lists, seven classes of compounds emerge: acetaldehyde, acrolein, formaldehyde, hydrazine, and cadmium, chromium, and nickel compounds. In addition to concentrating on these compounds, several individual presentations and the panel discussions also highlighted the importance of understanding the respiratory effects of ETS and diesel exhaust. Both are mixtures of various combustion-related particles and air toxics that may interact to enhance asthma incidence and/or severity. The point was made that future work must include the most vulnerable populations. Included in the most vulnerable groups are children, among whom the incidence of asthma has shown the greatest increases during recent decades (*20*).

In addition several speakers stressed the need for expanded surveillance efforts. Much can be learned from surveillance activities about effective intervention and assessment. Other speakers emphasized the need for a better understanding of the mechanisms of asthma formation and exacerbation, which are still not clear. More knowledge of these mechanisms may facilitate the task of explaining the complex relationship between asthma and environmental exposures. Other important future research needs included the interplay between allergy and asthma; issues of susceptibility and sensitivity; the effects of genetic factors on asthma; and reasons for the severity of asthma which is now worse than in the past. Last, it was also recommended that researchers must strive to increase the time and concentration resolution of exposure measurements. Improvements in modeling of personal exposures will lead to improved knowledge of personal exposures.

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Curr Pediatr Res 2011; 15 (1): 29-32

Environmental Risk Factors in Relation to Childhood Asthma in Rural Area

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Abstract

Asthma is a common chronic disorder with increasing prevalence both in children and adults. WHO estimates that annually 15 million disability adjusted life-years are lost and 250,000 asthma deaths are reported worldwide. Approximately 500,000 annual hospitalizations (34.6% in individuals aged 18 y or younger) are due to asthma. To study the Relationship between environmental factors and childhood asthma in a rural area has been studied. A hospital based descriptive study was carried out in Punjab, over a period of one year in children (6-15yrs) having asthma. In 200 children studied (boys 64% and 36% girls), asthma attacks were increased during a particular season (86%), after exertional work (70%) and along with ARI (72%). The risk of asthma was more in children where smoke producing fuel was used (70%), presence of insects/pets/domestic animals (70%) and moisture, mold (42%) in the home, born prematurely/LBW (56%), with family history of atopy (44%), one smoker in family (38%), and who belonged to poor socio-economic status (44%).Breast feeding was protective in reducing the incidence by (62%).No relationship was found with consumption of junk food and emotional factors. This study shows that asthma is an important public health issue in rural communities as in urban areas. Breast feeding, use of LPG for cooking, early treatment of ARI reduces incidence of asthma attacks. Further study of indoor and outdoor risk factors which trigger attacks of asthma and study of means to reduce or delay the development of asthma in susceptible individuals in this population is suggested.

Key words: Asthma; environmental; risk; smoke.

Accepted August 22 2010

Introduction

Asthma is a chronic inflammatory disorder of the airways characterized by an obstruction of airflow, which may be completely or partially reversed with or without specific therapy. Airway inflammation is due to interactions between various cells, cellular elements, and cytokines. In susceptible individuals, it causes bronchial hyper responsiveness (BHR), which results into inherent tendency of the airways to narrow in response to various stimuli (eg, environmental allergens and irritants), causing symptoms including wheezing, breathlessness, chest tightness, and cough, particularly at night or after exercise.

Over 300 million people worldwide are affected by asthma, with a high negative impact on quality of life, productivity and health care costs. Evidence shows that the prevalence of asthma is increasing, especially in children [1]. The cost of illness related to asthma is around $6.2 billion. Each year, an estimated 1.81 million people (47.8% in individuals aged 18 y or younger) require treatment in the emergency department. Among children and adolescents aged 5-17 years, asthma accounts for a loss of 10 million school days and costs caretakers $726.1 million because of work absence[2].

The risks for developing asthma depend on a complex interaction of hereditary and environmental factors. Risk factors are: genetic predisposition (family history of atopy or asthma); perinatal factors (low birth weight, prematurity); exposure to allergens; infections (respiratory infections, especially those caused by respiratory syncytial virus); environmental air pollution; tobacco smoke; diet and obesity[3].Environmental exposures in early life that affect immune maturation is the key factor. The indoor environment is a likely candidate since children spend significant time indoors at a time when immune deviation usually occurs. Exposure to indoor pollutants represents a potentially modifiable cause of allergic sensitization and asthma. So, it becomes important to establish which envi-

ronmental factors might influence the development of asthma in predisposed individuals. Primary prevention includes creation of a productive environmental situation, leading healthy life-style, elimination of environmental factors. Early detection of atopy and the causal allergens, including food, prevention of the development of viral infections, treatment of atopic dermatitis, allergic rhinitis, etc. are important components of primary prevention. Reduction of allergen exposure, leading to subsidence of inflammation and hyperactivity in bronchi belongs to secondary prevention. Since the quality of indoor environment is potentially modifiable there might be opportunities for intervention to reduce asthma symptoms. In order to counteract the increasing prevalence in asthma, the significance of the indoor environment where children grow and spend most of their time need to be given greater attention.

Methods

A hospital based descriptive study was carried out in rural area of Punjab, India on a population of 200 children, over a period of one year to determine the relationship between frequency of asthma attacks with the selected individual and family characteristics. The conceptual framework for this study was based on Modified Betty Newmen's model which concerns with identification of factors significant in causing asthma attacks. Criteria for sample selection was patients between age group 6-15yrs,attending Pediatric OPD, diagnosed with asthma (*International Classification of Diseases*, Ninth Revision, code 493) by a Pediatrician and were willing to participate in study.

The information was collected through a structured questionnaire which was given to both the child and a parent or caregiver. The questionnaire included information relevant to asthma risk factors, including socioeconomic status (age, gender, educational level, employment status), emotional stress, physical exertion, dietary pattern, family history of asthma, environmental tobacco smoke, the use of indoor combustion devices, usage of pesticides, birth weight and or premature birth, breast-feeding history. The last section of the questionnaire included information about frequency of asthma attacks. Data analysis were performed using Split half method of reliability by using Karl Pearson's co- efficient of correlation.

Results

In studied population of 200 children(64% boys and 36% girls)there were 44%children of age group 6-9years, 30% of 9-12 years and 26%of 12-15 years,22% belonged to middle class,34% from lower middle class and 44%were from poor socio economic status.The risk of having asthma was elevated in the families with history of atopy (44%), where one member was habitual smoker (38%), among children born prematurely/low birth weight (56%), where smoke producing fuel used(70%),presence of insects/pets/domestic animals in the home (70%) and presence of moisture, mold(42%). Asthma attacks were increased during particular season(86%) maximum (60%) during winter and (16%) autumn. The risk of asthma attacks increased after exertional work (70%) and

Table I. *Characteristics of the study population.*

Sr No.	Questions	Yes n(%)	No n(%)
1	Born prematurely/low birth weight	56	54
2	Breast feeding	38	62
3	Residential area rural	58	42
4	Presence of moisture, mold at home	48	52
5	Smoke producing fuel used	70	30
6	Anyone in the family habitual smoker	38	62
7	Use of scent sticks at home	56	54
8	Presence of insects/pets/domestic animals	70	30
9	Asthma attack during particular season	86	14
10	Asthma attack followed by ARI	72	28
11	Any family member diagnosed with asthma	08	92
12	Family history of atopy	44	56
13	Consumption of junk food	48	52
14	Does junk food precipitate asthma attacks	10	90
15	Emotional stress during examination days	18	82
16	Asthma attack due to family tension	08	92
17	Asthma attack after exertional work	70	30
18	Asthma attack after episodes of laughing/crying	20	80

along with ARI(72%). No relationship was found with consumption of junk food and emotional factors like examination stress, laughing/crying, tense atmosphere in the family. The risk of having asthma was lower among the children who were breast fed (62%) (Table 1).The envi ronmental as well as physical factors proved significant in asthma patients. Breast feeding proved to be protective, with breast fed children having lower risk than those that were not. While most of these results were not statistically significant, due to the small sample size, they are in the expected direction. These results confirm the role of susceptibility factors in asthma and prove that environmental factors contribute to the incidence of asthma.

Discussion

Incidence of asthma is reported to be very high in minority populations and in people living in poverty[2,3].This difference is reflected in the number of emergency room visits, hospitalizations and death, and is thought to reflect differences in risk factors of exposure and asthma control with socioeconomic status. Asthma, the most common chronic disease of childhood, has major public health and financial consequences [4]. Although children of low-income families and minority children, are more likely to have asthma, as they are less likely to receive optimal medical care. These children have been shown to receive fewer preventive asthma medications [1,2,5,6,7].

