NIH MedlinePlus®
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FALL 2013
the magazine

Gold medal, short-track speedskater Apolo Ohno doesn't let his exercise-induced bronchospasm (EIB) slow him down.

Breathing Easier

Controlling Asthma and Related Conditions

A publication of the **NATIONAL INSTITUTES OF HEALTH** and the **FRIENDS** of the **NATIONAL LIBRARY OF MEDICINE**

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(202) 679-9930
7900 Wisconsin Avenue, Suite 200,
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KRAMES staywell

Selby Bateman, Managing Editor
Linda F. Lowe, Senior Designer
Jan McLean, Creative Director
Traci Marsh, Production Director

NIH MedlinePlus the Magazine is published by
Krames StayWell
407 Norwalk St.
Greensboro, NC 27407
(336) 547-8970

William G. Moore, President
Sharon B. Tesh, Senior Staff Accountant

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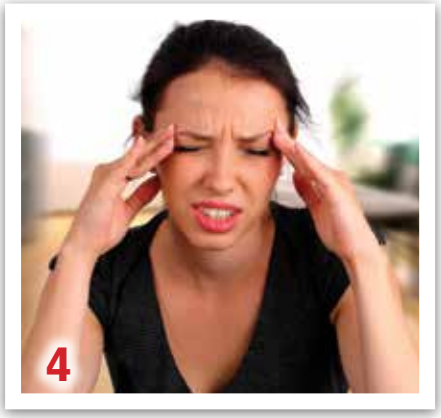
Volume 8 Number 3 **Fall 2013**



More than 46 million Americans are affected by communication disorders.

Parents can help make the school year a healthier one for their kids with just a few simple guidelines.

Before being treated, exercise-induced bronchospasm almost slowed down Apolo Ohno's short-track speedskating career.

Photos: (Cover & Center) Mat McCabe Photography, (Top) Thinkstock, (Bottom) Thinkstock

The National Institutes of Health (NIH)—the Nation's Medical Research Agency—includes 27 Institutes and Centers and is a component of the U.S. Department of Health and Human Services. It is the primary federal agency for conducting and supporting basic, clinical, and translational medical research, and it investigates the causes, treatments, and cures for both common and rare diseases. For more information about NIH and its programs, visit www.nih.gov.

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2013 Awards Gala Event!

On September 10, the Friends held its annual Awards Gala to celebrate advances in public health, medicine, and health communications, as well as the individuals and organizations dedicated to these causes. The 2013 Gala brought together representatives from the public, professional, and business sectors in health care to show their support for the Library.

Sincerely,
Glen P. Campbell, Chairman
Friends of the National Library of Medicine

Photos: Michael Spencer, NIH

▲With NLM Director **Donald A.B. Lindberg**, M.D. (left), and Fogarty International Center Director **Roger I. Glass**, M.D., Ph.D. (right), was **Jack Andraka**, 16, who recently won the 2012 Gordon E. Moore Award, grand prize of the Intel International Science and Engineering Fair. Andraka developed a quick and inexpensive method to identify pancreatic, ovarian, and lung cancer during their early stages.

◀The Honorable **Chris Van Hollen** (right), U.S. Congressman from Maryland's 8th District, received the Paul G. Rogers Award for Public Service from FNLM Vice President **Joseph Perpich**, M.D., J.D.

▶ **Raymond F. Schinazi**, Ph.D., Sc.D. (right), the Frances Winship Walters Professor of Pediatrics at the Emory University School of Medicine VA Medical Center, received the Distinguished Medical Science Award for his many contributions to the development of effective HIV/AIDS medications. Presenting the award was **Anthony S. Fauci**, Director of the National Institute of Allergy and Infectious Diseases.

▲ **Richard Wallace**, M.S.L.S., Ed.D., Professor and Assistant Director of Quillen College of Medicine Library at East Tennessee State University, received the Michael E. DeBakey Library Services Outreach Award from FNLM President **Barbara Redman**, Ph.D. (left), and FNLM Board member **Lucretia McClure**, M.A.

◀On assignment at the Lebanese-Syrian border, **Sanjay Gupta**, M.D., sent a video thank-you to the Friends for giving him the 2013 Distinguished Health Communications Award for his outstanding contributions to the health of the nation by his excellence in medical, biomedical, and health communications. A practicing American neurosurgeon and CNN's Emmy-award winning Chief Medical Correspondent, Dr. Gupta was unable to attend the Gala due to his scheduling conflicts.

NIH Research:

Dr. Anthony S. Fauci is director of the National Institute of Allergy and Infectious Diseases.

Photo: NIH

▲ Anthony S. Fauci, M.D., Director of the National Institute of Allergy and Infectious Diseases.

An AIDS-free generation is closer than we might think

Dr. Anthony S. Fauci, M.D., leads research to prevent, diagnose, and treat infectious diseases, such as HIV/AIDS, influenza, tuberculosis, malaria, and illness from potential agents of bioterrorism. He serves as one of the key advisors to the White House and U.S. Department of Health and Human Services on global AIDS issues. His remarks in this interview are adapted, with permission, from a recent article he wrote for the *Washington Post*.

What's the current state of the AIDS epidemic?

The number of people contracting HIV infection and dying of AIDS has decreased within the past decade, but the numbers are still unacceptably high, with roughly 34 million people worldwide infected with HIV, including an estimated 1.1 million people here in the United States. About 2.5 million people globally were infected in 2011 alone. And AIDS continues to be among the world's leading causes of death, claiming an estimated 1.7 million lives in 2011.

With that said, extraordinary progress has been made in the fight against HIV/AIDS, and I am convinced we can achieve an AIDS-free generation.

What do you mean by an AIDS-free generation?

An AIDS-free generation would mean that virtually no child is born with HIV; that, as those children grow up, their risk of becoming infected is far lower than it is today; and that those who do become infected can obtain treatment to help prevent them from developing AIDS and from passing the virus on to others.

Why are you optimistic that an AIDS-free generation is possible?

Initiatives such as the U.S. President's Emergency Plan for AIDS Relief (PEPFAR) and the Global Fund to Fight AIDS, Tuberculosis and Malaria are channeling antiretroviral treatment to millions of people in hard-hit countries. Of the estimated 34 million people worldwide infected with HIV, more than 10 million have access to antiretroviral drugs. These medications reduce the levels of HIV

in infected individuals, which not only improves the health of the infected person but also has the added benefit of making them less able to transmit the virus to others.

The curve of new HIV infections in many countries is trending downward. Thirteen countries receiving PEPFAR funds have reached a key "tipping point" at which the annual increase in new patients on antiretroviral treatment exceeds the annual number of new HIV infections.

What needs to be done to achieve an AIDS-free generation?

We need to expand access to antiretroviral treatment and scientifically proven HIV prevention tools to everyone who needs them. Success or failure rests heavily on human behavior. To reach and sustain an AIDS-free generation, those who are already infected or at risk of infection must faithfully practice recommended treatment and/or prevention strategies, including taking antiretroviral drugs daily as prescribed; using a condom every time they have sex; and, for those who inject drugs, always using a clean needle and syringe.

How would an HIV vaccine help achieve an AIDS-free generation?

An effective HIV vaccine would get us to an AIDS-free generation sooner and, more importantly, would help sustain the result to create a world permanently without HIV/AIDS. An HIV vaccine that is even 50 to 70 percent effective, coupled with other proven HIV prevention tools, would be immensely effective at reducing the rate of new HIV infections. It would be one component but not the only component of an HIV prevention tool kit.

Certainly, many scientific challenges remain in the search to develop an effective HIV vaccine, but we continue to gain important new insights into its potential design.

Can we achieve an AIDS-free generation without an HIV vaccine, and how long will it take?

Without an effective HIV vaccine, achieving an AIDS-free generation is still possible. However, the path to get there will take longer and be more difficult.

It is impossible to predict when we will see the first AIDS-free generation, but it is my hope that given what we have accomplished to date, it is not too far on the horizon.

"An AIDS-free generation would mean that virtually no child is born with HIV; that, as those children grow up, their risk of becoming infected is far lower than it is today; and that those who do become infected can obtain treatment to help prevent them from developing AIDS and from passing the virus on to others."

To Find Out More

- National Library of Medicine www.medlineplus.gov http://www.medlineplus.gov
- National Institute of Allergy and Infectious Diseases www.niaid.nih.gov
- AIDSInfo www.aidsinfo.nih.gov
- NIH Office of AIDS Research www.oar.nih.gov/
- U.S. Government www.aids.gov

MP

At Last: A National Test of Taste and Smell

A long-running health survey of American adults is, for the first time, now able to include valuable information about our taste and smell functions, thanks to support from the National Institute on Deafness and Other Communication Disorders (NIDCD).

