

THE CQ Researcher

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Asthma Epidemic

Why is it happening? What's to be done?



Asthma, a chronic breathing disorder, is rapidly increasing in the United States and many other industrialized countries. Asthma affects more than 17 million Americans, including more than 5.3 million youngsters, and the incidence rate has nearly doubled since 1982. Experts disagree about the causes of the epidemic-like increase, but many now believe the most important factors are indoor air contaminants that trigger the allergic reaction associated with asthma attacks. Medications can relieve asthma symptoms and control the inflammation of the airways that causes asthma, but asthma advocates say some doctors are not aggressive enough in prescribing treatments. Meanwhile, researchers are looking for more effective treatments and trying to determine the origins of the disease in hope of finding a cure.

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Cover: An asthmatic child receives outpatient nebulizer treatment at the South Bronx Health Center for Children and Families, run by the Children's Health Fund and Montefiore Medical Center. (The Children's Health Fund/Collins Yarrow)

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MANAGING EDITOR
Thomas J. Colin

STAFF WRITERS
Mary H. Cooper
Kenneth Jost
Kathy Koch
David Masci

PRODUCTION EDITOR
Angela S.D. Shoemaker

EDITORIAL ASSISTANT
Alecia A. Marzullo

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Asthma Epidemic

BY KENNETH JOST

THE ISSUES

Nadine Anderson's son Aaron was not yet 1 year old when she heard the telltale cough. "It was not like a regular cough," she recalls. It was "dry" and "dull" — "like he was choking."

Aaron's doctor recognized his wheezing and coughing as classic symptoms of asthma and treated him with albuterol — one of many strangely named medicines that Anderson now talks about with familiarity. The medicine, converted into a fine mist by a device known as a nebulizer and inhaled through a mask, opened Aaron's clogged airways enough for him to go home and breathe easily, at least until his next asthma attack.

On that day four years ago, Aaron joined the rapidly growing number of children who have been diagnosed with asthma, a chronic and debilitating breathing disorder that affects more than 5.3 million youngsters under age 18 in the United States and 17.3 million people overall.

While doctors and public health officials have been making progress against other chronic diseases, asthma has been increasing in numbers and in severity over the past two decades — for reasons that are not completely understood.¹

"We have an alarming increase in the prevalence of asthma, which may be considered of epidemic proportions," says Virginia Taggart, director of the division of lung diseases at the National Heart, Lung and Blood Institute, part of the National Institutes of Health (NIH) in Bethesda, Md. "The increase has been large. It's not clear why it has happened. And it's certainly had a profound impact on our lives."

Technically, the increased incidence of asthma that is being noted



in the United States and other industrialized countries does not qualify as an epidemic, a term normally used for infectious diseases spread by viruses or bacteria. Asthma, instead, appears to be a disease born from some genetic predisposition or early disorder of the immune system.

The condition, misleadingly dormant much of the time, can be triggered by the body's allergic response to indoor air contaminants, outdoor air pollution or, in some individuals, to cold, exercise or stress.¹ An attack leaves the asthma sufferer gasping for breath. A severe attack can require hospitalization or — in a small but disturbing number of extreme cases — can be fatal.

Whether an epidemic or not, doctors and public health officials are seeing more and more asthma cases, especially in inner-city neighborhoods and especially among blacks. "It's going up at a very rapid rate in the inner city and at a rapid rate elsewhere," says Lawrence Lichtenstein, director of the Asthma and Allergy Center at Johns Hopkins University Medical Center in Baltimore. In the South Bronx, researchers estimate that 9-14 percent of youngsters have asthma. A study by the Children's Health Fund earlier this year found that among children in New York City shelters the rate was alarmingly high: 38 percent.²

Treating homeless children with asthma poses particularly difficult

problems, according to Shawn Bowen, an asthma pediatrician with the asthma initiative being conducted jointly by the Children's Health Fund and Montefiore Medical Center.

"Children in the homeless shelter don't have a medical home," says Bowen, who is also an assistant professor in the division of community pediatrics at Montefiore Medical Center/Albert Einstein College of Medicine. "They get most of their care in an emergency room or clinic. As a result, there's very little continuity. And since asthma is a chronic disease, the only way to treat it is to have continuity of care."³

Aaron, who until recently lived in a shelter with his mother, has improved greatly, thanks in no small part to her efforts to learn how to deal with the disease. Anderson, a single parent in her 30s who came to the United States from Jamaica as a teenager, knows how to listen to Aaron's chest to gauge his breathing. "When he's wheezing, it sounds like the wind blowing through the trees," she says.

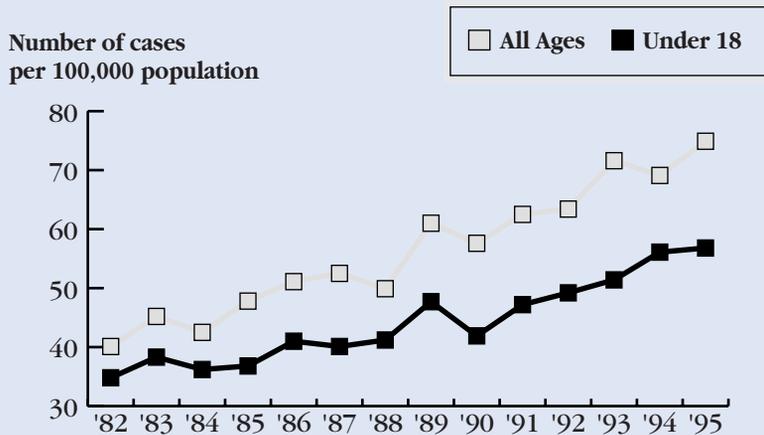
Initially, Aaron's asthma was classified as persistent and severe, the most serious of the four diagnostic gradations. (The others: intermittent/mild, persistent/mild and persistent/moderate.) Aaron needed two types of medications: bronchodilators — so-called rescue medicines — that relieve the immediate symptoms of an asthma attack by relaxing the bronchial tubes and allowing normal breathing to resume; and corticosteroids — so-called controller medicines — that reduce the chronic inflammation of the airways and thus help reduce the long-term severity of the disease.

Today, Aaron is only taking albuterol, one of the most common bronchodilators. He was once taking controller medicines up to four times a day but is no longer on daily

Childhood Asthma on the Increase

The rate of asthma among children under age 18 almost doubled from 1982 to 1998, while the rate among all ages increased by almost two-thirds. An estimated 17.3 million Americans had asthma in 1998, including 5.3 million children under 18.

Estimated Number of Asthma Cases



Source: National Center for Health Statistics, "National Health Interview Survey," 1982-1995

medication at all. Anderson, who now has her own apartment and works as a security guard at the shelter where she once lived, is clearly pleased. But she still keeps a close eye on Aaron. "I don't let him run too much," she says. "I don't let him cry too much."