The results of the present study are consistent with the evidence that premature children are at an increased risk of asthma, the risk being increased by two-fold for the subjects born prematurely [3,8]. Previous studies have suggested that the development of protective immune responses to microbes early in life may reduce the likelihood of the development of allergies, and as a result the development of asthma[9].Perinatal factors, including gestational age and birth weight, influence the development of atopy in early life, increase the risk of developing lower respiratory tract infections, and play a possible role in the development of asthma in later life [3,8]. Human milk contains numerous components protecting the infant against infections, including factors that provide specific immunity, nonspecific protective factors that inhibit the binding of bacterial pathogens and their toxins, and lipids that may disrupt enveloped viruses[10].Breast milk contains cytokines and growth factors that may play a role in modulating the development of asthma by preventing sensitization to environmental allergens, enhancing infant lung development and reducing susceptibility to respiratory infections [11]. The role of breastfeeding as a protective factor against asthma and atopic diseases, however, continues to be controversial, with some studies showing a negative effect of breastfeeding [12,13] and others showing a protective associtation[14,15,16]. Immunopro - tection conferred by human milk may vary in relation with the mother's atopic constitution, infections, immune status, and diet. Our results support a strong protective effect of breastfeeding against asthma in children.

The risks for developing asthma depend on a complex interaction of hereditary and environmental factors. Risk factors that have been identified include: genetic predisposition (family history of atopy or asthma); perinatal factors (low birth weight, prematurity); allergen exposures (sensitization and exposure to cockroaches, house dust mites, rodents, furry animals and molds); infections (respiratory infections, especially those caused by respiratory syncytial virus); environmental air pollution; tobacco smoke; diet and obesity [17,18].

We found an increased risk of current asthma in children associated with a family history of asthma, environmental smoke exposure and air pollution (Smoke producing fuel used, Anyone in the family habitual smoker, Use of scent sticks at home), and the results were statistically significant. Maternal smoking during pregnancy increased the occurrence of physician-diagnosed asthma during childhood suggesting that the exposure to tobacco compromises the development of the fetal lungs and as a result, an increased risk of developing asthma[19,20]. Pets are one of the most common indoor allergens along with dust mites, cockroaches and molds. In many countries, over 50% of homes have cats and/or dogs [21]. In our study population, 70% households had pets in the house. There was increased risk of asthma in children living in homes with pets. Emotional as well as dietary factors did not contribute significantly as risk factors for precipitating attacks of asthma.

The major limitation of our report is the size of the population studied. Because the population available for investigation was small, few of the results were statistically significant, although most of the results were in the direction expected from previous studies. This problem is difficult to avoid when one studies a small population. We believe our results to be useful in spite of this problem.

Conclusion

This research identified that asthma is not only a problem for urban city minority populations, but also is an important public health issue in rural communities. Rural children are at risk of exposure to a number of perinatal and environmental factors which may be causally related to the increasing rates of asthma in this population. Reducing exposure to indoor allergens, especially in genetically susceptible children, can reduce the development of allergic sensitization and this may prevent childhood asthma and decrease the frequency and severity of asthma attacks

[22,23]. Certain mechanical interventions are effective both in reducing allergen loads in the home and in improving asthmatic children's respiratory health. Several potential indoor and outdoor risk factors for asthma in rural homes, the avoidance of which may reduce or delay the development of asthma in susceptible individuals. Factors that contribute to this dilemma include inadequate preventive medical care for asthma management, inadequate asthma knowledge and management skills among children and their families, psychosocial factors, and environmental exposure to allergens or irritants. Since disparity of asthma mortality and morbidity among children in rural area is closely linked to socioeconomic status and poverty, measures to reduce exposure to environmental allergens and irritants and to eliminate barriers to access to health care are likely to have a major positive impact. Interventions for children in rural areas must focus on prevention of asthma symptoms and promotion of wellness. Future research should focus on improving the effectiveness of education on home asthma triggers, and understanding long-term children's health effects of the interventions that have proven effective in reducing asthma triggers.

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Mold Removal In Homes, Offices Could Cut Respiratory Illness

09 Sep 2011

A new evidence review finds that ridding homes and offices of mold and dampness can help reduce respiratory infections and troubling symptoms for asthma sufferers across the globe; however, the best way to eliminate the mold remains unclear.

Mold is one of the most important environmental triggers of symptoms such as coughing and wheezing, according to National Institute of Environmental Health Sciences.

"Mold is found in many homes with basements, in apartments and walkouts that are partially or fully below ground, and in buildings that have been flooded or have poor humidity control," said Peter Thorne, head of the occupational and environmental health department at the University of Iowa. "Homes and office buildings alike have problems."

But does "remediating" or relieving homes, offices and schools of dampness and mold make a big difference? Lead reviewer RiittaSauni at the Finnish Institute of Occupational Health in Tampere, Finland, said that results are mixed.

"We were happy to find evidence that remediation of mold-damaged houses decreased the severity and amount of symptoms in patients with asthma and respiratory infections," Sauni said. "Unfortunately, we did not find evidence that remeditation could prevent these diseases."

The review appears in the September issue of The Cochrane Library, a publication of The Cochrane Collaboration, an international organization that evaluates research in all aspects of health care. Systematic reviews draw evidence-based conclusions about medical practice after considering both the content and quality of existing trials on a topic.

Remediation of mold and dampness requires total or partial renovation of a building, or cleaning with a fungicide or bleach solution. Sauni and her team looked at eight studies with 6,538 participants who had their homes, schools or workplaces remediated by a mixture of these methods. The reviewers say that because the available studies did not offer high-quality evidence and sample sizes were small, "drawing hard conclusions was difficult."

Nonetheless, the review found that when compared to doing nothing at all, repairing houses decreased asthma-related symptoms as well as the amount of respiratory infections in adults. Remediation also decreased the number of acute care visits in children and students' visits to physicians for common colds.

In one South Wales study, for instance, 115 members of the group who had their homes remediated with the complete removal of visible mold, a fungicide treatment and installation of a fan, were more likely to see improvement in their respiratory symptoms for six and 12 months afterwards, compared to those in the control group whose homes were not cleaned.

The reviewers, however, could not determine which method of remediation was superior to significantly improving asthma symptoms.

"The studies have shown that after cleaning and fungicide treatment, a large number of the buildings were soon re-infected with molds, and also a partially remediated office building had to be repaired more thoroughly," Sauni said, adding that mold removal can be costly.

"Sometimes, if the structures are damaged widely, the easiest and most cost-effective possibility is to pull down the damp building and build a new one," she said.

The reviewers concluded that better research is necessary to give evidence of improved outcomes.

Source: Health Behavior News Service

Article URL: http://www.medicalnewstoday.com/releases/234128.php

Editorials

Fossil fuels, allergies, and a host of other ills

Paul R. Epstein, MD, MPH *Boston, Mass*

Key words: *Climate change, carbon dioxide, allergies*

Our defenses are under assault from a growing spectrum of challenges. For allergies and asthma, most research has focused on indoor pollutants, genetic predispositions, and socio/emotional factors. During the past decade, however, there has been an explosion of new work regarding outdoor sources of respiratory irritation and sensitization, and all these emerging issues are associated with the combustion of fossil fuels.

In the past 3 decades, asthma rates have risen several fold throughout the developed and developing world. There are multiple drivers and some are additive; others are acting synergistically.

Rising ragweed pollen is the leading edge. Repeated studies[1-3] confirm that elevated CO_2 stimulates weeds to produce pollen disproportionately to the photosynthetically derived growth in their biomass. It seems weedy, opportunistic species that thrive better in disturbances profit most from CO_2, putting the excess carbon into their male, reproductive, territorially seeking parts. Poison ivy (*Toxicodendron* taxa) does extraordinarily well, growing in vine abundance and toxicity, the chemical within it, urushiol, becoming stronger,[4] just as the pollen grains in ragweed become more allergenic (as demonstrated by electrophoresis).[5]

Inside inner cities, a "CO_2 dome" forms,[6] trapping ambient CO_2 levels in the 400s, 500s, and 600s of parts per million by volume. (The global average is now 387 ppm; preindustrially it was 280 ppm.) High levels of CO_2 inside the dome-shaped urban heat island effect affect inner-city ragweed (and fast-growing trees in spring) and most likely contribute to the heat-trapping in the urban setting, whereby temperatures can range 10°F above those in the surrounding countryside. Ground-level ozone from nitrogen oxides, another by-product of burning fossil fuels, combined with volatile organic compounds, is another heat-trapping (and lung tissue–damaging) agent. Increased ground-level ozone or photochemical smog exacerbates asthma and most likely initiates new cases,[7] and ozone formation is increased during heat waves (which are increasing with climate change from burning fossil fuels).

Trees are also feeling the effect of rising CO_2.[8] The Duke University Free-Air CO_2 Enrichment (FACE) experiments in North Carolina found that loblolly pines grown under elevated CO_2 grow a bit more but produce 3 times the number of cones and seeds.[9] Fast-growing pioneering trees—the opportunist trees—that like forest edges and pop up after disturbances (like fires, cuttings, blights, and blow-downs) appear to do especially well. Since the 1970s, the date of spring flowering has advanced 30 days,[10] the seasons changing with a changing climate from burning fossil fuels.