By Robin Latham, NIDCD

For more than 60 years, a national survey of American adults has been gathering information on a wide range of health factors and conditions. The exam includes the usual types of tests you find in a standard physical exam: height, weight, blood pressure, and cholesterol levels. But it also includes a nutrition survey using sample size bowls, plates, and cups to help people accurately describe what and how much they eat. In a separate home visit, researchers document day-to-day activities, lifestyle behaviors, illness symptoms, and chronic health conditions.

The ongoing survey is called the National Health and Nutrition Examination Survey (NHANES). It is the only national U.S. health survey that combines both in-person interviews with physical examinations.

In the recent past, thanks to NHANES' careful collection of health and health behavior data, scientists have been able to substantiate the dangers of second-hand cigarette smoke, and the health consequences of exposure to lead-based paint. NHANES' data built the growth charts your pediatrician uses to determine how well your baby is developing, compared to other babies of the same age.

Although NHANES had included a hearing test for decades, the NIDCD has been trying to add assessments for taste and smell function since 1997, when it first began working with the National Center for Health Statistics (NCHS) to develop reliable tests. NCHS is now part of the Centers for Disease Control and Prevention (CDC), which runs NHANES.

▲ Four 52-foot trailers contain a moveable state-of-the-art medical facility, gathering data for the NHANES national health survey, now including taste and smell information.

"Taste and smell form the basis for what we choose to eat or drink," says Howard Hoffman, M.A., program director of epidemiology and statistics at the NIDCD, and one of the prime movers of the drive to include taste and smell tests in NHANES. "Does the ability to taste and smell impact nutrition? I would say so, but in what ways and to what degree remains uncertain."

By adding tests that measure taste and smell func-

tion to the nutritional information NHANES already collects, epidemiologists and biomedical researchers will be able to take a closer look at the role of taste and smell in nutrition and health. Just as important, thanks to the physical exams and detailed medical histories NHANES technicians collect, researchers will be able to explore associations between taste and smell dysfunction and medical conditions such as high blood pressure and diabetes, as well as brain disorders such as Parkinson's and Alzheimer's diseases, which are characterized by an early loss of smell.

NIDCD: Celebrating 25 Years of Research Helping People with Communication Disorders

▲ James F. Battey, Jr., M.D., Ph.D., Director, National Institute on Deafness and Other Communication Disorders (NIDCD)

On October 28, 1988, Public Law 100-553 authorized the formation of the National Institute on Deafness and Other Communication Disorders and established the core mission areas of the research we support on hearing, balance, taste, smell, and voice, speech, and language. It's estimated that more than 46 million Americans are affected by health conditions and disorders encompassed within the areas of research the NIDCD funds.

In the 25 years since the NIDCD was established, researchers supported by the NIDCD have expanded what we know about many common and high-impact health conditions, such as hearing loss, balance disorders such as Ménière's disease, and impairments of taste and smell caused by neurological disorders or simply due to normal aging.

NIDCD researchers have also shown us a great deal about voice, speech, and language, including the areas of the brain involved in dyslexia, aphasia (loss of the ability to use or understand language), stuttering, and autism spectrum disorder, for example, and the disorders of vocal use and misuse that affect those who use their voices for a living, such as teachers, singers, and preachers.

Hearing loss can lead to social isolation and significant challenges in school, at work, and in relationships. NIDCD-supported researchers contributed major advances to our understanding of how we hear, how to detect hearing loss, and how to help those who are deaf or who have lost their hearing. These advances laid the foundation for Early Hearing Detection and Intervention programs in all 50 states, which help ensure that nearly every hospital born baby (98%) is now screened for hearing loss before they are discharged—up from as few as one in 10 newborns just 20 years ago.

Perhaps one of the most visible rewards of our investment in hearing research is the recent Lasker~Debakey Award in Clinical Medical Research given to two NIDCD-funded grantees for their seminal roles in the development of the modern cochlear implant, a device that has transformed the lives of hundreds of thousands of people worldwide who are deaf or profoundly hard of hearing, including 38,000 children in the U.S. The NIDCD is honored to have supported these remarkable scientists, their collaborators, and the many other researchers—and the study volunteers—who have brought us where we are today.

In this issue of *NIH MedlinePlus*, we invite you to celebrate our silver anniversary as we share highlights from the past 25 years of research supporting scientists dedicated to advancing biomedical research to improve the diagnosis, treatment, and technology for people with communication disorders.

To Find Out More

The National Institute on Deafness and Other Communication Disorders (NIDCD) maintains extensive research information and a directory of organizations that can answer questions and provide printed or electronic materials on all of the areas of its research:

- ✔ NIDCD—www.nidcd.nih.gov
- ✔ MedlinePlus—In the Search box, enter keywords
- ✔ Order form for free publications—www.nidcd.nih.gov/order/
- ✔ Noisy Planet from NIDCD—www.noisyplanet.nidcd.nih.gov/

Autism Center First to Study Minimally Verbal Children

The past decade has been a time of great advances in research exploring the causes, diagnosis, and treatment of autism spectrum disorder (ASD), a complex developmental disorder that affects behavior, communication, social interaction, and learning.

However, there still remains a number of children with ASD—a group that some experts estimate could be as high as 30 percent—who may never develop functional language skills or

learn to speak, in spite of having access to early intervention and intensive therapies. As they grow, these children develop few ways to communicate verbally with others. They are cut off from one of the most basic of human needs—self-expression and connection with other people.

To find out more about this little-studied group of children with ASD, the NIDCD recently awarded a grant to Boston University to look more closely at the children's underlying skills and impairments. They are studying how the use of creative and carefully targeted interventions could potentially help them develop basic communication skills. The $10 million grant, awarded over five years, is one of nine Autism Centers of Excellence (ACE) grants awarded by the National Institutes of Health (NIH) in 2012.

The NIDCD grant will allow researchers led by Helen Tager-Flusberg, Ph.D., professor of psychology, to direct an ACE based at Boston University that pulls together other NIDCD-funded researchers from the university. There are also collaborators from Harvard Medical School and Northeastern University, also in Boston, and Albert Einstein College of Medicine, in New York. The ACE funding gives them the opportunity to collaborate and apply what they know about the acquisition and production of language to better understand these challenged children.

This center will be asking some big questions about what makes these children different from other children with ASD. Researchers will take several different approaches to these problems, by using brain imaging techniques to look at auditory processing and the systems and connections involved in initiating and producing speech. They will also be testing a novel intervention that has appeared promising in preliminary studies, and which, if successful, will tell the researchers quite a bit about why these children previously failed to acquire spoken language skills.

"The sad truth is that despite the enormous growth in autism research, these minimally verbal children have been neglected in terms of our research population, primarily because they are so difficult to recruit and study," says Dr. Tager-Flusberg. ""If we don't address the fundamental research questions about the nature of the problems for these children, we'll never be able to figure out interventions that could help them acquire spoken language."

Smartphone App for Voice Disorders

The surgical state of the art for treating voice disorders has advanced greatly in recent years. But the way doctors try to determine what causes some people to develop voice disorders is still decidedly low-tech.

"We ask people how they use their voices," says speech-language pathologist and NIDCD-grantee Robert Hillman, Ph.D., "but the problem is, people are really bad historians when it comes to voice use. We have data that shows people tend to be off on average 150 to 200 percent when simply trying to estimate how much they use their voices during a typical day."

Dr. Hillman and his team at Massachusetts General Hospital have developed a mobile monitoring device that relies on smartphone technology to gather a week's worth of talking, singing, yelling—whatever it is people do with their voices.

The device that Dr. Hillman and his team have developed uses a small receiver the size of a dime (called an accelerometer), attached with double-sided sticky tape to the base of the throat, which captures the vibrations that are transmitted from the larynx through the skin. "The goal is to make it as unobtrusive as possible," says Dr. Hillman, "because you want people to be doing things the way they normally do them. The impact has to be minimal." In fact, an earlier version of the device was so unobtrusive that singer Steven Tyler wore it during an Aerosmith concert to document the vocal extremes of rock-and-roll singing.

Once the data are downloaded, a custom-designed software program analyzes the strength and frequency of the vibrations to produce a graph that shows daily voice usage in terms of amount, volume, and pitch.

One of the goals of the monitoring device is to be able to use the data to begin to make some correlations between patterns of voice use and the risk for a vocal disorder. What is normal and what is abnormal voice use? Are there certain ways of using the voice that can cause particular problems? A future feature, when the device goes into clinical testing, will be the addition of a feedback method, such as a buzzer or vibration, to tell the wearer when he is using his voice incorrectly.

"Voice therapy is like any kind of behavior change therapy," says Dr. Hillman. "People will do what we tell them to do when they're in front of us, but maybe not when they're not being watched. Highly habituated vocal habits are hard to break." The feedback device could act like a virtual speech-language pathologist, reminding the patient when she falls back on old habits and giving her a gentle nudge to try on the new ones.

Stop the World from Spinning!