Anderson's crash course in asthma parallels the experience of millions of other parents around the country, in well-to-do suburbs as well as inner cities. "Every day, we pull down about 50 or 60 requests for information, and the vast majority of those are from parents of children under age 6," says Nancy Sander, president of the Fairfax, Va.-based support network known as Allergy and Asthma Network/Mothers of Asthmatics.

"Many of the families are just newly diagnosed, so they don't know what they don't know," says Sander, who has asthma herself and has a daughter with the disease. "They're searching for help, understanding, information."

Oddly, many better-off families resist the diagnosis. "Parents are often reluctant to have their kids labeled as asthmatic," says John Carl, a pediatric pulmonologist at Rainbow Babies and Children's Hospital in Cleveland. "The label is not a negative thing. It may be a defining thing that may help other health-care providers provide appropriate treatment."

One reason for families' reluctance to acknowledge asthma in their children may be the widespread misunderstanding about the disease. Ancient Greek physicians recognized asthma, but its exact causes remain a mystery today. As recently as 50 years ago, many doctors believed — mistakenly — that the disease was largely psychosomatic. Still today, asthma is widely thought of as a not especially severe disease — even by some people who have asthma.

The asthma "epidemic" is helping to correct some of those mispercep-

tions, as more people deal with the disease in their families or encounter other people who have it. Meanwhile, public health officials are working to improve the care and treatment of people with asthma, while researchers look for more effective medicines to control the disease or — in the longer-term future — prevent it.

As the efforts continue, here are some of the questions being debated:

Are environmental factors causing the increase in asthma?

When the 12th-century rabbi and physician Maimonides treated an Egyptian prince for asthma, he prescribed, among other things, escape from the urban pollution of the time. With the advent of the Industrial Revolution in the 19th century, outdoor air pollution again became a leading suspect in either causing or aggravating asthma — and remained a major focus of asthma investigators into the 1980s.

Since that time, however, doctors and researchers have devoted greater attention to other possible "triggers" for asthma, especially allergens found in the air inside homes and offices. Today, tobacco smoke, cockroach infestation and dust mites rank as the leading suspects for aggravating the condition.

Indoor air problems are "a much more likely explanation of why asthma is increasing," says Carlos Camargo, an epidemiologist at Massachusetts General Hospital in Boston. "There's all kind of evidence that inhalation of things like dust mites, [decaying] cockroaches and other allergens worsen asthma. And they're also associated with a higher risk of developing asthma."

Researchers hypothesize that modern living conditions, including enclosed homes and offices and reduced outdoor time in particular for children, exacerbate the effect of indoor air problems and thus the potential for either causing or aggravating asthma. By contrast, outdoor air

pollution has been reduced in the United States in recent years as the incidence of asthma was increasing.

“Twenty years ago, people did suspect that outdoor pollution was high on the list of either causing or aggravating asthma, or both,” says Taggart at NIH. “Today, it’s highly unlikely that outdoor pollution is on the list of causing asthma, though it does aggravate the disease.”

One study often cited for discounting the role of air pollution in causing asthma compared the rates of the disease in east and west Germany after unification. Surprisingly, east Germany had a lower incidence of hay fever, bronchial asthma and other respiratory diseases than west Germany despite markedly worse outdoor air pollution in the former communist state. The researchers described the results as “paradoxical,” though they nonetheless concluded, “environmental factors . . . do influence the development” of the disease.⁴

Some researchers disagree with the de-emphasis on the role of outdoor air pollution in asthma research. Patrick L. Kinney, an associate professor and environmental health expert at the Joseph L. Mailman School of Public Health at Columbia University in New York City, says some studies provide evidence of a relationship between living near busy streets and having respiratory problems. In addition, other studies also suggest that diesel fuel particles — a contributor to outdoor air pollution — can “enhance” people’s response to allergens.

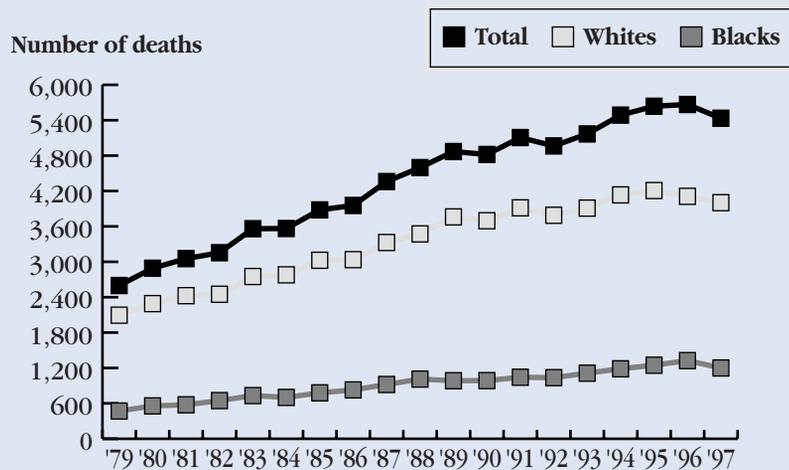
“We know that air pollution exacerbates asthma,” Kinney adds, “but we don’t know that that’s the only thing it does.”

In recent years, another suspect has been added to the list of possible causes of asthma: changes in human immunology. Some researchers believe that public health improvements — such as reduced incidence of respiratory infections among children,

Deaths Among Blacks Increased the Most

Deaths from asthma among blacks increased by more than 150 percent from 1979 to 1997, compared with a 91 percent rise among whites. Among all Americans, deaths increased by 92 percent during the same period. Nearly 90 percent of the 5,434 asthma deaths in 1997 were among adults age 35 and older.

Estimated Number of Asthma Deaths



Source: National Center for Health Statistics, “Monthly Vital Statistics Report, 1979-1997”

increased use of antibiotics and improvements in diet — may be stunting the development of immunological protections against allergens.

“By modifying the normal immune mechanisms in people, we’ve allowed for an increase in the incidence of asthma,” says William Busse, president-elect of the American Academy of Allergy, Asthma and Immunology and a professor of medicine at the University of Wisconsin. “We’re getting a changed immune response.”

The variety of hypotheses leaves researchers and health-care professionals frustrated.

“We don’t know what causes asthma,” Taggart says. “We are increasingly convinced that it’s some interplay between the environment, the genetic predisposition to having allergies and the developing immune systems and lungs. Which thing is the most important, or which comes first to start the

chain of events, we really don’t know.”

Are health services adequate for people with asthma?