Extraordinary spring pollen counts have been recorded in recent years (long-term records, save for in the paleo [ice] record, are sparse), and the early arrival of spring is extending the spring allergy and asthma seasons. (Allergies are also being reported anecdotally in the not-so-dead of winter; flowers sprout during especially warm Januaries.) In seasons with increased warmth and moisture, as during the 2008 spring, the addition of CO_2 and nitrogen provide a plethora of stimuli, making for hyperproductive tree pollen production. (Coastal marine systems are also feeling the effects of overfertilization, with nitrogen from multiple sources—sewage, agriculture, and aerosolized nitrogen from coal-fired plants.)

Some arbuscular mycorrhiza, fungi that hug the roots of trees, nourishing and supporting their growth (which pop up as mushrooms, their fruiting bodies), are also getting a boost from more CO_2 and are making a lot more spores.[11]

And now to a "nasty synergy."[12] Diesel particles, known respiratory irritants, turn out to be excellent delivery systems for aeroallergens (pollen and spores). Pollen grains and spores attach to diesel particles, as shown by scattering electron microscopy,[13] and are carried deep inside the lungs to the twigs and leaves of the pulmonary tract. The diesel particles (from burning fossil fuels) also contain nitrates that irritate mast cells, boosting the allergenic assault.

Before leaving the particulates (from burning fossil fuels and forests), black soot has just been found to play a stronger role in global warming than previously appreciated.[14] Black soot traps outgoing long-wave radiation—as do CO_2, CH_4, ozone, chlorofluorocarbons, and H_2O—and, as it settles in ice and snow, decreases the reflectivity (albedo) of otherwise reflecting surfaces (ie, holding heat). Its influence is now calculated to be 0.9 W/m^2, whereas that of CO_2 is 1.66 W/m^2. The good news is that the black carbon can wash out in weeks, whereas CO_2 lasts for a hundred years. Cleaning the composition of fuels we use means removing sulfates (which cool by reflecting sunlight and seeding clouds) and the black soot that enhances warming.

CO_2 itself has other consequences. Oceanic absorption is leading to ocean acidification, threatening coral reefs and other calcareous marine life by altering the saturation states of calcite and aragonite ($CaCO_3$).

Agricultural weeds are also getting a boost. Today, weeds, pests, and pathogens destroy an estimated 42% of growing and stored crops (equaling ~$300 billion losses) annually.[15] While rising CO_2 favors growth of weeds (requiring more herbicides), the higher C:N ratio in the leaves means that insect pests must

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Disclosure of potential conflict of interest: P. R. Epstein has received funding from Wells Fargo Bank and the Columbia Earth Institute. He is a member of the Columbia Earth Institute's Global Roundtable on Climate Change.

Received for publication July 16, 2008; accepted for publication July 16, 2008.

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J Allergy Clin Immunol 2008;122:471-2.

0091-6749/$34.00

doi:10.1016/j.jaci.2008.07.015

The Washington Post

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FACT CHECK: Despite claims, air pollution has been shown to aggravate and cause asthma

By Associated Press, Published: November 18

WASHINGTON — It was a startling claim: Air pollution has no connection to asthma, Kentucky GOP Sen. Rand Paul said on the Senate floor.

But Paul, and a chart he used to make his case against the health benefits of a new federal air pollution rule, relied on some creative sourcing and pseudoscience.

Paul's chart was a graph showing air pollution declining in California as the number of people diagnosed with asthma rose. The chart attributed the data to a May 2003 paper by what was then called the California Department of Health Services. But the department never plotted the relationship between those two factors.

The real source was a 2006 paper "Facts Not Fear on Air Pollution" from the National Center for Policy Analysis, a conservative think tank. The paper, by independent consultant Joel Schwartz, contends that most information on air pollution from environmentalists, regulators, scientists and journalists is exaggerated or wrong. The paper was not subjected to the normal peer-review process demanded for most published science.

Paul, an ophthalmologist and eye surgeon, cited Schwartz in his Nov. 10 remarks, saying: "We have decreased pollution and rising incidence of asthma. Either they are inversely proportional or they are not related at all."

At best, the chart suggests that air pollution alone cannot explain the rise in asthma, a chronic lung disease that inflicts approximately 34 million Americans and whose exact cause is unknown.

It certainly can't be used to say that air pollution plays no role in causing asthma.

"They may think there is a pattern there, but in fact it has no basis," said Dr. Richard Kreutzer, head of environmental and occupational disease control at what is now California's Department of Public Health, the agency cited on Paul's chart. Kreutzer said there is evidence that some pollutants can cause asthma and even more research showing that air pollution aggravates asthma in those who have the disease.

The National Institutes of Health said last year that "recent findings have conclusively demonstrated a link between asthma and air pollution, especially ground-level ozone."

But Schwartz, who now works for Blue Sky Consulting Group, discounts even studies linking pollution to asthma attacks, saying "they are probably not related."

In an interview with The Associated Press, Schwartz defended his work. "The fact that they move in opposite directions shows that air pollution is not a large factor in the cause," he said.

Dan Greenbaum, the president of the nonprofit Health Effects Institute, said such arguments "miss the point." The institute receives funding from both the Environmental Protection Agency and the auto industry.

"No pulmonary doctor has said that the primary reason for the increase in asthma is air pollution. That is not the concern with air pollution and asthma," Greenbaum said. "The concern is that if you have asthma, we have very strong evidence that you are sensitive to air pollution."

Follow Dina Cappiello on Twitter (at)dinacappiello

Online:

California Department of Public Health paper: http://www.bit.ly/s3RAen

National Center for Policy Analysis paper: http://www.bit.ly/w06uJC

EDITOR'S NOTE _ An occasional look at statements by public officials and how well they adhere to the facts.

Ozone, Air Quality, and Asthma

If your child has asthma, you probably understand triggers — those substances or activities that bring on breathing problems.

But what if the asthma trigger is in the air your child breathes? Ground-level ozone and other air pollutants can trigger worsening symptoms and asthma flare-ups. But you can help minimize your child's exposure.

About Ozone

Ozone is a gas that's found in both the Earth's upper and lower atmospheres. The protective ozone in the upper atmosphere is very different from the harmful ozone in the lower atmosphere. Ozone that exists naturally 10 to 30 miles (16 to 48 kilometers) above the Earth protects us all from the sun's ultraviolet (UV) rays.

But ground-level ozone is different. It's found close to Earth's surface and is a serious pollutant. It's produced when sunlight combines and reacts with chemicals produced by cars, power plants, and factories. That's why ground-level ozone, a main component of smog, tends to be higher in sunnier climates or during hot, still weather.

Ground ozone levels have declined somewhat since 2000, but according to the American Lung Association, 58% of the population of the United States live in areas with unhealthy ozone levels. This includes 4 million kids with asthma who live in towns or cities with very high levels of ozone.

Other Pollutants

Although ozone gets a great deal of press, it's not the only pollutant that causes poor air quality. In 2004, for the first time, the American Lung Association included not only ozone but particle pollution levels in its annual "State of the Air" report for the United States.

Particle pollution refers to tiny particles of acids (such as nitrates and sulfates), dust, dirt, smoke, soot, and droplets from aerosols that are suspended in the air we breathe. The smaller the particles, the deeper they can get into the lungs, where they cause problems.

Particle pollution data are graded by both year-round and short-term levels:

- More than 47 million U.S. residents, including over a million kids with asthma, live in areas with levels of particle pollution that are unhealthy year-round.

AMERICAN LUNG ASSOCIATION.
Fighting for Air

Asthma & Children Fact Sheet

November 2011

Asthma is a chronic inflammation of the airways with reversible episodes of obstruction, caused by an increased reaction of the airways to various stimuli. Asthma breathing problems usually happen in "episodes" or attacks but the inflammation underlying asthma is continuous.