Imagine walking down the street when you suddenly hear a roaring in one ear and everything around you begins to violently spin. You might drop to your knees, unable to control the overwhelming dizziness and nausea that is likely to keep you confined to a dark, quiet room for several hours or more until it gets better. Even worse, now that it has happened, you will never know when, or if, it will happen again.

This is what life is like for someone with Ménière's disease, a balance disorder that affects approximately 600,000 people a year in the United States, and primarily strikes adults between 40 and 60 years old. Researchers still aren't entirely sure what causes the roaring in the ears and the dizziness of Ménière's disease, although they do know that it has to be the result of some kind of disturbance in the inner ear's vestibular system, which helps us maintain

our sense of balance. Most people only experience problems in one ear, but a small minority will have attacks in both.

The treatments currently available for Ménière's disease aren't always effective and some can only end the dizziness by causing hearing loss. Some people are never able to find relief from their disabling symptoms and live with the uncertainty and the attacks of dizziness for the rest of their lives.

This could begin to change, thanks to the work of Jay Rubinstein, M.D., Ph.D., and colleagues at the University of Washington, Seattle. The scientists are using a device based on the same technology found in a cochlear implant to stop a Ménière's attack by restoring a stable pattern of electrical activity in the vestibular nerve of the damaged ear. Like the cochlear implant, the vestibular implant consists of a wireless processor worn behind the affected ear and an implanted device almost directly beneath it. Instead of traveling to the cochlea, however, the electrodes snake into the three semicircular canals—one in each canal. In addition, a handheld controller uses push buttons to start and stop a range of electrical stimuli that can be directed to any or all of the electrodes. The rates and intensities of these signals are customized to each patient.

According to Dr. Rubinstein, at the first warning signs of an attack—usually either an extreme feeling of pressure in the ear or roaring tinnitus—someone wearing the implant only has to push the buttons until he or she finds a series of signals that may make the symptoms retreat. "They can start by stimulating one of the semicircular canals—the one that we think is the most likely to control their symptoms," says Dr. Rubinstein. "But that could change the symptoms in such a way that we'll need to activate the other canals as well." Once the dizziness is gone, the controller is turned off.

If the current clinical trial is successful, doctors will have another option for people with Ménière's disease that resolves their vertigo and spares their hearing. Moreover, if it is found to help control vertigo—a symptom of a number of balance disorders—it may be useful in the treatment of many more people as well.

DID YOU HEAR?

98% of newborns in the U.S. are screened for hearing loss before they leave the hospital.

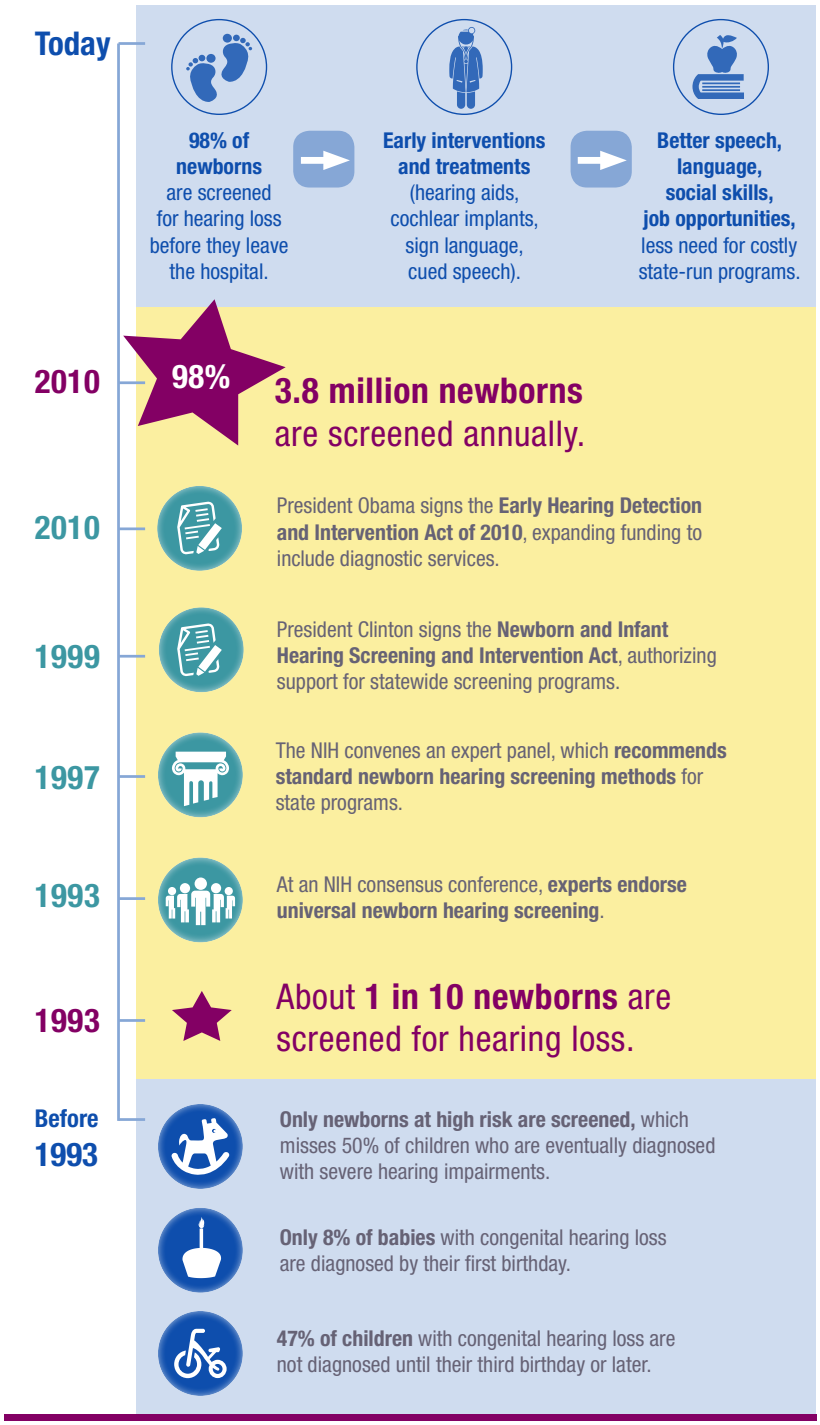
Research improves the quality of life of people with hearing loss, starting with the day they are born.

Biomedical discoveries supported by the National Institute on Deafness and Other Communication Disorders (NIDCD) laid the foundation for states to take action to ensure children are screened and treated early for hearing loss.

- NIDCD research demonstrates **the need for both newborn hearing screening and early intervention**, which is crucial for speech and language development.
- NIDCD research leads to **two gold-standard tests** for hearing loss in infants.
- NIDCD research finds **genetic causes of profound hearing loss and deafness**, which account for more than half of all cases.
- NIDCD research explores **intervention strategies** for children with hearing loss.
- NIDCD research develops and improves **technology for hearing devices** such as hearing aids and cochlear implants.
- NIDCD research reveals **the basic mechanisms of how we hear.**

DID YOU KNOW?

12,000 babies are born deaf or hard of hearing each year in the United States.



Screening Newborns' Hearing Now Standard

In 1993, children born in the U.S. were screened for hearing loss before being discharged only if they were at risk, and half of those who were eventually found to have profound hearing loss were missed until they were older. At a landmark NIH consensus development conference, experts endorsed the hearing screening of all newborns for hearing loss before they leave the hospital. Combined with similar recommendations by the Joint Committee on Infant Hearing, and further research and workshops supported by the NIDCD, universal newborn hearing screening began in 1999, when President Clinton signed the Newborn and Infant Hearing Screening and Intervention Act, authorizing the coordination and funding of statewide newborn and infant hearing screening programs. In December 2010, President Obama expanded the funding to include diagnostic services. Now, about 98 percent of all U.S. newborns are screened for hearing loss prior to discharge from the hospital, providing them with much greater opportunities for early and life-changing care.

The NIDCD has many resources in English and in Spanish for parents and caregivers to answer questions you might have about hearing screening for children, including:

- It's Important to Have Your Baby's Hearing Screened
- What to Do if Your Baby's Screening Reveals a Possible Hearing Problem
- Your Baby's Hearing and Communicative Development Checklist
- Communication Considerations—for parents of children with hearing loss
- Cochlear Implants—surgically implanted hearing devices

Visit NIDCD.nih.gov and click on Health Information, or contact us by calling toll-free at (800) 241-1044 or emailing NIDCDinfo@nidcd.nih.gov.