When he was struggling with asthma as a youngster in the 1930s, Lichtenstein of Johns Hopkins University was advised to spend every winter in Florida to take advantage of its warm, sunny climate. Today, as one of the country’s leading asthma researchers, Lichtenstein says his doctor’s advice was flat wrong.

“For asthmatics, some of the most common irritants are dust mites, mold and other substances you’ll find in a wet climate, like Florida,” Lichtenstein writes. His doctor “didn’t know enough about asthma to realize that I would wheeze and cough as much — if not more — during our winter vacation at the beach.”⁵

Health care for people with asthma has improved dramatically since that

time. Doctors and other medical professionals are better informed. Some misconceptions — like the idea that asthma was primarily psychosomatic — have been dispelled. New medications and new devices have been introduced to control and prevent asthma attacks.

Still, the asthma epidemic has focused attention on shortcomings in the care and treatment of asthmatics. Public health experts say that youngsters in medically underserved areas — inner-city neighborhoods in particular — often go undiagnosed until their asthma reaches an advanced state and may get inadequate care after that because they do not have a regular primary-care provider.⁶ Children in families that do have good medical care also may not be properly diagnosed or treated because some general practitioners fail to recognize the symptoms or fail to prescribe the right course of treatment after making the diagnosis.

In addition, Lichtenstein and others say that the present treatment options are still short of a cure. “What we’re doing is treating the symptoms rather than the underlying disease,” he says.

For many patients, however, even symptomatic treatment is far from ideal. In the inner cities — where asthma is increasing most rapidly — too many people see doctors only at times of acute attacks. “They have episodic contact with the health-care system, usually in the emergency room,” says Irwin Redlener, president of the Children’s Health Fund, a New York City-based organization working to improve health services for children in medically underserved areas.

“The ER ends up being both the receiving and monitoring point for people whose asthma is out of control,” says Michael McDermott, an emergency room physician at Cook County Hospital in Chicago. “It’s theoretically possible that asthmatics

should never come to an emergency room once they’re properly trained.”

Redlener, who is also president of the Children’s Hospital at Montefiore Medical Center in the Bronx, says that inadequately trained physicians are also a problem. “Many kids go to doctors that aren’t even close to up-to-speed with respect to the latest treatments that are available to children.”

Too many general practitioners tend to be late in diagnosing asthma, according to Bruce Bender, a doctor at the National Jewish Medical and Research Center in Denver, a leading asthma research and treatment facility. “Treating asthma earlier can prevent it from being worse later on,” Bender explains.

Meanwhile, researchers are trying to develop more effective medications. NIH’s Taggart calls the research “very exciting and very promising.” “We’ll get more therapies that will target the earlier parts of the inflammatory process so that we can stop this chain reaction earlier in the cycle,” she says.

Some asthma experts, however, say they want to see more attention paid to improving existing services without waiting for therapies that are years away from being introduced. “We have excellent tools right now to achieve reasonable disease control, but the system is providing for inadequate application of those controls,” says Carl, at Rainbow Babies and Children’s Hospital. “We can do much better nationally than we are doing.” ■

BACKGROUND

Gasping for Breath

Ancient Greek physicians as early as Hippocrates in the fifth cen-

tury B.C.E. used the word “asthma” (meaning panting) to refer generally to conditions of gasping or breathlessness.⁷ Only in the 17th century did the English physician Sir John Floyer and others develop the modern view of asthma as a condition distinct from other breathing disorders.

Diagnosis of asthma advanced in the 18th and 19th centuries with the development of new medical techniques and tools. The 18th-century Viennese physician Leopold Auenbrugger introduced the now standard technique of chest examination in a 1761 treatise, “On Percussion of the Chest,” that explained how tapping on a fluid-filled chest cavity produces a different sound than tapping on a clear one. In the early 19th century, the French physician Rene Laënnec invented the stethoscope for listening to the heart and lungs.

Treatment of asthma also improved, but remained fairly primitive through the 19th century. In the United States, asthma was widely recognized as a common ailment, and medical hucksters advanced a variety of cures and treatments for the disease. Opium, cocaine and tobacco were often prescribed: As stimulants, they help open airways, but they also have adverse side effects. A variety of powders and inhalants were also advertised as cures.

By the turn of the century, some experimenters were working on ways to deliver medications into the lungs with devices that used air or steam instead of smoke — forerunners of today’s inhalators.

Doctors remained divided about the causes of asthma through the 19th century. As early as the 17th century, the German physician Konrad Schneider had identified dust as an irritant of the disease. In the mid-19th century, the English physician Henry Slater identified animal dander as an asthma trigger. By then,

Chronology

several researchers had concluded that the underlying cause of bronchial asthma was a spasm of the bronchial musculature. But the dominant theory linked asthma to a nervous disorder.

Early Breakthroughs

In 1910, though, American scientist Samuel Meltzer put forth the theory — close to the modern understanding — that asthma is caused by a spasm of the bronchioles triggered by some specific substance to which a person with the disease is hypersensitive.⁸

The great medical breakthrough in treating asthma came with the introduction of corticosteroids to control asthma attacks in the 1950s.⁹ Biochemists had identified the importance of the natural hormones produced by the cortex of the adrenal gland as early as the mid-19th century. Extracts of the adrenal cortex were purified during the 1930s, and the individual steroids were identified, including the most important: cortisone. After the U.S. physician Philip Hench demonstrated that cortisone could be used to treat acute arthritis, doctors tried it on other diseases, including asthma.

“It was very quickly evident,” the English physician Donald Lane writes, “that steroids would combat severe life-threatening attacks of asthma.” But “disappointing relapses” occurred when the steroids were withdrawn. So doctors turned to prescribing steroids as long-term maintenance for some asthmatics. The results were generally positive, but a rash of side effects produced a reaction against the use of steroids in the 1960s. Concerns about side effects were alleviated, however, by the development of manufactured corticosteroids — more powerful than the natural sub-

Before 1900

Asthma is recognized, but causes are not completely understood and treatments are primitive.

1600s

German physician identifies dust as asthma trigger.

1820s

Invention of the stethoscope helps doctors better diagnose asthma.

Mid-1800s

English physician Henry Slater systematically documents asthma cases, identifies animal dander as trigger.

Late 1800s

Opium, cocaine, tobacco and other inhalants are widely prescribed for treating asthma in the United States.

1900s-1960s

Biochemists make progress in understanding the body's response to allergens.

1920s

Adrenaline is used to relieve asthma symptoms despite potential side effects.

1940s

Cortisone — a hormone produced by the adrenal gland — is isolated and used to treat arthritis.

1950s-1960s

Manufactured corticosteroids are introduced to treat asthma; bronchodilators are developed to relieve symptoms with fewer side effects.

1980s Asthma rates increase in United States and other industrialized countries; outdoor air pollution is thought to be major factor in causing disease.