- Asthma is one of the most common chronic disorders in childhood, currently affecting an estimated 7.1 million children under 18 years; of which 4.1 million suffered from an asthma attack or episode in 2009.[1]
- An asthma episode is a series of events that results in narrowed airways. These include: swelling of the lining, tightening of the muscle, and increased secretion of mucus in the airway. The narrowed airway is responsible for the difficulty in breathing with the familiar "wheeze".
- Asthma is characterized by excessive sensitivity of the lungs to various stimuli. Triggers range from viral infections to allergies, to irritating gases and particles in the air. Each child reacts differently to the factors that may trigger asthma, including:
  - respiratory infections, colds
  - allergic reactions to allergens such as pollen, mold, animal dander,
  - feathers, dust, food, and cockroaches
  - exposure to cold air or sudden temperature change
  - cigarette smoke
  - excitement/stress
  - exercise
- Secondhand smoke can cause serious harm to children. An estimated 400,000 to one million asthmatic children have their condition worsened by exposure to secondhand smoke.[2]
- Asthma can be a life-threatening disease if not properly managed. In 2007, 3,447 deaths were attributed to asthma. However, deaths due to asthma are rare among children. The number of deaths increases with age. In 2007, 152 children under 15 died from asthma compared to 659 adults over 85.[3]
- Asthma is the third leading cause of hospitalization among children under the age of 15. Approximately 32.7 percent of all asthma hospital discharges in 2006 were in those under 15, however only 20.1% of the U.S. population was less than 15 years old.[4]
- In 2005, there were approximately 679,000 emergency room visits were due to asthma in those under 15.[5]
- Current asthma prevalence in children under 18 ranges from 4.6% in Idaho to 13.9% in the District of Columbia.[6]
- Since 1999, mortality and hospitalizations due to asthma have decreased and asthma prevalence had stabilized, although it now appears to be increasing.
- Asthma medications help reduce underlying inflammation in the airways and relieve or prevent airway narrowing. Control of inflammation should lead to reduction in airway sensitivity and help prevent airway obstruction.
- Two classes of medications have been used to treat asthma -- anti-inflammatory agents and bronchodilators. Anti-inflammatory drugs interrupt the development of bronchial inflammation and have a preventive action. They may also modify or terminate ongoing inflammatory reactions in the airways. These agents include inhaled corticosteroids, cromolyn sodium, and other anti-inflammatory compounds. A new class of anti-inflammatory medications known as leukotriene modifiers, which work in a different way by blocking the activity of chemicals called leukotrienes that are involved in airway inflammation have recently come on the market.
- Bronchodilators act principally to dilate the airways by relaxing bronchial smooth muscle. They include beta-adrenergic agonists, methylxanthines, and anticholinergics.
- The annual direct health care cost of asthma is approximately $50.1 billion; indirect costs (e.g. lost productivity) add another $5.9 billion, for a total of $56.0 billion dollars.[7]

- Asthma is one of the leading causes of school absenteeism;[8] in 2008, asthma accounted for an estimated 14.4 million lost school days in children with an asthma attack in the previous year.[9]

For more information on asthma, please review the Asthma Morbidity and Mortality Trend Report in the Data and Statistics section of our website at www.lung.org or call the American Lung Association at 1-800-LUNG-USA (1-800-586-4872).

Sources:

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3 Centers for Disease Control and Prevention. National Center for Health Statistics. Final Vital Statistics Report. Deaths: Final Data for 2007. May 2010. Vol 58 No 19.
4 Centers for Disease Control and Prevention: National Center for Health Statistics, National Hospital Discharge Survey, 2006. Unpublished data provided upon special request to the NCHS.
5 Centers for Disease Control and Prevention: National Center for Health Statistics, National Hospital Ambulatory Medical Care Survey, 2005. Unpublished data provided upon special request to the NCHS.
6 Center for Disease Control and Prevention: Behavioral Risk Factor Surveillance Survey, 2009. Analysis by the American Lung Association Research and Program Services Division using SPSS and SUDAAN software.
7 Barnett SB, Nurmagambetov TA. Costs of Asthma in the Unites States: 2002-2007. Journal of Allergy and Clinical Immunology. 2011; 127:145-52.
8 Centers for Disease Control and Prevention. National Center for Chronic Disease Prevention and Health Promotion. Healthy Youth! Health Topics: Asthma. August 14, 2009. Accessed on February 9, 2010.
9 Centers for Disease Control and Prevention: National Center for Health Statistics, National Health Interview Survey Raw Data, 2009. Analysis by the American Lung Association Research and Program Services Division using SPSS and SUDAAN software.

Related links on the Web

These sites are not part of The American Lung Association web site, and we have no control over their content or availability.

- Web MD
- National Institutes of Health
- AAAAI - Childhood Allergies
- AAAAI - Find an Allergist/Immunologist

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AMERICAN LUNG ASSOCIATION.
Fighting for Air

For Parents of Children with Asthma

Most of the information about asthma in these pages applies to both children and adults, so be sure to visit the rest of the site. But there are some differences and some special concerns about asthma in children.

Diagnosing Asthma in Young Children

Most children who have asthma develop their first symptoms before 5 years of age. However, asthma in young children can be hard to diagnose. Sometimes it can be difficult to tell whether a child has asthma or another childhood condition because the symptoms of both conditions can be similar.

Young children who have wheezing episodes when they get colds or respiratory infections don't all go on to develop asthma. The wheezing may be caused when a child's already small airways get inflamed by an illness. The airways grow as a child grows older, so wheezing no longer occurs when the child gets a cold.

A young child who has frequent wheezing with colds or respiratory infections is more likely to have asthma if:

- a parent has asthma
- the child has signs of allergies, including the allergic skin condition eczema
- the child wheezes even when he or she doesn't have a cold or other infection

To help your pediatrician make a correct diagnosis, be prepared to provide information about family history of asthma or allergies, the child's overall behavior, breathing patterns and responses to foods or possible allergy triggers. Lung function tests—often used to make a definitive asthma diagnosis—are very hard to do with young children. The doctor may use a 4 to 6 week trial of asthma medicines to see if they make a difference in your child's symptoms.

Children and Asthma Medicines

As with any medicine, do not leave asthma medication within reach of young children. A responsible adult should supervise your child while taking medicine until you, your child and the pediatrician agree that he or she is responsible enough to handle it alone.

Children as young as three can use an inhaler with a spacer if get proper instruction and some practice. Children who have trouble using inhalers may find a nebulizer helpful. This is a small machine that converts the asthma medicine into a mist that the child can breathe in through a mask.

If your child must take asthma medicine during the school day, contact the school health services staff to work out a plan. Be sure to share a copy of your child's Asthma Action Plan.

Click here for tips on communicating with the school about your child's asthma.

Be aware that sometimes a child who is having an asthma flare may not be able to effectively use an inhaler because they can not breathe in enough air to get the medicine to their lungs. If you suspect this may be happening, get emergency help right away.

Avoiding Asthma Triggers

What are your child's asthma triggers? Talk to your pediatrician and your child about asthma triggers, and some ways to avoid them. Some important things to keep in mind:

- Secondhand smoke is harmful to everyone, especially children with asthma. Keep your home and car smoke-free, and try to avoid smoky public places. If you smoke now is the time to quit for your child. The American Lung Association can help.

- Pets with fur and feathers can be an asthma trigger for many people. Think carefully, and discuss with your pediatrician, before adding a dog, cat or bird to your household. If you already have a pet like this you may need to make some changes. The child's bedroom at least should be a pet-free zone.
- Another common trigger for children is exercise. If your child has trouble with sports or other physical activity, talk to your doctor about the possibility of prescribing medicine for use before exercising. Also, keep an eye on the pollen and air quality forecast in your area, and limit the amount of time your child plays outdoors on bad air days.
- Remember that children can not always control their own environment, and may need you to advocate for them.

Learning Self-Management Skills

Children benefit from being empowered to manage their own asthma and make healthy choices as soon as they are developmentally ready. Talk to your pediatrician and your child about setting specific management goals and follow up on these each visit, since they should change as you child grows.

The American Lung Association's Open Airways For Schools program is designed to teach children ages 8 to 11 to manage their asthma and lead healthier, active lives.

A Special Word about Teens

The rebelliousness and need for independence that comes with adolescence can be especially difficult for teens with asthma and their families. Children who have been responsibly managing their asthma for years may start to have more problems with symptoms. This could be because of hormonal changes, or it could be because of changes in their attitude and behavior.

Here are a few things that might be causing problems for your teen:

- **Needing to be "normal":** Teens are super sensitive about anything that they think makes them different from their friends. They may feel "uncool" taking medicine. They may be nervous about having an asthma episode in public. Or they may be encountering asthma triggers at a friend's house that they are uncomfortable dealing with. You may be able to help by encouraging your teen to talk about these feelings. And it is important to keep the lines of communication open between you, the doctor and your teen.
- **Smoking:** Smoking and secondhand smoke can cause sudden and severe asthma flares. If your child has started to smoke, or is spending time with smokers, they are going to have a lot of trouble keeping their asthma under control. The American Lung Association Not On Tobacco program can help 14 to 19 year old smokers end their addiction to nicotine. Teen smokers can also get free telephone counseling through the Lung Helpline.
- **Playing sports:** Like everyone who has asthma, teens should be able to live healthy active lives, including playing sports if they want to. Check in with the pediatrician to make sure your child's Asthma Action Plan is up to date, and make sure the coach knows your child has asthma, and has a copy of the Plan.

Staying Positive

You can have a big impact on how well your child deals with asthma by how well you deal with your child's asthma. Listen to your child. Support him or her. Say how proud you are of how well he or she is managing asthma.

Lungtropolis™: Where Kids with Asthma Learn to Play

The American Lung Association and ORCAS are pleased to announce *Lungtropolis™: Where Kids with Asthma Learn to Play*, a new interactive website designed for children with asthma between the ages of 5 to 10 and their parents.

» More

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AMERICAN LUNG ASSOCIATION.
Fighting for Air

New resources to help kids with asthma stay healthy, in school, and ready to learn

(May 16, 2012) — As we spotlight the severity of asthma throughout the month of May, creating asthma-friendlier schools becomes an important topic. Asthma is a life-long lung disease that affects millions of children in the U.S. and is the leading cause of lost school days from a chronic disease. Poorly controlled asthma has a direct impact on a child's classroom attendance and can affect their academic success. By supporting and engaging in asthma management programs, schools and parents can work together to reduce the number of asthma-related absences, reduce the number of asthma emergencies, and help safeguard all students, faculty and staff.