MP

Breathing Easier

Combatting asthma and related conditions

Apolo Anton Ohno, winner of eight Winter Olympic medals for short-track speedskating, had to first overcome exercise-induced bronchospasm (EIB). The condition is a temporary narrowing of the airways during or after exercise. Although the symptoms of EIB are similar to asthma, they are different. An estimated 30 million people in the U.S. have EIB. A total of 80-to-90 percent of patients with asthma also have EIB. But you don't have to have asthma to have EIB. Ohno was diagnosed with EIB as an adolescent. The treatment allowed him to compete at the highest levels. Today, he is a commentator for NBC Sports and competed successfully on *Dancing with the Stars*.

Can you describe the symptoms you had before being diagnosed with EIB? Do you remember when you started having symptoms?

During my training, I started experiencing decreased exercise endurance, trouble breathing, and coughing. These symptoms affected my ability to compete at my ultimate athletic level. I thought it was just a byproduct of the work I was putting in; it didn't cross my mind that I could have a respiratory condition.

Photo: Mat McCabe Photography

You were diagnosed with EIB in 2000. Can you tell us about how that happened?

I'd have to spend an hour warming up, and even then, I continued to feel fatigued throughout my training sessions. My symptoms were really bad—sometimes I would end up coughing for hours after my time trials, I just couldn't get rid of it. I thought it was just a result of intense training. My symptoms were really impacting my performance, so I went to see my doctor where I was ultimately diagnosed with EIB.

What were your first thoughts upon getting the diagnosis?

It was such a relief to know what was wrong. After I was diagnosed and began treatment, I noticed a huge difference in my performance on the ice. I could finally reach my full potential as an athlete and actually won almost all of my races that year because my symptoms weren't limiting my performance anymore.

How do you manage your EIB?

During my initial diagnosis, my doctor worked with me to determine a treatment plan that works for me. Now I make sure to visit my doctor regularly to ensure my symptoms are being properly managed. I'm hoping that by sharing my experience with EIB, others will learn the importance of talking to a doctor and managing their symptoms.

What is the message you'd most like to send to people who have been diagnosed with EIB or may have its symptoms? Do you have a special message to kids and their parents?

Often times, people think their symptoms occur because they are out of shape or not pushing themselves hard enough in their workouts. Sometimes people even think their symptoms are normal and just something they have to live with. I got involved with EIB All Stars to help raise awareness about EIB and educate the public about the importance of managing these symptoms. There is a serious need to elevate the discussion between patients and doctors about respiratory conditions.

You just recently announced your retirement from competitive speed skating. What does the future hold for Apolo Ohno?

Even though I'm no longer skating competitively, I'm still staying active every day and keeping in shape. I'm really excited that I'll be a commentator for the Winter Olympics next year for NBC. I also started hosting a new version of *Minute to Win It* on the Game Show Network this past June.

Photo: Mat McCabe Photography

What is Asthma?

Asthma is a lung disease that inflames and narrows the airways, causing wheezing, chest tightness, shortness of breath, and coughing. It starts mostly in childhood but affects all age groups. Asthma is a chronic—long-term—disease.

Fast Facts!

- Asthma is a chronic (long-term) lung disease that inflames and narrows the airways. The exact cause is unknown. There is no cure.
- Asthma most often starts during childhood. Of the 24.6 million Americans affected, nearly seven million are children.
- Asthma causes wheezing, chest tightness, shortness of breath, and coughing.
- It's important to treat asthma symptoms when you first notice them. This helps prevent them from worsening and causing severe attacks that may require emergency care, and can be fatal.
- Allergens, pollutants, and irritants can bring on symptoms. So can exercise, but do not avoid it. Physical activity is important for health. Discuss with your health professional asthma medicines that can help you stay active.
- Most people who have asthma are able to manage the disease. They have few, if any, symptoms and can live normal, active lives.

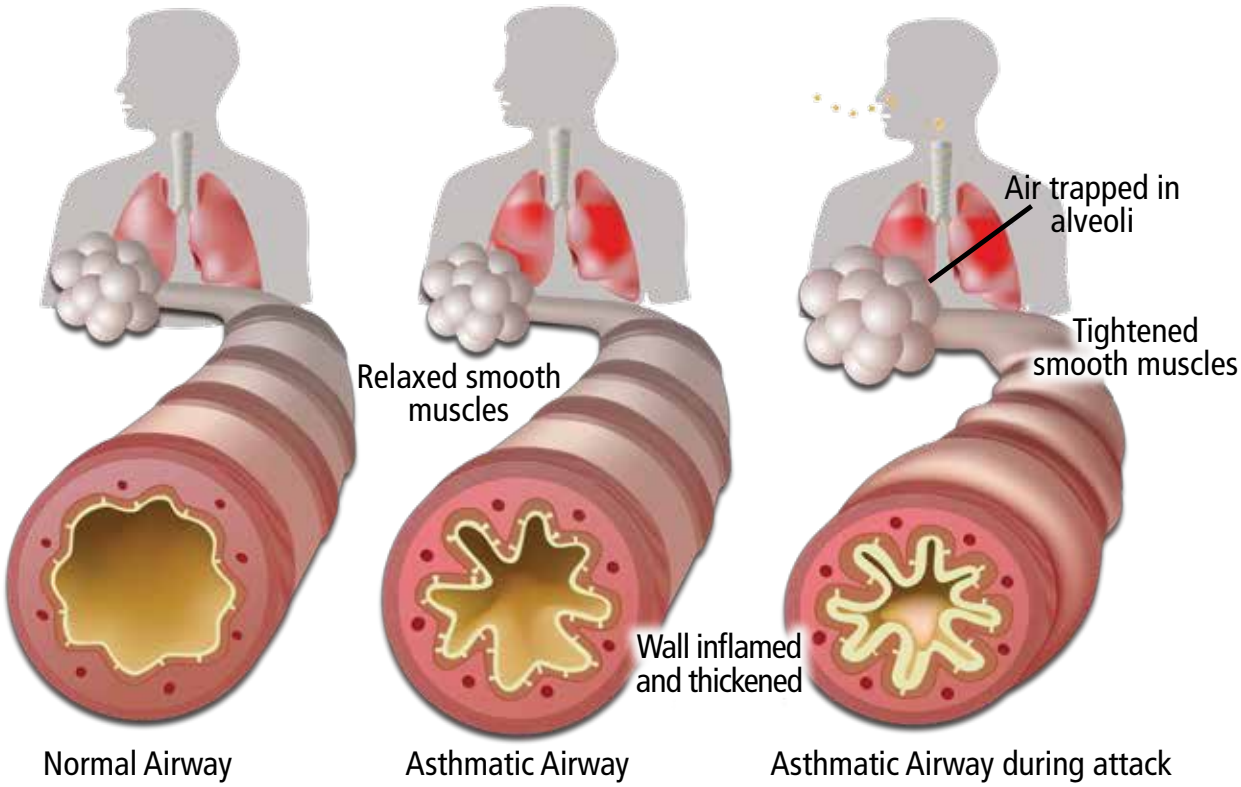
Common signs and symptoms of asthma include:

- Coughing.
- Wheezing.
- Chest tightness, like something squeezing your chest.
- Shortness of breath, feeling out of breath, or being unable to expel air from your lungs.

Not everyone with asthma has these symptoms. Nor does having them always mean asthma. To diagnose asthma for certain requires a lung function test, a medical history (including type and frequency of symptoms), and a physical exam.

Asthma symptoms vary in frequency and severity. Sometimes they may just annoy you. Other times they might limit your daily routine. Severe symptoms can be fatal, so it's important to treat symptoms when you first notice them, so they don't become severe. It is also important to take day-to-day actions to prevent symptoms from starting. Avoid things that bring on symptoms and take proper treatment. Many people benefit from daily medicine to control asthma and prevent attacks. With proper treatment, most people can expect to have few symptoms, if any, day or night.

Illustration: National Heart, Lung, and Blood Institute



▲(Top row) Location of the lungs and airways in the body. (Second row) At left, cross-section of a normal airway. Middle and right images show a cross-section of an airway during asthma symptoms and attack.

Overview

Airways are tubes that carry air into and out of your lungs. People with asthma have inflamed airways. They are swollen, very sensitive, and tend to react strongly to some inhaled substances.

When airways react, surrounding muscles tighten, airways narrow, and less air flows into the lungs. Swelling can worsen, making airways even narrower. There may be more mucus than normal, causing further narrowing.

This chain reaction can cause asthma symptoms. Sometimes, symptoms are mild and go away on their own or after treatment with medicine. Other times, they may get worse. If you have more symptoms or they get worse, you're having an asthma attack.

It's important to treat symptoms when they first appear to prevent them from getting worse and causing severe attacks. Severe attacks require emergency care and can be fatal.

Outlook

Asthma can't be cured, but it can be controlled. With today's knowledge and treatments, most people who have asthma can manage the disease. They have few, if any, symptoms, live normal, active lives, and sleep through the night.

Successful treatment means managing your asthma actively every day and building strong partnerships with your doctor and other healthcare providers.