1990s Public health agencies and support groups mount campaigns to increase public awareness of asthma “epidemic”; indoor air contaminants viewed as major factor in causing or triggering disease.

1991

National Heart, Lung and Blood Institute prescribes guidelines for diagnosing and treating asthma; updated in 1997.

1997

Researchers suggest exposure to tuberculosis virus may reduce susceptibility to asthma.

1999

Clinical trials continue on anti-IgE therapy; companies plan to seek government approval for use of the drug in 2000.

A Guide to Asthma Medications

Asthma patients and their families can easily feel bewildered by the array of medications and devices used to manage the disease and the instructions on how to use them. Moreover, many specialists and asthma advocates believe that doctors often fail to educate patients adequately and tend to underprescribe the anti-inflammatory medications that decrease swelling in the airways and thus provide long-term protection against severe attacks.

Many asthma patients, however, believe doctors are insensitive to complaints about side effects of asthma medications, such as jitteriness and rapid heartbeat and growth reduction in youngsters who take anti-inflammatory corticosteroids on a regular basis. But asthma specialists believe the side effects are minimal — most youngsters reach their anticipated height anyway, they say — and in any event are outweighed by the benefits of the medications.

People with “persistent” asthma — symptoms more than twice a week — are typically given two types of medications: anti-inflammatory (“control”) medicines and so-called bronchodilators (“rescue” medicines) for symptomatic relief. Here’s a brief guide:

Anti-inflammatory medicines — Corticosteroids, not to be confused with the anabolic steroids used and abused by athletes and body-builders, are most commonly prescribed to reduce the asthmatic’s chronic inflammation of the airways. Typically, they are inhaled so that more of the medicine reaches the lungs instead of other parts of the body — thus allowing lower doses and minimizing side effects. Some brand names: Vanceril, Pulmicort, Flovent and Azmacort.

Cromolyn and nedocromil are non-steroid, anti-inflammatory drugs that block allergens from attaching to and triggering certain inflammatory cells that line the airways. Both are inhaled. Brand names: Intal and Tilade. Anti-leukotrienes are another non-steroid drug that target one type of inflammatory cells, leukotrienes. Two pills are being aggressively marketed since winning approval two years ago: Accolate and Singulair.

Bronchodilators — These drugs provide short-term relief of coughing, wheezing and shortness of breath by relaxing the constriction of the bronchial muscles that causes breathing difficulties in an asthma attack. The most widely used is albuterol, also sold as Ventolin and Proventil. It comes in metered-dose inhalers or in a solution for use in a nebulizer, a mist-creating machine used by infants or other people who have difficulty operating an inhaler. Another bronchodilator, salmeterol, acts for up to 12 hours but takes longer to start working.

Alternative-medicine advocates list a variety of non-pharmacological methods of treating asthma, including reducing air pollutants, taking vitamins or dietary supplements and decreasing stress.¹ Some of the approaches are “quite mainstream,” says Virginia Taggart, director of the division of lung diseases at the National Heart, Lung and Blood Institute, part of the National Institutes of Health. But she says the use of herbal teas, acupuncture and meditation “have not been adequately studied” to assess their effectiveness.

¹ For background, see Richard L. Worsnop, “Alternative Medicine’s Next Phase,” *The CQ Researcher*, Feb. 14, 1997, pp. 121-144, and Charles S. Clark, “Alternative Medicine,” Jan. 31, 1992, pp. 73-96.

stances — and by physicians’ greater familiarity with their use.

The second medical breakthrough came with the development of bronchodilators — chemicals that open up the narrow airways by relaxing the bronchial muscle.¹⁰ The natural hormone adrenaline was first used for treating asthma at the end of the 19th century and introduced into commercial use in the 1920s. But, as Lane explains, adrenaline is a general stimulant that causes higher blood pressure and a number of other adverse physical changes.

Biochemists worked to produce more selective agents that would operate only on the bronchial

muscles and by the 1960s had created what Lane calls “a daunting array” of bronchodilators with fewer side effects. In addition, the development of the metered-dose inhaler made it easier for patients to administer bronchodilators themselves, getting a small, measured dose directly into the clogged airways.

Unexplained Epidemic

Doctors and asthma researchers were encouraged by their progress in treating the disease in

the 1960s and ’70s. They took further encouragement from the gradual decline in the number of asthma deaths among young people reported in the United States beginning in 1968 and continuing through the next decade.

In the 1980s, however, asthma-related deaths began a steady rise that has continued up to the present. By the beginning of the 1990s, two experts writing in the *Journal of the American Medical Association* labeled the trend “an alarming reversal” in the progress against the disease.¹¹

Now, at the end of the decade, experts still profess bafflement at the

increased incidence of asthma and asthma-related deaths. "There are a lot of thoughts," says Thomas Casale, an asthma researcher at the Nebraska Medical Research Institute in Papillion. "I don't think we have a clear-cut answer." Lichtenstein at Johns Hopkins agrees: "Basically, we don't know the reason why, which is a little discouraging."

Focus on Education

Through the decade, asthma advocates worked to increase public awareness of the disease. "There remains a pervasive attitude, among physicians as well as patients, that asthma is not all that serious," medical writer Robin Marantz Henig observed in a 1993 article.¹² Educating patients and physicians remains a major concern today.

"We think a lot of people have adjusted to a lower quality of life than they need to," the NIH's Taggart says. "It's a matter of changing ways that people look at the disease. It's a chronic disease that needs daily therapy for most people who have asthma."

Among physicians, asthma specialists have long complained that primary-care providers are not aggressive enough in treating asthma. General practitioners rely too much on bronchodilators for symptomatic relief rather than turning to steroids to relieve the chronic inflammation of the airways, specialists say.

"Half of the people with asthma are being undertreated," Busse says. He blames the cost of medication in part but places primary responsibility on what he calls "lack of aggressiveness on the part of the physician."

With asthma rates continuing to climb in the United States, researchers continued to look for explanations for the increase. A new hypoth-

esis emerged toward the end of the decade that, paradoxically, suggested improved childhood health might be partly responsible for the increased incidence of asthma. In January 1997, a team of English and Japanese physicians reported that they found a higher rate of asthma among children in a Japanese village who had been exposed to the tuberculosis virus than those who had not.¹³ In effect, the researchers hypothesized, the immune system's response to exposure to the tuberculosis virus served to inhibit the development of asthma.

Other researchers have broadened the idea into a so-called "hygiene hypothesis" that suggests children's immune systems get stronger by fighting off viruses and allergens but have less opportunity to develop fully today because of improved sanitation, greater use of antibiotics and more widespread immunizations.