Where should you begin? The American Lung Association has a number of resources and online tools to support the asthma safety efforts of school personnel, community volunteers, parents and caretakers. Here are some steps you can take to help make a difference:

For school personnel & volunteers: Create a healthy, asthma-friendly learning environment

- **Become an asthma expert**. The school health office is the first line of defense during an asthma emergency. If you are a school nurse or school-based healthcare provider, learn how to provide guideline-based care. Take the National Asthma Educator Certification Board's exam to become a Certified Asthma Educator (AE-C) by participating in an Asthma Educator Institute®. The American Lung Association's In Your Community tool can help you locate a course near you.
- **Educate students on asthma self-management**. When children feel confident in their ability to manage asthma in school, they are better able to concentrate on learning. The Open Airways For Schools (OAS) program empowers elementary school children in a fun, interactive group setting. Learn how to become an OAS Certified Facilitator today!
- **Implement a multi-faceted approach to asthma management in schools**. The most effective way to address asthma management in schools is through combined efforts that include: maximizing school health services, providing asthma education, ensuring a healthy school environment, and supporting participation in physical activity when a student with asthma is able. Find out how your school can incorporate these elements to create a long-term asthma management plan through the Asthma-Friendly Schools Initiative (ASFI). The AFSI Toolkit's guidance can help your school create a plan that is unique to your specific community's needs and available resources.

For parents & caregivers: Provide a supportive, asthma-friendly home

- **Learn more about asthma**. The more you know about your child's asthma, the better prepared you are to help them manage their disease, handle an emergency and reduce environmental triggers. Do you like learning online? Contact onlinelearning@lung.org to sign up for the American Lung Association Asthma Basics online learning module. Also, check out our YouTube asthma channel for demonstration videos on asthma medicines.
- **Use fun and imagination to help strengthen your child's asthma self-management skills**. What would you do if you were attacked by the Mucus Mob? Learning to manage your asthma can be fun with Lungtropolis®, an online learning game for children with asthma ages 5-10 and their parents.
- **Create a support community**. Even parents and caregivers need a little help at times. The My Fighting For Air Community is a free, online tool for people with lung disease and their families to help coordinate support among family, friends, and neighbors during difficult times.

Additional resources for community advocates and policy makers working to establish asthma-friendlier environments are available in the Guide to Asthma Policy for Housing and Schools.

For more information on lung health, call the American Lung Association Helpline at 1-800-586-4872.

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EPA 402-K-10-004 | August 2010 | www.epa.gov/iaq

EPA
United States
Environmental Protection
Agency

Managing Asthma in the School Environment

Indoor Air Quality Tools for Schools

Indoor Air Quality (IAQ)

Take Action to Manage Asthma in the School Environment

1. Establish and Continuously Evaluate an Indoor Air Quality – IAQ – Management Program in Your School or District.

- Use the *IAQ Tools for Schools* Action Kit and "Framework for Effective School IAQ Management" and implement the IAQ practices outlined in this booklet to improve the school environment, support children's health and reduce exposure to environmental asthma triggers.

2. Develop an Asthma Management Plan in Your School or District.

- Adopt school policies to support Asthma Action Plans, student access to inhalers and other asthma medications, and emergency procedures for school staff to use when a student has an asthma attack.
- Use the Centers for Disease Control and Prevention's – CDC – "Strategies for Addressing Asthma within a Coordinated School Health Program" to guide the development of your Asthma Management Plan. Follow national guidelines to administer high-quality asthma care in schools.
- Evaluate and monitor program effectiveness by using CDC's evaluation guidance designed specifically for asthma programs.
- Identify all students with asthma. Focus resources, in particular, on students whose asthma is not well controlled.

3. Reduce Environmental Asthma Triggers.

- Recommended actions to reduce these triggers include:
  - Control animal allergens.
  - Control cockroach and pest allergens.
  - Clean up mold and control moisture.
  - Control sources of indoor air pollutants.
  - Reduce exposure to dust mites.

Visit http://www.epa.gov/asthma for information on common asthma triggers and how to manage them; asthma education programs available in your community; and no-cost resources that schools can use to educate students and staff about asthma.

The Asthma Epidemic

Asthma has reached epidemic proportions in the United States, affecting millions of people of all ages and races. An average of one out of every 10 school-age children now has asthma, and the percentage of children with asthma is rising more rapidly in preschool-age children than in any other age group. Asthma is a leading cause of school absenteeism due to a chronic condition, accounting for nearly 13 million missed school days per year. Asthma also accounts for many nights of interrupted sleep, limits activity and disrupts family and caregiver routines.

Asthma symptoms that are not severe enough to require a visit to an emergency room or to a physician can still be serious enough to prevent a child with asthma from living a fully active life.

Asthma is a long-term, inflammatory disease that causes the airways of the lungs to tighten and constrict, leading to wheezing, breathlessness, chest tightness and coughing. The inflammation also causes the airways of the lungs to become especially sensitive to a variety of asthma triggers. The particular trigger or triggers and the severity of symptoms can differ for each person with asthma.

Because Americans spend up to 90 percent of their time indoors, exposure to indoor allergens and irritants may play a significant role in triggering asthma episodes. Some of the most common asthma triggers found in schools, as well as techniques to mitigate them, are addressed in the Reduce Environmental Asthma Triggers section on page 7.

Asthma is a leading cause of school absenteeism due to a chronic condition, accounting for nearly

13 million

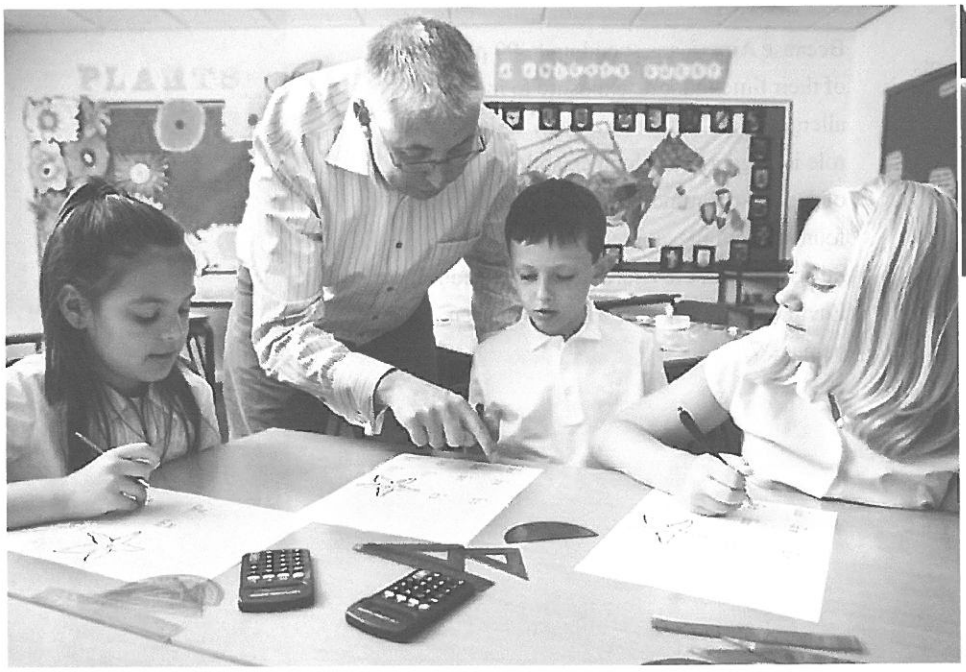
missed school days per year.

Asthma in Schools

Each day, one in five Americans occupies a school building. The majority of these occupants are children. Environmental asthma triggers commonly found in school buildings include respiratory viruses; cockroaches and other pests; mold resulting from excess moisture in the building; dander from animals in the classroom; and dander brought in on clothing from animals at home. Secondhand smoke and dust mites are other known environmental asthma triggers found in schools. Children with asthma may be affected by other pollutants from sources found inside schools, such as unvented stoves or heaters and common products including chemicals, cleaning agents, perfumes, pesticides and sprays. In addition, outdoor environmental asthma triggers, like ozone and particle pollution, or bus exhaust, can affect children with asthma while at school.

Students with uncontrolled asthma often miss more school and have poorer academic performance than healthy students. With the help of strong school asthma management programs, students with asthma can have equally good school attendance. When asthma is well controlled, students are ready to learn.

Effectively managing a child's asthma is best accomplished through a comprehensive plan that addresses both the medical management of the disease and the avoidance of environmental triggers. Because children spend most of their time in schools, day care facilities or at home, it is important to reduce their exposure to environmental asthma triggers as much as possible in each of these environments. This publication focuses on steps that schools can take to help children breathe easier.