To Find Out More

- MedlinePlus Asthma Overview
  www.nlm.nih.gov/medlineplus/asthma.html
- MedlinePlus Asthma Tutorial
  www.nlm.nih.gov/medlineplus/tutorials/asthma/htm/index.htm
- National Asthma Control Initiative
  www.nhlbi.nih.gov/health/prof/lung/asthma/naci/
- Centers for Disease Control and Prevention
  www.cdc.gov/VitalSigns/Asthma/
- National Asthma Education and Prevention Program
  National Heart, Lung, and Blood Institute Information Center 301–251–1222
  www.nhlbi.nih.gov
- NAEPP School Materials
  www.nhlbi.nih.gov/health/prof/lung/
- Asthma and Allergy Foundation of America 800–727–8462
  www.aafa.org

Asthma and Schools

Asthma is one of the leading causes of school absenteeism. On average, in a classroom of 30 children, about three are likely to have asthma. Low-income populations, minorities, and children living in inner cities experience more emergency department visits, hospitalizations, and deaths due to asthma than the general population.

When children and adolescents are exposed to things in the environment—such as dust mites, and tobacco smoke—an asthma attack can occur. These are called asthma triggers.

Asthma-friendly schools are those that make the effort to create safe and supportive learning environments for students with asthma. They have policies and procedures that allow students to successfully manage their asthma.

Asthma and Physical Activity

Exercise-induced asthma is triggered by physical activity. Vigorous exercise will cause symptoms for most students who have asthma if their asthma is not well-controlled. Some students experience asthma symptoms only when they exercise. However, proper asthma treatment will prevent exercise-induced asthma and help students participate vigorously in any activities the student chooses.

Asthma varies from student to student and often from season to season or even day by day. Students who have asthma should have a written asthma plan and appropriate medicine at school to prevent symptoms. At times, physical activity programs for these students may need to be temporarily modified, such as by varying the type, intensity, duration, and/or frequency of activity. At all times, students who have asthma should be included in activities as much as possible. Remaining behind in the gym or library or frequently sitting on the bench can set the stage for teasing, loss of self-esteem, unnecessary restriction of activity, and low levels of physical fitness.

Clinical Trials and Asthma

The National Heart, Lung, and Blood Institute (NHLBI) supports studies that explore:

- How new technologies can improve asthma care
- How certain medicines and other therapies can help treat asthma and improve quality of life
- What factors cause asthma to develop

For more information about clinical trials related to asthma, talk with your doctor. You also can visit the following websites to learn more about clinical research and to search for clinical trials:

- clinicalresearch.nih.gov
- www.clinicaltrials.gov
- www.nhlbi.nih.gov/studies/index.htm
- www.researchmatch.org

For more information about clinical trials for children, visit the NHLBI's Children and Clinical Studies Web page.

HOW ASTHMA-FRIENDLY IS YOUR SCHOOL?

NATIONAL HEART, LUNG AND BLOOD INSTITUTE
National Asthma Education and Prevention Program
NAEPP School Asthma Education Subcommittee

Students who have asthma need proper support at school to keep their asthma under control and be fully active. Use this checklist to find out how well your school serves students who have asthma:

YES	NO	Are the school buildings and grounds **free of tobacco smoke** at all times?
YES	NO	Are all school buses, vans, and trucks free of tobacco smoke?
YES	NO	Are all school events, like field trips and athletic events (both "at home" and "away") free from tobacco smoke?
YES	NO	Does your school have a policy or rule that allows **students to carry and use their own asthma medicines**?
YES	NO	If some students do not carry their asthma medicines, do they have quick and easy access to their medicines?
YES	NO	Does your school have a **written emergency plan** for teachers and other staff to follow to take care of a student who has an asthma attack?
YES	NO	In an emergency, such as a fire, weather event, or lockdown, or if a student forgets his or her medicine, does your school have standing orders and quick-relief medicines for students to use?
YES	NO	Do all students who have asthma have **updated asthma action plans** on file at the school? (An asthma action plan is a written plan from the student's doctor to help manage asthma and prevent asthma attacks.)
YES	NO	Is there a **school nurse or other school health staff** in your school building during the school day?
YES	NO	Does a school nurse or other school health staff identify, assess, and monitor students who have asthma at your school?
YES	NO	Does a school nurse or other school health staff help students with their medicines and help them to participate fully in exercise and other physical activity, including physical education, sports, recess, and field trips?
YES	NO	If a school nurse or other school health staff is not full-time in your school, is a nurse readily and routinely available to write and review plans and give the school guidance?
YES	NO	Does an asthma education expert **teach all school staff about asthma**, asthma action plans, and asthma medicines?
YES	NO	Is asthma information incorporated into health, science, first aid, and other classes as appropriate?
YES	NO	Can students who have asthma **participate fully and safely in a range of exercise and other physical activity**, including physical education, sports, recess, and field trips?
YES	NO	Are students' quick-relief medicines nearby before, during, and after exercise and other physical activity?
YES	NO	Can students who have asthma choose a physical activity that is different from others in the class when it is medically necessary?
YES	NO	Can students who have asthma choose another activity without fear of being ridiculed or receiving reduced grades?
YES	NO	Does the school help to **reduce or prevent students' contact with allergens or irritants—indoors and outdoors**—that can make their asthma worse? Are any of the following are present? ☐ Cockroach droppings ☐ Excessive dust and/or carpets, pillows, cloth-covered or upholstered furniture, or stuffed toys that harbor dust mites (tiny bugs too small to see) ☐ Mold or persistent moisture ☐ Pets with fur or hair ☐ Strong odors or sprays, such as paint, perfume, bug spray, and cleaning products
YES	NO	Does your school have a no-idling policy for vehicles on school grounds, such as school buses and carpools?
YES	NO	Does your school monitor daily local Air Quality Index (AQI) information to help reduce students' exposure to unhealthy air quality?
YES	NO	Does your school partner with parents and health care providers to address students' asthma needs?
YES	NO	Does your school work with an asthma specialist in the community?

If the answer to any question is "no," then it may be harder for students to have good control of their asthma. Uncontrolled asthma can hinder a student's attendance, participation, and progress in school. School staff, health care providers, and families should work together to make schools more asthma-friendly to promote student health and education.

Asthma cannot be cured, but it can be controlled.

Students who have asthma should be able to live healthy, active lives with few symptoms.

National Asthma Education and Prevention Program (NAEPP)
Convened by the National Institutes of Health

Source: Courtesy NHLBI

Asthma and Health Disparities

- Among racial groups, persons of multiple races (14.1%), black (11.2%), and American Indian or Alaska Native (9.4%) ancestries had higher asthma prevalence compared with white persons (7.7%) or persons of Asian background (5.2%).
- Black persons had higher hospitalization rates and death rates due to asthma than white persons.
- Among Hispanic groups, asthma prevalence was higher among persons of Puerto Rican (16.1%) than Mexican (5.4%) descent
- Asthma prevalence was higher for groups with lower incomes.
- 11.2% of persons with incomes less than 100% of the poverty level had asthma, compared to 8.5% of persons with incomes 100%-250% of the poverty level.
- In 2012, the NHLBI joined several other NIH Institutes and other Federal agencies to implement a Coordinated Federal Action Plan to Reduce Racial and Ethnic Asthma Disparities. The Action Plan presents a framework to maximize the use of existing federal resources to address the major public health challenge of asthma disparities during the next three to five years.
- According to recent data from the Centers for Disease Control and Prevention, African-American children are about twice as likely as Caucasian children to have asthma.

Age-adjusted percentages for children under 18 years of age, who currently have asthma, 2010

Non-Hispanic Black	Non-Hispanic White	Non-Hispanic Black/ Non-Hispanic White Ratio
16.1	8.2	2.0

Tips to help parents manage their child's asthma every day

There are six steps that can help control asthma:

- Use inhaled corticosteroids if your child has persistent asthma (for example, symptoms more than 2 days a week). Your health provider will help you choose the best treatment for your child's asthma.
- Use a written action plan to tell your child and your child's caregivers two things: 1) what to do daily to control your asthma, and 2) how to handle symptoms or asthma attacks and when to get medical attention
- Work with your doctor to assess asthma severity during the first visit to determine what treatment is needed to get your child's asthma under control
- Assess and monitor how well your child's asthma is controlled at all follow-up visits. The doctor may need to increase your child's medicine to keep his or her asthma under control, or may be able to decrease his or her medicine.
- Schedule follow-up visits ("asthma check-ups") with your child's doctor at regular times, at least every 6 months.
- Work with your healthcare provider to identify allergens or irritants that make your child's asthma worse, and learn how to avoid them. If needed, use a treatment plan that helps your child participate actively in physical activities and exercise.

Asthma Action Plan

Use the plan on the right-hand page, together with your doctor, to write down how to manage your child's asthma, routinely on a daily basis and during an attack.