"Some people think that immunizations have been so effective that kids' immune systems are shifted in a way that they might be more prone to having allergies," Casale explains. He stresses that the hypothesis is "not proven."

By the end of the decade, public awareness of the asthma "epidemic" was increasing with greater media coverage of the issue. The National Heart, Lung and Blood Institute issued updated guidelines for doctors, stressing early diagnosis and aggressive treatment. Asthma organizations were putting out concrete checklists for patients on how to manage the disease and reduce exposure to asthma "triggers." Still, researchers had no agreed-upon explanation for the cause of the epidemic.

"Ten allergists will give you 10 different answers — maybe 15 or 20," James Wedner of the Washington University School of Medicine in St. Louis said in a *Newsweek* cover story in May 1997. "No one really knows."¹⁴ ■

CURRENT SITUATION

Helping the Poor

The key to improving health care for people with asthma is better education for both patients and doctors, according to asthma specialists and advocacy groups. But people in inner-city neighborhoods where the asthma epidemic is most severe face a variety of obstacles in coping with the disease. And asthma specialists say that the rise of managed care hampers the ability of primary-care providers to educate patients and families regardless of their economic status.¹⁵

For the asthma patient without a regular primary-care provider, medical care is too often hit and miss. Families are "whisked in and out of the emergency room," says Bowen of the New York City asthma initiative. "A patient's history has to be taken over a month really to be treated adequately. The people in the ER don't get that because too much is going on."

Families in homeless shelters or public housing may also have difficulty controlling the environmental factors that can trigger asthma attacks. "If you live in public housing, you may not have good control over such things as cockroach infestation, or it may not be as easy to go outdoors and smoke," says Floyd Malveaux, an asthma expert and acting dean of the Howard University medical school. "It also may not be as easy to get good ventilation or to control individual heating and cooling."

In addition, poor families may be less able — either because of limited education or preoccupation with other day-to-day problems — to make sure children are taking asthma medi-

cations regularly. “Non-compliance is a bigger problem with inner-city kids,” says Bender at National Jewish Hospital. “Even if they have inhaled corticosteroids, they’re taking them very erratically.”

Families that do have a regular, primary-care physician and health insurance coverage may still not receive the kind of education and treatment needed to manage asthma effectively. One problem, specialists say, is that many primary-care providers do not understand the importance of daily medication for most people with asthma. “Too many people — more poor than rich, but both poor and rich — are being undertreated,” says Lichtenstein at Johns Hopkins Medical Center.

“Everybody but the ‘intermittent’ [sufferer] should be treated with an anti-inflammatory on a daily basis,” says Carl, the Cleveland physician. “Our goal is to enable someone to have a fully active life without the intrusion of acute symptoms.”

Carl also says primary-care physicians and health-plan administrators do not refer as many patients to specialists as they should. “We don’t need to see three-quarters of the patients with asthma,” Carl says. “But for the sickest quarter, specialty care needs to be viewed not as the enemy but as a partner with the primary-care community.”

Seeing specialists is “not happening across the country,” agrees Sander of the asthma-support network. “That has less to do with the individual doctor than with the way managed care and HMOs are set up.”

Even specialists may fail to do a good job in patient education, however. Cook County Hospital’s McDermot says a recent survey found that only about one-tenth of the asthma specialists in Chicago had any educational program for patients other than informal consultation in the office. “It is unlikely that ad-

equated education could be done under those circumstances,” he says.

New Treatments

Ever since Maimonides prescribed chicken soup as part of an anti-asthma regimen, doctors have been looking for medications to cure, or at least control, the disease. Today, researchers are optimistic about a new drug that might rid the body of the chemical that touches off an allergic asthma attack. Some doctors are skeptical, however, saying the search for new treatments diverts attention from making better use of the anti-asthma drugs already available.

The new drug — known as anti-IgE — is aimed at blocking the anti-body Immunoglobulin E that is released in the body when someone susceptible to allergic asthma or hay fever comes into contact with an allergen.¹⁶ The IgE binds to cells in the bronchial or nasal passages — known as mast cells — which then release the substances — histamines and leukotrienes — that cause runny noses and sneezing among hay-fever sufferers and gasping and wheezing among asthmatics.

Once scientists discovered exactly how IgE binds to the mast cells, they set about trying to manufacture an antibody that would block the process and interrupt the so-called allergic cascade. Scientists at the California-based biotech company Genentech genetically engineered anti-IgE from mouse cells.¹⁷ Genentech is now partnering with the Swiss-based pharmaceutical company Novartis in conducting clinical trials of the drug in the United States and Europe.

Casale, the Nebraska asthma specialist and one of the people supervising the trials, says the results are encouraging. “This anti-IgE has been shown to improve the quality of life

of people with asthma, to decrease the need for their rescue inhaler, to decrease their symptom scores and to enable patients to reduce the dose of oral or inhaled steroids they are using to treat their asthma,” he says.

The drug appears to have caused few side effects, Casale adds, aside from the discomfort of regular injections every two to four weeks. Genentech says it hopes to seek Food and Drug Administration approval for the anti-IgE therapy in May.

One new type of drug already on the market treats asthma in a different way from bronchodilators and inhaled steroids by inhibiting the release of leukotrienes, one of the inflammatory agents produced in an allergic attack. Two so-called leukotriene modifiers are being marketed in the United States under the brand names Accolate and Singulair. These drugs are taken once a day but are useful only in mild cases.

McDermott, the Chicago physician, is strongly skeptical of the new drugs. The leukotriene modifiers, he says, are “not very good” and are “very expensive.” As for the anti-IgE therapy, he feels it is being oversold. “Rather than use inhaled steroids, we’re going to introduce a new product which is not nearly as good and claim that it is salvation,” he says. ■

OUTLOOK

Research vs. Prevention

Researchers at National Jewish Hospital in Denver are halfway through a five-year research project aimed at finding out whether intensive assistance to at-risk families can

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At Issue:

What changes are needed to improve the treatment of asthma?

Educate Patients

NANCY SANDER

President, Allergy and Asthma Network/Mothers of Asthmatics, Fairfax, Va.

most people view asthma as little more than a nuisance, but each day it drowns 15 people in their own mucus and fluids escaping from inflammatory cells that line their airways. Talk to the families of loved ones that have died. They'll tell you they didn't know asthma could kill. They'll ask why their doctors didn't tell them. It's what they didn't know that hurts.

If you don't have the facts about asthma, you'll believe the myths and suffer the consequences. Education is important whether you are the patient, the family, the physician or a legislator. What you know affects how you breathe. It's that simple.

Education, learning and applied knowledge begin in a skilled physician's office and should continue for the patient and family over a lifetime. It's asthma's nature to play hide and seek with symptoms. Those unaware will suffer more than those in the know. That's why our organization — the Allergy and Asthma Network/Mothers of Asthmatics — dedicates every dollar to patient education and outreach.