Establish and Evaluate an IAQ Management Program in Your School or District

Many IAQ problems in schools can impact the health of students and staff, including those with asthma. In order to help improve IAQ, school districts all across the country have successfully adopted the *IAQ Tools for Schools* Program. The *IAQ Tools for Schools* Program is a comprehensive set of resources that is helping school officials safeguard and improve school occupant health, comfort, attendance and performance.

The *IAQ Tools for Schools* Program provides programmatic guidance through the "Framework for Effective School IAQ Management" to help schools develop sustainable, effective IAQ management programs using proven strategies, organizational approaches and leadership styles that are fundamental to program effectiveness. The "Framework for Effective School IAQ Management" helps schools develop and sustain a clear vision of the pathway to school IAQ excellence.

In addition, the *IAQ Tools for Schools* Action Kit provides technical guidance and straightforward checklists to help school personnel identify, resolve and prevent IAQ problems. Using an IAQ management plan that includes checklists for the entire building can lower student and staff exposure to asthma triggers and a range of other harmful exposures. The checklists available in the *IAQ Tools for Schools* Action Kit help schools implement consistent, appropriate practices for a variety of school maintenance issues, classroom policies and practices, and much more. See page 9 for a list of all the checklists contained in the Action Kit.

Most schools form a multi-disciplinary IAQ coordinating team to implement the guidance in the *IAQ Tools for Schools* Action Kit. Because IAQ problems can originate anywhere in the school building, the entire staff should be informed about and participate in improving IAQ. Students also can be involved in the process. Thousands of schools across the country are doing it just this way.

- For more information about EPA's *IAQ Tools for Schools* Program and the "Framework for Effective School IAQ Management," visit the Program's website at http://www.epa.gov/iaq/schools.
- Download the *IAQ Tools for Schools* Action Kit at http://www.epa.gov/iaq/schools/actionkit.html.
- Information about K-12 lesson plans on IAQ can be found on the *IAQ Tools for Schools* Program website at http://www.epa.gov/iaq/schools/curricula.html.

When asthma is well controlled, students are ready to learn.

Effectively managing a child's asthma is best accomplished through a comprehensive plan that addresses both the medical management of the disease and the avoidance of environmental triggers.

Case Study: Broward County Public Schools

Prior to 2002, Broward County Public Schools did not have an integrated system to manage its IAQ. But when a building audit revealed that seven elementary schools had moisture problems, the district knew it needed to act quickly to protect the buildings and their occupants. School district officials turned to the *IAQ Tools for Schools* Program to address the immediate issues, and then develop a comprehensive, integrated approach to proactively manage indoor environments and indoor environmental health.

Clean Up Mold and Control Moisture: School district personnel immediately investigated and attacked moisture and mold problems. Mitigating a serious public outcry and wanting to communicate well with the community, school district personnel provided public access to IAQ reports and the district's IAQ management plan. The district's quick actions – supported by *IAQ Tools for Schools* Program guidance – helped repair the district's image and secured the integrity of the buildings' structures. With the immediate problem under control, the district used the crisis as a springboard to launch a permanent IAQ program that addressed indoor environmental quality and health comprehensively.

Develop and Evaluate a District- or School-Wide Asthma Management Plan: In an effort to focus more specific attention on asthma, in 2008, the school district established the Asthma Improvement and Management Program. The district uses school-level data to address asthma in a culturally competent manner with students, parents and faculty. With the program growing in popularity, the demand for asthma education in schools is increasing and those involved report fewer days missed from school and fewer visits to the health room for asthma-related issues. The program is a complement to the technical IAQ work the district is already doing to reduce asthma triggers and maintain quality indoor air for all students.

Conclusion: While a crisis is often the initial reason for swift action, successful districts leverage crises to improve community relations, decrease student absences and ensure quality, long-term facilities maintenance. An asthma management plan complements an IAQ management plan and is a natural extension of environmental management and efforts to improve environmental health.

Develop an Asthma Management Plan in Your School or District

An IAQ management program that does not address asthma will not be able to address environmental health risks comprehensively, because IAQ and asthma are inextricably linked. By managing IAQ, you are already taking an important first step to managing asthma in your school or district. However, IAQ is only one component of effective asthma management. To address asthma on all fronts, it is important to have an asthma management plan. If you are using the *IAQ Tools for Schools* Program and "Framework for Effective School IAQ Management," you most likely have the sustainable programmatic infrastructure in place to address this critical need in a more measurable, targeted and intentional way.

The components of "CDC's Strategies for Addressing Asthma within a Coordinated School Health Program," described below, form the foundation for an effective asthma management plan.

1. Establish **management and support systems** for asthma-friendly schools.
2. Provide appropriate school **health and mental health services** for students with asthma.
3. Provide **asthma education** and awareness programs for students and school staff.
4. Provide a safe and **healthy school environment** to reduce asthma triggers.
5. Provide safe, enjoyable **physical education and activity** opportunities for students with asthma.
6. Coordinate **school, family and community efforts** to better manage asthma symptoms and reduce school absences among students with asthma.

For more information, download the following guidance documents:

- "CDC's Strategies for Addressing Asthma within a Coordinated School Health Program," at: http://www.cdc.gov/healthyyouth/asthma/strategies.htm.
- "Managing Asthma: A Guide for Schools," at: http://www.nhlbi.nih.gov/health/prof/lung/asthma/asth_sch.htm.

It is important to identify all students with asthma through monitoring morbidity associated with asthma, for example, frequent episodes at school, health room visits, limited physical activity, needing to leave school early or absenteeism. This can help to assess which programs or monitoring activities your school or district should implement. Focus resources on students whose asthma is not well controlled in order to promote improved school attendance and performance.

In order to identify what works and how you can improve the design and delivery of your school asthma management plan, it is essential to monitor program effectiveness. CDC and EPA offer resources on evaluation guidance specifically for asthma programs. To view a webinar entitled "Evaluating School-based Asthma Programs," visit http://www.asthmacommunitynetwork.org/webinars/program_evaluation_basics.aspx.

As you develop your district's or school's Asthma Management Plan, consider incorporating the following activities for quality asthma management:

- **Use the *IAQ Tools for Schools* Action Kit**
- **Identify all students with asthma**
- **Provide school-based asthma education programs**
- **Communicate with parents**

Case Study: Charlotte-Mecklenburg Schools

Prior to 2002, Charlotte-Mecklenburg Schools, an urban district in North Carolina, had little knowledge of which students had asthma. However, school health officials realized that asthma was a growing problem in the community and that nationwide, asthma absences represented a heavy burden to students and school systems. They set out to better understand the impact that asthma was having on their district.

Identify All Students with Asthma: School health leaders began by talking with students and parents to determine if students had ever been diagnosed with asthma or if they currently had asthma symptoms. These data formed the baseline for a compelling case made to the superintendent and school board for increased funding and programming for asthma education and management. Once they began moving forward with their plan, these data also helped school district leaders prioritize their efforts. By comparing asthma rates to absentee data, they were able to identify schools with the greatest needs for increased school health presence, allowing them to immediately establish asthma-focused school health teams where they were needed most.

Develop and Evaluate a District- or School-Wide Asthma Management Plan: The district established a plan to manage asthma based on CDC's "Strategies for Addressing Asthma within a Coordinated School Health Program." (See page 5 for more information on this guidance document.) At the heart of their plan was the Asthma Education Program, which is founded and structured around two core goals. The first goal is to create healthy, safe learning environments for students with asthma by institutionalizing asthma education and awareness through student, staff and family learning opportunities. The second is to provide in-depth case management to students with poorly-managed asthma through a partnership with the local health department and a respiratory care program.

Conclusion: School officials created a realistic, district-wide asthma management plan that spanned departments and multiple levels of management to establish a coordinated school health program. Working step by step, the district evolved and adapted their program and its strategies to find what worked and what did not work in helping students better manage their asthma.

Case Study: Hartford Public Schools

In 2001, a study of Medicaid-eligible, school-aged children in Hartford revealed an asthma prevalence of 19 percent, nearly double the national average. The city council quickly declared an asthma emergency and, in partnership with Hartford Public Schools, established goals to manage asthma throughout the community. Heeding the call, the school district identified existing assets to leverage their limited resources into gains for the health and well-being of students with asthma.

Use the *IAQ Tools for Schools* Action Kit and Framework to Develop an IAQ Management Plan: Two school district employees were identified to lead the district's response to the problem. They knew that to create an effective wellness program, they needed to forge connections and develop a unified response to asthma among different departments, schools and layers of management. They used the *IAQ Tools for Schools* "Framework for Effective School IAQ Management" as a blueprint for building a wellness program and leveraged a partnership with the city to recruit collaborators from across the community to support their efforts, including the health department and the local American Lung Association chapter. Together, they established a network of Health and Safety Teams in individual schools that linked back and reported to the nursing and facilities staff to inform and guide the newly-created district-wide wellness program. Bundling *IAQ Tools for Schools* with the Health and Safety teams has maintained a sustainable system to address school wellness.