This Asthma Action Plan can also be ordered from the National Heart, Lung, and Blood Institute: http://catalog.nhlbi.nih.gov/catalog/facet/Diseases-and-Conditions/term/Asthma

Asthma Action Plan

For: _____ Doctor: _____ Date: _____

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

GREEN ZONE — Doing Well

- No cough, wheeze, chest tightness, or shortness of breath during the day or night
- Can do usual activities

And, if a peak flow meter is used,

Peak flow: more than _____
(80 percent or more of my best peak flow)

My best peak flow is: _____

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

Medicine	How much to take	When to take it
Before exercise	❒ _____	❒ 2 or ❒ 4 puffs _____	5 minutes before exercise

YELLOW ZONE — Asthma Is Getting Worse

- Cough, wheeze, chest tightness, or shortness of breath, or
- Waking at night due to asthma, or
- Can do some, but not all, usual activities

-Or-

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

First

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

_____ (short-acting beta$_2$-agonist)
❒ 2 or ❒ 4 puffs, every 20 minutes for up to 1 hour
❒ Nebulizer, once

Second

If your symptoms (and peak flow, if used) return to GREEN ZONE after 1 hour of above treatment:
❒ Continue monitoring to be sure you stay in the green zone.

-Or-

If your symptoms (and peak flow, if used) do not return to GREEN ZONE after 1 hour of above treatment:
❒ Take: _____ (short-acting beta$_2$-agonist) ❒ 2 or ❒ 4 puffs or ❒ Nebulizer
❒ Add: _____ (oral steroid) mg per day For _____ (3–10) days
❒ Call the doctor ❒ before/ ❒ within _____ hours after taking the oral steroid.

RED ZONE — Medical Alert!

- Very short of breath, or
- Quick-relief medicines have not helped, or
- Cannot do usual activities, or
- Symptoms are same or get worse after 24 hours in Yellow Zone

-Or-

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

Take this medicine:

❒ _____ (short-acting beta$_2$-agonist) ❒ 4 or ❒ 6 puffs or ❒ Nebulizer

❒ _____ (oral steroid) mg

Then call your doctor NOW. Go to the hospital or call an ambulance if:
- You are still in the red zone after 15 minutes AND
- You have not reached your doctor.

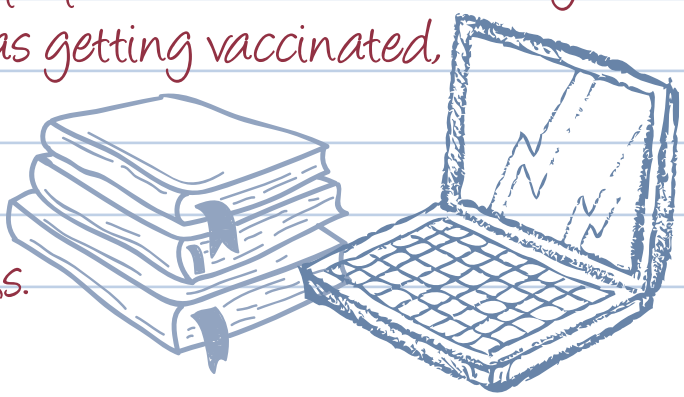
DANGER SIGNS
- **Trouble walking and talking due to shortness of breath**
- **Lips or fingernails are blue**

- **Take ❒ 4 or ❒ 6 puffs of your quick-relief medicine AND**
- **Go to the hospital or call for an ambulance _____ (phone) NOW!**

Back to School

Health Tips

Your child spends more time at school than anywhere else except home. Make sure your school-aged children are ready for a healthy school year before and while they attend. Whether you're a parent or educator, use these resources and tips to prepare for and work through common challenges, such as getting vaccinated, getting enough sleep and exercise, and eating healthy lunches and snacks.



Check-Ups and Immunizations

It's a good idea to take your child in for a physical and eye exam before school starts. If your child will be participating in a sports activity, your family doctor may have to sign a release form to permit your child to participate.

Most schools require that your child's immunization shots be up-to-date. Remember, that each state has different immunization requirements. Let your healthcare provider know if you have any questions or concerns about the vaccines your child is scheduled to receive.

School entry may require documentation of immunization records. Find out what your child's school requires and bring any school forms for your healthcare provider to fill out and sign. Be sure to keep your own copy of any records. Failure to keep immunizations up-to-date could prevent your child from attending school.

Vaccines Stop Illness

To prevent the spread of disease, it is more important than ever to vaccinate your child. In the United States, vaccines have reduced or eliminated many infectious diseases that once routinely killed or harmed many infants, children, and adults. However, the viruses and bacteria that cause vaccine-preventable disease and death still exist and can be passed on to people who are not protected by vaccines.

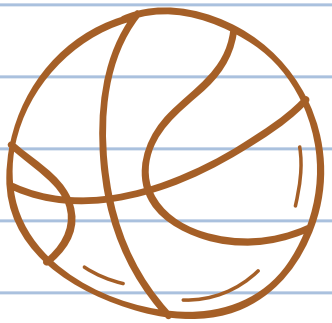
Some diseases (like polio and diphtheria) are becoming very rare in the United States. Of course, they are becoming rare largely because we have been vaccinating against them. Unless we can completely eliminate the disease, it is important to keep immunizing. Even if there are only a few cases of disease today, if we take away the protection given by vaccination, more and more people will be infected and will spread disease to others.

We don't vaccinate just to protect our children. We also vaccinate to protect our grandchildren and their grandchildren. With one disease, smallpox, we eradicated the disease. Our children don't have to get smallpox shots any more because the disease no longer exists. If we keep vaccinating now, parents in the future may be able to trust that diseases like polio and meningitis won't infect, cripple, or kill children.

Which Vaccines Do Kids Need, and When?

- **Tdap:** A booster to protect against tetanus, diphtheria, and pertussis (whooping cough). Recommended for preteens (11-12), as well as any teens (13-18) who haven't gotten this shot yet.
- **Meningococcal conjugate vaccine (MCV4):** Protects against meningococcal disease. First dose is recommended at age 11 or 12 followed by a booster (2nd shot) at age 16-18.
- **Human papillomavirus (HPV) vaccine:** Protects against the types of HPV that cause most cervical cancers. HPV vaccine is given in three doses over a 6-month period to boys and girls starting at 11-12 years old.
- **Influenza (flu) vaccine:** Protects against different strains of seasonal influenza. A yearly dose is recommended for everyone 6 months and older.
- Also, check to confirm that your teen has received all recommended childhood vaccines, or if they need to catch up on any vaccines they have not yet received.

6 "Bests" About Kids' Exercise



At least one hour of physical activity a day helps kids to:

- Feel less stressed
- Feel better about themselves
- Feel more ready to learn in school
- Keep a healthy weight
- Build sturdy muscles, bones, and joints
- Sleep better at night

More time in front of the TV means less time playing and running. So parents should limit TV, video game time, and computer time. They should set a good example by being physically active themselves.

Exercising together can be fun for everyone. Some easy ways for kids to stay active include walking or biking to school, jumping rope, going to the playground, and participating in organized sports programs.

Getting Enough ZZZZ's

Nodding off in school may not be the only outcome for otherwise healthy teens who don't get enough sleep. A study funded by the National Heart, Lung, and Blood Institute (NHLBI) links poor sleep in teens (ages 13 to 16 years old) to higher blood pressure.

Researchers found that teens who got less than 6 ½ hours sleep were 2½ times more likely to have elevated blood pressure than teens who slept longer. Also, teens who had trouble falling asleep or staying asleep were 3½ times more likely to have high blood pressure or pre-high blood pressure than teens who slept well. These results are similar to findings from other studies in adults. High blood pressure, if left untreated, can increase the risk of stroke and heart diseases later in life.

- **Sleep Facts:** School-aged children and teens need at least nine hours of sleep a night. Adults need seven to eight hours of sleep a night.
- **Sleep Tips:** Set a sleep schedule, going to bed and waking up the same times each day. Keep room temperature on the cool side. A TV or computer in the bedroom can be a distraction.

10 Healthy Breakfast and Lunch Tips

Remember that nutrition is an important factor in academic performance. Studies have shown that children who eat healthful, balanced breakfasts and lunches are more alert throughout the school day and earn higher grades than those who have an unhealthy diet.

Making food choices for a healthy lifestyle for you and your child can be as simple as using these 10 tips. Use the ideas in this list to balance your calories, to choose foods to eat more often, and to cut back on foods to eat less often.