Across-the-Board Improvements

IRWIN REDLENER, M.D.

President, Children's Health Fund

modern medicines for asthma can keep patients essentially symptom-free, with no missed school days and no limitation of activity — not even the dreaded chronic nighttime cough. Yet countless hospitalizations, emergency room visits and missed school days are the reality for too many asthma sufferers. The costs are staggering — and almost totally avoidable.

What's needed are "medical homes" where children get competent care from concerned, informed providers; great follow-up; education for themselves and their parents; and proper medications.

But with more than 11 million uninsured children in the United States, and millions more facing other barriers to appropriate and timely care, true control of the asthma epidemic is not possible. Furthermore, many children who are getting some care do not receive state-of-the-art information from their doctors.

My prescription: (1) More money for research on the underlying causes of asthma; (2) universal access to health insurance and comprehensive health services; (3) community education and awareness programs; (4) improving awareness of providers, parents and patients; and (5) unencumbered availability of needed medications.

Better Physician Training

MICHAEL MCDERMOTT, M.D.

Department of Emergency Medicine, Cook County Hospital, Chicago

almost 10 years have passed since the first edition of the National Institute of Health's asthma guidelines. Nonetheless, a recent survey in one large city shows that only 50 percent of one class of specialists gave out peakflow meters to patients to measure asthma problems at home, and only 60 percent of asthmatics received written plans for how to deal with attacks. These are basic steps agreed upon for all serious asthmatics.

Many physicians have neither the training, skills nor interest to work with the crucial educational and behavioral parts of asthma. Even if the correct medications are prescribed, the feedback and questioning to develop proper medication habits are not done. The predictable result is more attacks, and blaming the patient as non-compliant.

There's no crying need for a new asthma magic bullet. There is a crying need for physicians who can work with patients to help them take meds regularly, to watch their asthma closely, to change their meds early in an attack. And our health-care system needs to help doctors get the training and take the time to do the job right.

Find New Treatments

WILLIAM BUSSE, M.D.

President-elect, American Academy of Allergy, Asthma and Immunology

each year, we are learning more and more about the mechanisms of asthma, and this information is giving us insight into how we might best treat this disease.

The experimental anti-IgE therapy — which controls the antibody that causes all allergic reactions — has been shown to be safe and potentially effective in treating allergic asthma. Anti-IgE may make it possible to remove one of the most important keys to allergic reactions and thus lessen the severity of asthma.

Genetics may play an important role in our attempts to control asthma. Once the genes responsible for asthma are discovered, it will be possible to establish their functions and the products they regulate and to develop medications to block these products. In addition, it should be possible to more accurately diagnose the disease early in its course.

With further advances in knowledge, it may be possible in the next decade to use compounds that have greater specificity to treat asthma or even prevent it. That is the hope — and there is promise for its fulfillment.

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reduce the incidence of asthma among infants. After identifying 180 low-income families in Denver with infants who had visited doctors at least three times for wheezing problems, the project sent nurses to visit the homes more than a dozen times a year. The nurses tried to help the families reduce indoor allergens, improve communication with physicians and deal with other problems.

The results so far? "We know that we've reduced allergens in some of the homes, and we've reduced cigarette smoke in some of the homes," says Mary Klinnert, who is supervising the study. "We can say that we have had some positive effects in the process part of it. But nobody knows whether that will translate into less asthma or less severe asthma."

The \$1.8-million, NIH-funded project epitomizes one approach — prevention — to trying to stem the asthma epidemic. Research into new treatments represents a second. The two approaches need not conflict, but they do compete for the time and attention of health-care policy-makers and for financial support from government and health-care institutions.

Public health advocates are eager to see more time and money invested in prevention. "If we can make resources available, especially in our impoverished communities and in our underserved population, we can dramatically improve the statistics," says Howard University's Malveaux. "If you put resources into prevention and wellness, you will reduce the numbers of hospitalization use, of emergency room visits."

Other experts voice greater enthusiasm about the potential payoff of research into new therapies. "The new treatments may be helpful, and they may also tell us something more about the disease," says the University of Wisconsin's Busse. "We still don't know the basic mechanisms of

the disease. These treatments become very informative for investigators."

"Five years down the road, we're going to be able to recognize some of the genes that are characteristic of asthma," Busse adds. "By understanding the disease better, we're going to get a very different therapeutic approach, not five years from now but 10 years."

For the moment, though, experts expect the incidence of asthma to continue rising in the United States. "It's going to get worse in the sense that more people will have it," says Camargo at Massachusetts General Hospital. But he sees doctors making progress in managing the disease.

Others are less optimistic. Carl says he is "frustrated at the way the system is structuring care, the way that specialists are [not used enough] in the current system." At National Jewish Hospital, Bender worries about the quality of patient education. "That's where we're getting stuck," Bender says.

For her part, Sander of the asthma-support network hopes that prevention efforts and research will combine to help give people with asthma the power to cope with the disease without letting it dominate their lives. "The more we know as consumers about ourselves and what medical research has to offer us," she says, "the more likely we are to put asthma in its place and get on with our lives."

"I don't want my son or daughter to wake up every morning and say, 'I have asthma,' and identify themselves with this disease," Sander adds. "Taking care of my airways is just as important as taking care of the rest of my life, and that is the place I want to help other people to reach. Taking care of asthma is just part of what they do." ■

Notes

¹ For background, see Richard L. Worsnop,

"Indoor Air Pollution," *The CQ Researcher*, Oct. 27, 1995, pp. 945-968.

² See *The New York Times*, May 5, 1999. Further details can be found on Children's Health Fund Web site: www.childrenshealthfund.org.

³ For background, see Charles S. Clark, "Emergency Medicine," *The CQ Researcher*, Jan. 5, 1996, pp. 1-23.

⁴ Ring et al., "Environmental Risk Factors for Respiratory and Skin Atopy: Results from Epidemiological Studies in Former East and West Germany," *International Archives of Allergy and Immunology*, Vol. 118, pp. 403-407 (1999).

⁵ Lawrence M. Lichtenstein, *Conversations About Asthma* (1998), p. vii.

⁶ For background, see Bob Adams, "Primary Care," *The CQ Researcher*, March 17, 1995, pp. 217-240.

⁷ Some background drawn from National Library of Medicine/National Institutes of Health, "A Breath of Life," exhibit on display March 23, 1999-June 30, 2000.

⁸ See E. L. Becker, "Elements of the History of Our Present Concepts of Anaphylaxis, Hay Fever and Asthma," *Clinical and Experimental Allergy*, Vol. 29, p. 880 (1999).