Conclusion: The *IAQ Tools for Schools* Program provided a framework for action that allowed school district leaders to implement a comprehensive solution to manage asthma.

Additional Resources

U.S. Environmental Protection Agency

- http://www.epa.gov/iaq/schools
  Download the *IAQ Tools for Schools* Action Kit and learn about the "Framework for Effective School IAQ Management."
  - The *IAQ Tools for Schools* Update e-mail newsletters bring hot topics, emerging research and best practices directly to your inbox. To subscribe, please send an e-mail to IAQTfSConnector@cadmusgroup.com with "Subscribe" in the subject line.
  - The *IAQ Tools for Schools* Connector e-mail discussion list allows you to connect directly with your peers in the *IAQ Tools for Schools* National Network. Through the Connector, you can share information and resources, as well as communicate by e-mail and on the Web. Join today by sending a blank e-mail message to schools_iaq_connector-subscribe@lists.epa.gov. Then, check your e-mail inbox for your confirmation and membership details.
- http://www.epa.gov/asthma
  Find asthma resources on EPA's website.
- http://www.asthmacommunitynetwork.org/
  AsthmaCommunityNetwork.org serves as a year-round resource for mentoring and collaboration. It's designed to provide the tools, information and partners to support asthma management programs to communities and schools.

Centers for Disease Control and Prevention

- http://www.cdc.gov/asthma
  Find more asthma resources on CDC's website.
- http://www.cdc.gov/healthyyouth/asthma
  Find asthma data and resources, including the "Initiating Change: Creating an Asthma-Friendly School" toolkit and "Strategies for Addressing Asthma Within a Coordinated School Health Program."

National Heart, Lung and Blood Institutes

- http://www.nhlbi.nih.gov/health/prof/lung/asthma/naci/audiences/schools-childcare.htm
  Find the National Asthma Control Initiative's 10 tips and more to assist children and youth and their families to keep asthma under control, both in and out of the classroom.
- http://www.nhlbi.nih.gov/health/prof/lung/
  Download "Managing Asthma: A Guide for Schools," "Asthma and Physical Activity in School," How Asthma Friendly is your School?," "Asthma Awareness Curriculum," and many other school related resources.

Almost 40 percent

Students report signs of asthma

Research looks at central Ohio school buildings

Almost four in 10 central Ohio fourth-graders who took part in a recent survey said they had asthma symptoms, even though just one in 10 had been told by a doctor they had the disease.

The survey was part of a study that aims to better predict where asthma is most prevalent and to look for ways to make schools healthier.

The research, which includes measures of indoor and outdoor air quality and a survey of more than 1,050 children at 13 schools, is still being analyzed. But preliminary data already are helping researchers and others better understand the relationship between schools and asthma, said Mandy Burkett, chief of the Ohio Department of Health's indoor-environment section.

The department and Ohio State University's College of Public Health are collaborating on the work, which was paid for in part by a $228,066 grant from the Ohio Air Quality Development Authority. They are not naming the schools, all of which are in Franklin and surrounding counties and include buildings in urban, rural and suburban districts.

The research team is trying to determine how best to identify schools in Ohio where more children are at risk of asthma and where intervening might make the most difference, Burkett said.

The survey of schoolchildren included questions such as whether the child's breathing was noisy or wheezy, whether he or she had a hard time taking a deep breath and whether the child found it difficult to stop coughing. Those children who answered "sometimes" or "a lot" to three or more of the questions — an average of 37 percent from the schools surveyed — have a high asthma score, Burkett said. "That's the first thing that kind of slapped us in the face."

That doesn't mean that all those fourth-graders have asthma, but it is a number that could point to a large number of children who aren't getting appropriate medical care.

"The asthma rates by themselves are high enough, but to think that may be just the tip of the iceberg is troubling," said Tim Buckley, associate professor and chairman of environmental health sciences at Ohio State. He and Burkett led the study.

Todd Nein, the interim executive director of the Air Quality Development Authority, said the research is already providing some clues about how schools can create a better environment for children with asthma. Aerosol cleaners, markers that aren't water-based, dusty piles of papers and other things commonly found in classrooms can be eliminated in the interest of healthier children, Nein said.

Idling buses and cars outside schools also can contribute to air problems, as can poorly filtered air inside the buildings, Nein said. "A lot of these things can be easy fixes. ... We need to figure out how to get this in front of educators, custodial staff and administration."

Almost all the schools in the study had problems with ventilation, Burkett said, and it was especially severe in older schools with individual units rather than centralized ventilation. Many also had classrooms crowded with things that could collect dust and provide shelter for pests and rodents, which can exacerbate asthma, she said.

Beyond improving school environments, the work could also help guide where new schools are built, Buckley said. Proximity to industry and high-volume roadways should be considered, he said.

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Off to College with Allergies and Asthma

This article has been reviewed by Thanai Pongdee, MD, FAAAAI

For many students, starting college marks the beginning of adulthood and it may be the first time they'll be living independently. This exciting (and sometimes scary) transition poses special challenges for those with allergies and asthma, and it often raises concerns for parents.

A new environment exposes students to different allergy and asthma triggers. The challenges of college life may add additional stress that can aggravate asthma. And, for those with food allergies, dining on campus can seem like a minefield.

These may seem like daunting hurdles to overcome. But with a little planning, teens can successfully transition from high school to college, and at the same time take a more active role in managing their health.

DID YOU KNOW?

- There are approximately 17.5 million full- and part-time college students in the United States.
- About 9% of college students report having been diagnosed with asthma, according to the American College Health Association (ACHA).
- Twenty-two percent of college students have allergies, according to the ACHA.
- A recent study of college students with food allergies found that only 3.5% had informed campus dining services of their allergies.

Steps to take

If they aren't already doing so, now is the time for teens begin to take responsibility for managing their conditions. Here are some timely tips for the college-bound:

- When you arrive on campus, meet with staff (especially food service personnel and residence hall advisors) to develop a plan to control your allergies and asthma.
- Don't take chances. Know what triggers your allergic disease and stay away from these allergens. Be aware of signs that you need to seek medical attention.
- Keep prescriptions filled and up-to-date. Always have your medications on hand, including your autoinjectable epinephrine and quick-relief inhaler.
- Consider talking to your friends and roommates about your allergies and asthma. Letting those close to you know about your health, and the signs of a medical emergency, can help you stay safe.
- If you are going away to college, it is important to find an allergist in the area you can contact if you need medical attention while at school. To locate an allergist near your campus, visit www.aaaai.org/phsyref.

Taking control of your health and being prepared for emergencies will help you manage your asthma and allergies and give your parents some peace-of-mind.

To the Point

Studies have shown that young people are more likely than others to take risks with their health. For example, one study found that many young people with food allergies have eaten a food even though they know that it contains an allergen.

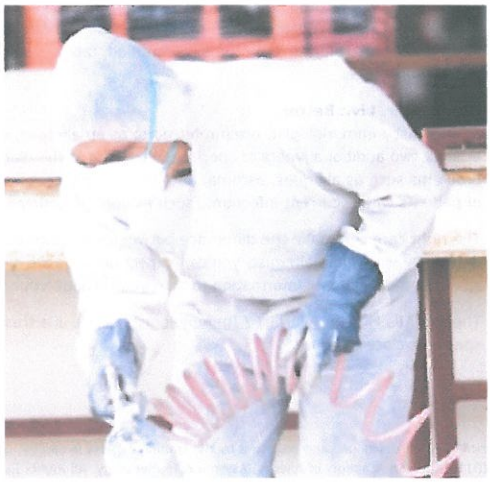
American Academy of Allergy Asthma & Immunology
www.aaaai.org

Your source for more information or to find an allergist/immunologist.

American Academy of Allergy Asthma & Immunology

Occupational Asthma: Tips to Remember

Occupational asthma is caused by inhaling fumes, gases, dust or other potentially harmful substances while "on the job." Often, your symptoms are worse during the days or nights you work, improve when you have time off and start again when you go back to work.



You may have been healthy and this is the first time you've had asthma symptoms, or you may have had asthma as a child and it has returned. If you already have asthma, it may be worsened by being exposed to certain substances at work.

People with a family history of allergies are more likely to develop occupational asthma, particularly to some substances such as flour, animals and latex.

But even if you don't have a history, you can still develop this disease if you're exposed to conditions that induce it. Also, if you smoke, you're at a greater risk for developing asthma.

Prevalence

Occupational asthma has become the most common work-related lung disease in developed countries. However, the exact number of newly diagnosed cases of asthma in adults due to occupational exposure is unknown. Up to 15% of asthma cases in the United States may be job-related.

The rate of occupational asthma varies within individual industries. For example, in the detergent industry, inhaling a particular enzyme used to make washing powders has led to the development of symptoms in some exposed employees. About 5% of people working

Causes

Irritants in high doses that induce occupational asthma include hydrochloric acid, sulfur dioxide or ammonia, which is found in the petroleum or chemical industries. If you are exposed to any of these substances at high concentrations, you may begin wheezing and experiencing other asthma symptoms immediately after exposure. Workers who already have asthma or some other respiratory disorder may also experience an increase in their symptoms during exposure to these irritants.