1. **Balance Calories:** Find out how many calories you need for a day as a first step in managing your weight. Go to www.ChooseMyPlate.gov to find your calorie level. Being physically active also helps you balance calories.
2. **Enjoy Your Food, But Eat Less:** Take the time to fully enjoy your food as you eat it. Eating too fast or when your attention is elsewhere may lead to eating too many calories. Pay attention to hunger and fullness cues before, during, and after meals. Use them to recognize when to eat and when you've had enough.
3. **Avoid Oversized Portions:** Use a smaller plate, bowl, and glass. Portion out foods before you eat. When eating out, choose a smaller size option, share a dish, or take home part of your meal.
4. **Foods to Eat More Often:** Eat more vegetables, fruits, whole grains, and fat-free or 1% milk and dairy products. These foods have the nutrients you need for health—including potassium, calcium, vitamin D, and fiber. Make them the basis for meals and snacks.
5. **Make Half Your Plate Fruits and Vegetables:** Choose red, orange, and dark-green vegetables like tomatoes, sweet potatoes, and broccoli, along with other vegetables for your meals. Add fruit to meals as part of main or side dishes or as dessert.
6. **Switch to Fat-Free or Low-Fat (1%) Milk:** They have the same amount of calcium and other essential nutrients as whole milk, but fewer calories and less saturated fat.
7. **Make Half Your Grains Whole Grains:** To eat more whole grains, substitute a whole-grain product for a refined product—such as eating whole-wheat bread instead of white bread or brown rice instead of white rice.
8. **Foods to Eat Less Often:** Cut back on foods high in solid fats, added sugars, and salt. They include cakes, cookies, ice cream, candies, sweetened drinks, pizza, and fatty meats like ribs, sausages, bacon, and hot dogs. Use these foods as occasional treats, not everyday foods.
9. **Compare Sodium in Foods:** Use the Nutrition Facts label to choose lower sodium versions of foods like soup, bread, and frozen meals. Select canned foods labeled "low sodium," "reduced sodium," or "no salt added."
10. **Drink Water Instead of Sugary Drinks:** Cut calories by drinking water or unsweetened beverages. Soda, energy drinks, and sports drinks are a major source of added sugar, and calories, in American diets.

—Source: ChooseMyPlate.gov and National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK)

MP

Photo: Kristin Donahue

I Live With Psoriasis

▲Kristin Donahue has been fighting psoriasis since she was five years old.

Psoriasis is a long-term skin disease that causes scaling and inflammation. It affects more than 5 million Americans, mostly adults. It affects both men and women about equally.

By Christopher Klose

"Know as much as you can about psoriasis…"

—Kristin Donahue

Psoriasis first flared into Kristin Donahue's life as an angry, inflamed scale on her elbow when she was five years old. It progressed through elementary school, most prominently on her eyelids, knees and elbows. By middle school, it had spread to her scalp.

"Fortunately, I grew up in a small town in Oregon where everyone knew and accepted me," recalls Donahue, now 31, and a freelance writer.

Surrounded by a loving family and understanding friends, she thrived emotionally and socially, swam freestyle on her high school swim team and never let psoriasis hold her back.

"But psoriasis can be very isolating," she says. "It's shaped me, made me a good judge of character." She credits her knack for finding people able to look beyond her physical condition with helping sustain her.

"Psoriasis is very difficult to talk about but when I do, then it's up to the other person to decide about me," she observes.

Recognizing that everyone feels insecure about something, she's found that it's easiest to break the ice in small group settings. "You feel insulated enough to talk about it. But above all," she advises, "hold on to those who love and support you; your family and friends."

As for treating psoriasis, she urges people to learn as much as possible, to not give in to the disease and to be their own best advocates. "There are ways to manage," she says. Except for a brief period in grade school, when ultraviolet light treatments cleared her legs, Donahue continues to suffer periods of intense, painful flares.

"I live with the disease," she says, cautious about being treated with narrow band ultraviolet light (UVB) for relief. Due to years of prior such treatment, she's had two basal cell carcinoma cancers removed and remains at high risk for more skin cancer. She gets a complete skin check every six months.

To learn more and perhaps better manage her condition, last year she joined a clinical research study at the National Institutes of Health Clinical Center, in Bethesda, Maryland, conducted by Dr. Nehal N. Mehta, a cardiologist at the National Heart, Lung, and Blood Institute. The four-year study will enroll as many as 1,200 psoriasis patients.

Mehta and colleagues are testing how chronic inflammation, such as that seen in psoriasis, is associated with cardiovascular disease, diabetes, and obesity. "We are looking beyond psoriasis as a cosmetic disease, at all its potential effects," says Mehta. "Our participants are highly self-motivated. As we learn more, so do they, and that's the benefit."

Photo: Stephen Voss/National Psoriasis Foundation

▲Kristin Donahue has joined a clinical study relating to psoriasis, conducted by Dr. Nehal N. Mehta (right), a cardiologist at the National Heart, Lung, and Blood Institute.

Although she maintains a healthy diet and exercises regularly and would not normally be considered "at risk" for developing heart disease or diabetes, Donahue can't be sure and admits to having down days.

"But that's normal for everyone," she says.

What Causes Psoriasis?

Psoriasis is a disorder of the immune system, which defends the body against infection and disease. In psoriasis, white blood cells—called T cells—become overly active. This causes inflammation—pain, swelling, heat, and redness. It also leads to fast turnover of skin cells. Normally skin cells grow deep in the skin and slowly rise to the surface. With psoriasis, it can happen in just a few days because the cells rise too fast and pile up on the surface. In many cases, there is a family history of psoriasis. Researchers have identified genes linked to the disease.

People with psoriasis may notice times when their skin problems get worse. These are called flares. Flares may be due to infection, stress, or dryness of the skin. Certain medicines, such as beta-blockers for high blood pressure, may trigger or worsen the disease. Sometimes psoriasis will appear after a cut, scratch, sunburn, or an infection.

What Is Psoriasis?

There are several forms of psoriasis. The typical form causes itchy or sore patches of thick, red skin covered with silvery scales. Although they can appear anywhere on the body, the patches occur mostly on the elbows, knees, other parts of the legs, scalp, lower back, face, palms, and soles of the feet. Psoriasis may also affect the fingernails, toenails, the soft tissues of the genitals, and inside the mouth. Some people get psoriatic arthritis in which the joints become inflamed and painful.

Fast Facts!

- ✔ Psoriasis is a chronic (long-term) disorder of the immune system, which defends the body against infection and disease.
- ✔ It causes scaling and inflammation of the skin.
- ✔ More than 5 million Americans have psoriasis.
- ✔ You cannot catch the disease from other people.
- ✔ Stress, dry skin, infections and certain medicines could make it worse.
- ✔ In many cases, there is a family history of psoriasis. Researchers have identified genes linked to the disease.
- ✔ There are more options than ever to help patients cope with psoriasis.

How Does Psoriasis Affect Quality of Life?

People with psoriasis may have significant physical discomfort and some disability. Because of itching and pain, they may have trouble taking care of themselves or others. Walking and sleeping may be difficult. Medical care is frequent and costly and can disrupt work and school schedules. People with psoriasis may feel self-conscious about their appearance. That can lead to depression and social isolation.

How Is Psoriasis Diagnosed?

Psoriasis may be difficult to diagnose. It often looks like other skin diseases, such as eczema. Examining a small skin sample under a microscope can help your doctor make the diagnosis.

There are several types of psoriasis, including:

- **Plaque** – Skin lesions (damaged areas) are red at the base and covered by silvery scales.
- **Guttate** – Small, drop-shaped lesions on the trunk, limbs, and scalp. It is most often set off by upper respiratory infections such as a sore throat from streptococcal bacteria.
- **Pustular** – Blisters of noninfectious pus on the skin, possibly caused by medicines, infections, stress, or exposure to certain chemicals.
- **Inverse** – Smooth, red patches in the folds of the skin near the genitals, under the breasts, or in the armpits. Symptoms may be worsened by friction and sweating.
- **Erythrodermic** – Widespread reddening and scaling of the skin may be a reaction to severe sunburn or to taking cortisone or other medicines. It can also be caused by prolonged, poorly controlled psoriasis. Erythrodermic psoriasis can be very serious and requires immediate medical attention.

Some people with psoriasis also develop psoriatic arthritis, a form of arthritis that causes inflammation, pain, and stiffness in the joints.

What Research Is Being Conducted on Psoriasis?

To stop psoriasis, researchers are looking at how skin cells form healthy skin, as well as the mechanisms that cause skin lesions. Significant progress has been made in understanding a number of the genes, either known or suspected, to be involved in psoriasis. Some studies are trying to determine the genes responsible for causing itching.

Researchers also have been studying new treatments to quiet immune system reactions in the skin. These include blocking the activity of T cells or the proteins (cytokines) that promote inflammation. If ways can be found to target only the disease-causing immune reactions, resulting treatments could benefit psoriasis patients as well as those with other autoimmune diseases.

Patients, especially those with severe psoriasis, may be at greater risk of cardiovascular problems, as well as obesity, high blood pressure, and diabetes. So researchers also are trying to understand how these conditions are associated and how best to treat patients.

How Is Psoriasis Treated?