⁹ Background drawn from Donald J. Lane, *Asthma: The Facts* (1st ed.) (1979), pp. 123-126. The 1996 edition includes a somewhat shorter version of the history, pp. 148-149.

¹⁰ See *ibid.* (1st ed.), pp. 109-111; (3d ed.), pp. 138-139.

¹¹ *Journal of the American Medical Association*, Oct. 3, 1990, pp. 1683-1687.

(asthma mortality); pp. 1688-1692 (asthma hospitalization among children).

¹² Robin Marantz Henig, "Asthma Kills," *The New York Times Magazine*, March 28, 1993.

¹³ Shirakawa et al., "The Inverse Association Between Tuberculin Responses and Atopic Disorders," *Science*, Vol. 275 (1997), p. 77.

¹⁴ Quoted in Geoffrey Cowley and Anne Underwood, "Why Ebonie Can't Breathe," *Newsweek*, May 26, 1997, p. 60.

¹⁵ For background, see Adriel Bettelheim, "Managed Care," *The CQ Researcher*, April 16, 1999, pp. 305-328.

¹⁶ Some background drawn from Arthur Allen, "Breath of Life," *The Washington Post Magazine*, Oct. 31, 1999, p. 21.

¹⁷ For background, see Craig Donegan, "Gene Therapy's Future," *The CQ Researcher*, Dec. 8, 1995, pp. 1089-1112.

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American Lung Association, *Family Guide to Asthma and Allergies: How You and Your Children Can Breathe Easier*, Little Brown, 1997.

A practical guide to dealing with asthma including a glossary, references, a list of lung association state chapters and other asthma organizations and state-by-state listings of asthma camps for children.

American Medical Association, *Essential Guide to Asthma*, Pocket Books, 1998.

A comprehensive guide to understanding what causes asthma, how to diagnose and treat the disease and how to control asthma attacks, with resources, short bibliography and glossary.

Casler, Kristin, *Asthma: Questions You Have ... Answers You Need*, People's Medical Society, 1998.

A question-and-answer format provides straightforward explanations of the causes of asthma and medical procedures for diagnosing and treating the disease, with a list of organizations and glossary.

Chaitow, Leon, *Asthma and Hayfever: Safe Alternatives Without Drugs* [rev. ed.], Thorsons, 1998.

The book discusses consequences of conventional pharmacological treatment of asthma and details alternative treatments, including nutritional regimens.

Lane, Donald J., *Asthma: The Facts* (3d ed.), Oxford University Press, 1996.

Lane, a physician, gives a detailed but accessible medical account of the causes of asthma and methods of treating the disease.

Lichtenstein, Lawrence M., with Kathryn S. Brown, *Conversations About Asthma*, Williams & Wilkins, 1998.

Lichtenstein, director of the Johns Hopkins Asthma and Allergy Center, gives a very practical guide to living with asthma, including steps to "asthma-proof your world" and work with health-care providers to better manage the disease, with a list of organizations with addresses, telephone numbers and Web addresses.

FOR MORE INFORMATION

Allergy and Asthma Network/Mothers of Asthmatics Inc., 2751 Prosperity Ave., Suite 150, Fairfax, Va. 22031-4397; (703) 641-9595. The organization maintains an informative Web site and also publishes a quarterly magazine.

American Academy of Allergy, Asthma and Immunology, 611 East Wells St., Milwaukee, Wis. 53202; (414) 272-6071; www.aaaai.org. The academy has about 6,000 members, including allergists, asthma specialists and immunologists.

American Lung Association, 1740 Broadway, New York City, N.Y. 10009; (212) 315-8700; www.lungusa.org. The association's Web site offers a variety of information, including current statistics on asthma rates.

Children's Health Fund, 317 E. 64th St., New York, N.Y. 10021; (212) 535-9400; www.childrenshealthfund.org. The fund seeks to improve health services for children in underserved medical areas, it cosponsors the Childhood Asthma Initiative with Montefiore Medical Center and Schering-Plough Corp.

National Heart, Lung and Blood Institute, 6701 Rockledge Drive, Suite 10018, Bethesda, Md. 20892; (301) 435-0233; www.nhlbi.nih.gov/nhlbi/nhlbi.htm. The institute maintains a detailed Web site with information for laypersons and medical professionals.

National Jewish Medical and Research Center, 1400 Jackson St., Denver, Colo. 80206; (303) 388-4461; www.njc.org. The center is a leading asthma hospital and research facility with an informative Web site.

Articles

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Allen discusses the current asthma "epidemic" by focusing on the experiences of two Washington-area children of differing socioeconomic backgrounds.

Stolberg, Sheryl Gay, "Poor People Are Fighting a Baffling Surge in Asthma," *The New York Times*, Oct. 18, 1999, p. A1.

Stolberg gives a comprehensive overview of the current asthma "epidemic," with interviews with a wide variety of national experts.

Reports and Studies

National Heart, Lung and Blood Institute, National Asthma Education and Prevention Program, Expert Panel Report 2: Guidelines for the Diagnosis and Management of Asthma, 1997.

The 153-page report — an update of a 1991 report — sets out guidelines for diagnosis and treatment of asthma and education of asthma patients.

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*Additional information from UMI's Newspaper
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Causes

"Research Excludes Outdoor Pollution as Main Cause of Asthma," *Journal of Environmental Health*, July 1998, p. 52.

A British study has shown that indoor pollution appears more likely than outdoor pollution to be the main cause of childhood asthma. Britain has one of the highest levels of asthma in the world.

Kher, Unmesh, "Roaches Cause Asthma," *Discover*, January 1998, p. 58.

According to a study released in 1997, asthma can be brought on by a combination of genetic, psychological and environmental factors — including cockroaches.

Leary, Warren E., "Cockroaches Cited as Big Cause of Asthma," *The New York Times*, May 8, 1997, p. A18.

Researchers said that a national study conclusively showed that allergic reaction to cockroaches is a major cause of the high level of asthma in children in inner cities. A five-year study conducted at eight medical centers in seven cities concluded, as experts had long suspected, that children are at high risk of asthma attacks if they are allergic to cockroaches and their homes show high levels of the insects' body parts and droppings.

Children With Asthma

Boseley, Sarah, "Car Exhaust Fumes Linked to Worsening Asthma in Children," *The Guardian*, March 12, 1999, p. 1-10.

New evidence for a definite link between air pollution — from car exhausts and other sources — and worsening asthma in children was published in the *Lancet* medical journal. Scientists in the Netherlands concluded that "the effect of air pollution on public health is likely to be substantial." Children with asthma or allergies "should be targeted by public health improvement strategies."

Deas, Gerald W., "Is Your Child Thirsty for an Asthma Attack?" *Amsterdam News*, July 9, 1998, p. 16.