TIPS TO REMEMBER BROCHURES

This article is available in brochure format as part of the AAAAI's Tips to Remember brochure series. For ordering information visit the AAAAI Store.

Allergies play a role in many cases of occupational asthma. This type of asthma generally develops only after months or years of exposure to a work-related substance. Your body's immune system needs time to develop allergic antibodies or other immune responses to a particular substance.

For example, workers in the washing powder industry may develop an allergy to the enzymes of the bacteria Bacillus subtilis, while bakers may develop an allergy and occupational asthma symptoms from exposure to various flours or baking enzymes.

Veterinarians, fishermen and animal handlers in laboratories can develop allergic reactions to animal proteins. Healthcare workers can develop asthma from breathing in powdered proteins from latex gloves or from mixing powdered medications.

Occupational asthma can also occur in workers after repeated exposure to small chemical molecules in the air, such as with paint hardeners or in the plastic and resin industries.

The length of time you are exposed to a substance before it triggers your asthma varies. It can be months or years before symptoms occur. On the other hand, exposure to a high concentration of irritants can cause asthma within 24 hours.

Finally, inhaling some substances in aerosol form can directly lead to the buildup of naturally occurring chemicals in your body, such as histamine or acetylcholine within your lungs, which leads to asthma. For example, insecticides, used in agricultural work, can cause a buildup of acetylcholine, which causes your airway muscles to contract and tighten.

Diagnosis and Treatment

Many people with persistent asthma symptoms caused by substances at work are incorrectly diagnosed as having bronchitis. If occupational asthma is not correctly diagnosed early, and you aren't protected or removed from the exposure, it can cause permanent changes to your lungs.

An allergist / immunologist, often referred to as an allergist, is the best qualified physician to determine if your symptoms are allergy or asthma-related. Your allergist can properly diagnose the problem and develop a treatment plan to help you feel better and live better.

Once the cause of your symptoms is identified, you and your employer can work together to assure that you avoid exposure to the substance that triggers your asthma symptoms and to

high concentrations of irritants. Also, you may need to avoid or reduce your exposure to irritants that can trigger symptoms in most asthmatics, such as smoke or cold air. In some cases, pre-treatment with specific medications to protect against asthma worsened at work may be helpful. In other situations, particularly if you are very allergic to a substance in your workplace, avoiding the substance completely may be necessary.

Healthy Tips

- Occupational asthma is caused by inhaling fumes, gases, dust or other potentially harmful substances while at work.
- You may find that your symptoms are worse during the days or nights you work, improve when you have time off and start again when you go back to work.
- If occupational asthma is not correctly diagnosed early, and you aren't protected or removed from the exposure, it can cause permanent changes to your lungs.
- Once the cause of your symptoms is identified, talk to your employer and avoid exposure to that substance.

Feel Better. Live Better.

An allergist / immunologist, often referred to as an allergist, is a pediatrician or internist with at least two additional years of specialized training in the diagnosis and treatment of problems such as allergies, asthma, autoimmune diseases and the evaluation and treatment of patients with recurrent infections, such as immunodeficiency diseases.

The right care can make the difference between suffering with an allergic disease and feeling better. By visiting an allergist, you can expect an accurate diagnosis, a treatment plan that works and educational information to help you manage your disease.

The AAAAI's Find an Allergist / Immunologist service is a trusted resource to help you find a specialist close to home.

Health and Safety Executive
HSE

List of substances that can cause occupational asthma

Alpha amylases

Enzymes that change starch into sugar. Used in flour milling and bread baking. Also used in detergents, animal feed, textile processing and brewing C37/ C21, C22

Azodicarbonamide

Used in the expansion of polymers in the rubber and plastics industries C1

Bromelains

Enzymes within the fruit, stem and leaves of the pineapple. Used pharmaceutically as an aid to digestion and as an anti-inflammatory agent C38

Carmine

An insect-derived dyestuff. Used for cosmetic and pharmaceutical dyeing and as a food and drink colouring C2

Castor bean dust

Castor oil is used in paint, varnish, hydraulic fluids, printing inks, nylon, plastics and cosmetics and hair oils C3

Cephalosporins

Antibiotics similar to penicillin C39

Chloramine-T

A disinfectant with antiviral, bactericidal and fungicidal properties. Highly reactive with proteins C4

Chloroplatinates and other halogenoplatinates

Platinum salts produced during the refining of platinum metal and the manufacture of catalysts and electrodes C5

Chromium (VI) compounds

Compounds present in stainless steel welding fume and cement and used in electroplating C6

Cobalt (metal and compounds)

Present in the hard metal production and diamond polishing industries C7

Cockroach material

Dust from the bodies, eggs, saliva, faeces and cast skins of cockroaches C40

Coffee bean dust

Dust from the processing of coffee beans C30

Cow epithelium/urine

Dust from cow hair and dander C8

Crustacean proteins

From the processing of prawns, crabs, shrimps and lobsters C9

Diazonium salts

Used in the manufacture of dyes, photocopier paper and fluorine polymer production C10

Egg proteins

From the processing of egg products or the use of eggs in glazing bakery products C31

Ethylenediamine

A corrosive chemical with an irritating vapour used in the printed circuit board and metal finishing industries. Also used in epoxy coatings and resins and in the manufacture of pharmaceuticals C11 / C5

Fish proteins

From the use of automated machines to gut various species of fish C32

Flour dust

Finely ground particles of cereals or pulses, and additives in the final product mix C41

Glutaraldehyde

A chemical disinfectant and biocide used as a cold sterilant of medical and surgical instruments. Also used in the oil and gas industry for the inhibition of corrosion causing bacteria C12

Some hardwood dusts

A general term covering a wide variety of wood dusts. There are 12,000 species of trees of which 11,000 are hardwoods. About 40 species are implicated in causing occupational asthma C13

Henna

A plant derived dye that is used to colour hair and skin C33

Isocyanates

Widely used in manufacture of polyurethane foams, plastics, coatings, varnish, two-pack paints and adhesives C14

Ispaghula

A laxative obtained from the dried ripe seeds of Plantago ovata C42

Laboratory animal excreta/secreta

Mainly from rodents (rats and mice). Also small mammals and insects C15

Latex

Natural rubber latex is from the Hevea braziliensis tree. Health care workers are particularly susceptible through the use of latex gloves. If used the gloves should be the 'powder free' type C16

Maleic anhydride

Used in the manufacture of polyester resins, oil additives and maleic acid C17

Methyltetrahydrophthalic anhydride

Used in the production of epoxy resins used in the manufacture of special application plastics C18

Nickel sulphate

Used in the electroplating industry and the production of hard metal C34

Opiates

A group of drugs derived from opium - includes morphine, heroin and codeine C35

Papain

An enzyme from the fruit of the paw-paw tree. Used for meat tenderising, clearing of beer, treatment of wool and silk and in food, cosmetic and pharmaceutical products C19

Penicillins

A large group of natural or semisynthetic antibiotics C20

Persulphates

Strong oxidising agents used to enhance the action of peroxide hair bleaches C21

Phthalic anhydride

Used in the manufacture of plasticisers, resins, dyes, pesticides and pharmaceuticals C22

Piperazine

Used in the manufacture of dewormers in veterinary and human medicine; the manufacture of hot melt adhesives; and the manufacture of a corrosion inhibitor for the offshore oil industry C23/ HSE RIA

Psyllium

A laxative obtained from the Plantago species C43

Some reactive dyes

Reactive dyes have a high degree of wet fastness. The reactive dye molecule fixes itself to natural materials such as cotton, silk, wool or leather by a strong chemical bond C24/ HSE TEXIAC Info Sheet 5

Rosin-based solder flux fume

Rosins are natural resin derived from pine trees. Most commonly, gum rosin (colophony) is the form used by solderers C25

Some softwood dusts

A general term covering a wide variety of wood dusts derived from mainly coniferous trees. Occupational exposure to cedar dusts is associated with the development of asthma C26

Soybean dust

Soybean, a very rich source of protein, comes from the leguminous plant Glycine max. It is used as the whole bean, the oil and the meal. Soybean flour is used alone or mixed with other flours C44

Spiramycin

An antibiotic manufactured as a fine white powder C27

Storage mites

Found in stored foodstuffs such as hay and grain in conditions of high humidity C36

Subtilisins

Enzymes used in the manufacture of detergents and animal feeds. Also food & leather processing C45 / C24

Tetrachlorophthalic anhydride

Used in production of epoxy resins for manufacture of plastics, paints and electronic components C28

Trimellitic anhydride

Used in production of plasticisers, wire enamels, surface coatings and wall and floor coverings C29

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Ralph Nader

"CHEJ has been a pioneer nationally in alerting parents to the environmental hazards that can affect the health of their children."

New York, New York

"Again, thank you for all that you do for us out here. I would have given up a long time ago if I had not connected with CHEJ!"

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