The author warns that many artificial fruit drinks popular with children can trigger asthma attacks.

Chase, Marilyn, "Can Video Dinosaurs Help Children Manage Illnesses Like Asthma?" *The Wall Street Journal*, Oct. 5, 1998, p. B1.

Bronkie the Bronchiasaurus is a video hero with asthma. The player's mission is to keep Bronkie or his female counterpart, Trakie the Trachiosaurus, from coughing and wheezing in an environment riddled with allergens

such as dust, smoke and pollen. Made in the Super Nintendo format by Click Health Inc., Bronkie is one of a series of games that teaches children how to manage health problems. Doctors at Stanford University Medical Center are studying whether game-playing can help reduce asthma episodes and hospital visits.

Hines, Michael, "Program Encourages Children's Checkups for Asthma; Goal Is to Reduce Number of Hospitalizations and Visits to Emergency Room," *St. Louis Post-Dispatch*, July 28, 1999, p. B1.

The article discusses a program started by St. Louis Children's Hospital to help children deal with asthma by giving families more information about asthma and encouraging children to have regular checkups to prevent severe attacks.

Wahler, Marni, "Waiting to Inhale: Is Our Insular Lifestyle Creating a Health Menace? New Theories Point to the Very Way We Live as Cause for the Significant Rise in Childhood Asthmatics," *San Francisco Chronicle*, Aug. 9, 1998, p. MAG13.

Thomas A.E. Platts-Mills has been researching asthma for more than 30 years, looking closely at changes in the Western lifestyle to better understand why asthma is increasing among children. A major factor in developed countries, says Platts-Mills, is that we have constructed houses so carefully that they have become hermetically sealed allergen chambers. The huge increase in time children spend in front of TV and the decrease in time they spend outdoors exacerbates the problem.

Epidemic

"The Asthma Epidemic," *American Journal of Nursing*, February 1999, pp. 18-20.

A survey indicates that asthma management in the United States falls far short of the goals established by the National Institutes of Health (NIH).

Carter, Brian, "Asthma Reaches Epidemic Proportions in the African American Community," *Los Angeles Sentinel*, July 23, 1998, p. A10.

The American Lung Association says the number of people diagnosed with asthma between 1982 and 1994 has reached epidemic proportions.

McDaniel, Charles-Gene, "New Treatments in the War Against Asthma," *Consumer's Digest*, May 1998, pp. 20-26.

Asthma is gaining in the United States despite better medications and a general increase in understanding

about the illness. Steps necessary to control asthma are discussed.

Stapleton, Stephanie, "Asthma Rates Hit Epidemic Numbers; Experts Wonder Why," *American Medical News*, May 11, 1998, p. 4.

In the United States, asthma rates have increased 75 percent since 1980, with cases among very young children up 160 percent, according to a recent CDC report. The pediatric implications of the disproportionate increase of asthma in children are discussed.

Socioeconomic Factors

Bernstein, Nina, "38 Percent Asthma Rate Found in Homeless Children," *The New York Times*, May 5, 1999, p. B1.

A study has found that at least 38 percent of homeless children in the city's shelters have asthma, more than six times the national rate for all children and more than double the rate found by an earlier study of some of the city's poorest neighborhoods. Moreover, only 9 percent of the asthmatic homeless children were on proper medication.

Noble, Holcomb B., "Far More Poor Children Are Hospitalized for Asthma, Study Shows," *The New York Times*, July 27, 1999, p. B1.

In the first study of its kind of the nation's urban asthma epidemic, researchers have found the rate of hospitalization from the disease far greater among children in poor, predominantly minority neighborhoods of New York City than experts suspected.

Saltus, Richard, "Yearning to Breathe Free: Asthma Epidemic Broadens its Reach and Hits Children the Hardest," *The Boston Globe*, April 12, 1999, p. F1.

For reasons not entirely clear, the asthma burden is falling heaviest on minorities, especially those living in urban poverty. Blacks and Hispanics have a higher rate of asthma and also get sicker. Minorities have a threefold greater rate of hospitalizations and double the rate of emergency room visits.

Starling, Kelly, "What's Behind the Asthma Epidemic in Black America?" *Ebony*, July 1998, pp. 62-67.

African-Americans are among the hardest hit when it comes to incidence of asthma. Some think a complex web of triggers, such as poverty, pollution and cockroaches, causes the disease.

Treating Asthma

Goodman, David C., Chiang-hua Chang, Julia Hecht, Paula Lozano and Therese A. Stukel, "Has Asthma Medication Use in Children Become More Frequent,

More Appropriate, or Both?" *Pediatrics*, August 1999, pp. 187-194.

Despite national initiatives to improve medical treatment, the appropriateness of medications that physicians prescribe for children with asthma remains unknown. This study measures trends and recent patterns in the pediatric use of asthma medications.

Gordon, Ruth M., and Phillip S. Moser, "Home Health: Your Client has Asthma — Now What?" *Nursing*, June 1999, pp. HH1-HH7.

Home health-care nurses play a vital role in helping clients manage asthma. The authors review client assessment, possible triggers of acute exacerbation, use of drug therapy and delivery devices and recommendations for client education.

Lagerlov, Per, Anne Leseth and Ingrid Matheson, "The Doctor-Patient Relationship and the Management of Asthma," *Social Science & Medicine*, July 1998, pp. 85-91.

General practitioners differ on how to relate to their patients, diagnose asthma and update their knowledge. By understanding the doctors' attitudes within these domains, it is possible to design a better information strategy and improve disease management.

Lucas, Beverly D., "Asthma Management Information Online," *Patient Care*, March 15, 1999, p. 15.

The new Web site launched by the National Heart, Lung, and Blood Institute that provides information on chronic asthma is discussed. Asthma Management Model System is located at www.nhlbisupport.com/asthma/index.html.

Morrow, David J., "New Treatments Lag In Fighting Asthma," *The New York Times*, Oct. 19, 1999, p. F5.

Within the past two years, only two significant asthma drugs were approved: Accolate, manufactured by Astra-Zeneca and Singulair from Merck. But the new pills have not been proved to be as effective as the inhaled corticosteroids that are part of standard asthma treatment. Nor can they replace drugs for asthma attacks.

Owen, Cheryl L., "New Directions in Asthma Management," *American Journal of Nursing*, March 1999, pp. 26-34.

Recent advances in asthma research can help patients avoid acute exacerbation and hospitalization. A wider range of therapeutic agents is now available for treatment of asthma.

Ryhal, Bruce T., "What's New in Asthma Treatment?" *Healthline*, March 1998, pp. 6-7.

New treatment protocols for asthma have resulted in improved outcomes and a reduced cost of asthma care.

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