Treatment depends on:

- How serious the disease is
- The size of the psoriasis patches
- The type of psoriasis
- How the patient reacts to certain treatments

All treatments don't work the same for everyone. Doctors may switch treatments if one doesn't work, if there is a bad reaction, or if the treatment stops working.

Topical Treatment:

Treatments applied right on the skin (creams, ointments) may help. These treatments can:

- Help reduce inflammation and skin cell turnover
- Suppress (slow) the immune system
- Help the skin peel and unclog pores
- Soothe the skin

Light Therapy:

Natural ultraviolet light from the sun and artificial ultraviolet light are used to treat psoriasis. One treatment, called PUVA, uses a combination of a drug that makes skin more sensitive to light and ultraviolet A light.

Systemic Treatment:

If the psoriasis is severe, doctors might prescribe drugs or give shots (medicines) that suppress the immune system. This is called systemic treatment. Antibiotics are not used to treat psoriasis unless bacteria make the psoriasis worse.

Combination Therapy:

When you combine topical (put on the skin), light, and systemic treatments, you can often use lower doses of each. Combination therapy can also lead to better results.

Psychological Support

Some people suffering from moderate to severe psoriasis may benefit from counseling or participation in a support group to reduce self-consciousness and relieve fears of social rejection.

Questions to Ask

- ***What is the best treatment for me?***
- ***How long will it last?***
- ***When can I expect to get some relief?***
- ***What are the possible side effects of treatment?***
- ***What should I do if there are severe side effects?***

Find Out More

- MedlinePlus – www.medlineplus.gov
- National Institute of Arthritis and Musculoskeletal and Skin Diseases – www.niams.nih.gov
- Clinical Trials – www.clinicaltrials.gov
- National Psoriasis Foundation – www.psoriasis.org
- American Academy of Dermatology – www.aad.org

An Expert's Advice: What to do if you have psoriasis

Joel M. Gelfand, M.D., M.S.C.E., focuses on psoriasis and how it can lead to various conditions, such as heart disease, diabetes, and obesity. His research has been funded in part by grants from the National Institute of Arthritis, Musculoskeletal, and Skin Diseases (NIAMS),the National Heart, Lung, and Blood Institute (NHLBI), the National Psoriasis Foundation, the Dermatology Foundation, and the American Skin Association.

Photo: Penn Medicine/Addison Geary

▲ Joel M. Gelfand, M.D., M.S.C.E., is Associate Professor of Dermatology and Epidemiology, Senior Scholar Center for Clinical Epidemiology and Biostatistics, University of Pennsylvania School of Medicine.

What is psoriasis?

Psoriasis is a chronic (long-term) inflammatory skin disease for which there is no cure at this time. Depending on the severity, psoriasis patients also are at increasing risk for other diseases affecting the lungs, heart, kidneys, liver, and pancreas. These include cardiovascular disease, obesity, diabetes, and other serious illnesses.

What do you recommend for people with psoriasis?

Patients and their doctors should beware of the higher odds psoriasis holds for other serious illnesses, especially in severe cases. Patients should get regular checkups, including testing for cholesterol, blood sugar and lipids (fats in the blood), and urine analysis. They should exercise regularly, keep their BMI (body mass index) below 25, and eat a healthy diet. If they smoke, they should quit. There are many treatments for psoriasis and, therefore, patients should consult a dermatologist (skin specialist) for the most appropriate treatment, especially if the diagnosis is uncertain or is not responding well to treatment.

Is there a preferred treatment for psoriasis?

In a recent survey of ours, dermatologist members of the American Academy of Dermatology and the National Psoriasis Foundation reported they prefer treating patients with ultraviolet light. Unfortunately, most patients find this treatment too expensive to continue for very long. We have to make it more accessible and more affordable. Dermatologists also prefer traditional oral medications for psoriasis, such as methotrexate and newer biologic medications.

What are your research goals?

We always want to learn more, especially with such a complicated disease as psoriasis. The challenge is to develop effective, long-term treatments that have minimal side effects. Our priority is to improve psoriasis patient outcomes in the skin and joints, while lowering the risk of diabetes, cardiovascular disease, and mortality.

What new treatments are on the horizon?

The short-term future looks very positive, thanks to our growing understanding of how psoriasis works. In particular, we are looking at targeted, injectable, and oral medications.

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HEALTHLINES

Break a Sweat, Reduce Your Stroke Risk

Here's another reason to exercise. New research suggests that regular exercise—enough to break a sweat—may reduce the risk of having a stroke.

Strokes happen when a blood vessel in the brain bleeds or is blocked by a clot. Brain cells then quickly begin to die. Smoking, high blood pressure, diabetes, and being inactive are risk factors.

Researchers looked at the medical histories and lifestyle characteristics of thousands of people in a large, long-term study. Inactive people were 20 percent more likely to have a stroke or a "mini-stroke" known as a TIA than people who exercised four or more times a week. Researchers say that's likely explained by the positive effect exercise has on high blood pressure, obesity, and diabetes.

NIH's National Institute on Neurological Disorders and Stroke funded the study.

Possible Malaria Vaccine Shows Promise

Tests of an experimental malaria vaccine show that it's safe and protects a small number of healthy adults from infection. Researchers call the results a promising first step.

Malaria is a serious disease. Infected mosquitoes pass it to humans through a bite. Malaria occurs rarely in the U.S., but is still a major threat in other parts of the world.

A company in Maryland developed the new vaccine, known as PfSPZ Vaccine. An early-stage clinical trial was done at the NIH Clinical Center. Healthy adult volunteers who agreed to participate were given the vaccine and closely monitored. Researchers say there were no major side effects or infections from the vaccine.

Right now, the vaccine is administered into a vein instead of the more common routes into the muscle or under the skin. More studies are anticipated to determine the best dose and delivery method. Researchers with the Vaccine Research Center of NIH's National Institute of Allergy and Infectious Diseases conducted the study, along with researchers from a number of other organizations.

Healthy Eyes: Read All About It

If you want to learn how to keep your eyes healthy as you age, you can visit the NIHSeniorHealth website. A new topic page, "Healthy Eyes," offers a variety of tips. For example, a diet rich in fruits and vegetables, particularly dark leafy vegetables, such as spinach, kale, or collard greens, can help to keep your eyes healthy and disease free. There's also information on finding an eye care professional, preparing for your visit, and what to expect when you get there. The "Healthy Eyes" topic page was developed by NIH's National Eye Institute. The NIHSeniorHealth website was developed by the National Institute on Aging and the National Library of Medicine.

Photo: Maggie Bartlett, National Human Genome Research Institute

▲ A display in "Genome: Unlocking Life's Code" exhibition at the National Museum of Natural History in Washington, DC. NIH's National Human Genome Research Institute and the Smithsonian Institution developed the exhibition.

Taking a Genomic Journey

A new exhibition gives people a unique look at the genome—all the hereditary material of an organism. "Genome: Unlocking Life's Code" is on display at the National Museum of Natural History in Washington, DC, until September 1, 2014. After that, it will travel around North America. NIH's National Human Genome Research Institute and the Smithsonian Institution's National Museum of Natural History developed the exhibition. It's filled with interactive displays, animations, and videos that give people a new understanding of themselves.

Info to Know

NIH Quickfinder

For more information or to contact any of the following NIH institutes, centers, and offices directly, please call or go online as noted below:

Institutes

- **National Library of Medicine (NLM)**
  www.nlm.nih.gov
  1-888-FIND-NLM (1-888-346-3656)
- **National Cancer Institute (NCI)** www.cancer.gov
  1-800-4-CANCER (1-800-422-6237)
- **National Eye Institute (NEI)** www.nei.nih.gov
  (301) 496-5248
- **National Heart, Lung, and Blood Institute (NHLBI)**
  www.nhlbi.nih.gov (301) 592-8573
- **National Human Genome Research Institute (NHGRI)** www.genome.gov (301) 402-0911
- **National Institute on Aging (NIA)** www.nia.nih.gov
  Aging information 1-800-222-2225
  Alzheimer's information 1-800-438-4380
- **National Institute on Alcohol Abuse and Alcoholism (NIAAA)** www.niaaa.nih.gov
  (301) 443-3860
- **National Institute of Allergy and Infectious Diseases (NIAID)** www.niaid.nih.gov
  (301) 496-5717
- **National Institute of Arthritis and Musculoskeletal and Skin Diseases** www.niams.nih.gov
  1-877-22NIAMS (1-877-226-4267)
- **National Institute of Biomedical Imaging and Bioengineering (NIBIB)** www.nibib.nih.gov
  (301) 451-6772
- ***Eunice Kennedy Shriver* National Institute of Child Health and Human Development (NICHD)**
  www.nichd.nih.gov 1-800-370-2943
- **National Institute on Deafness and Other Communication Disorders (NIDCD)**
  www.nidcd.nih.gov 1-800-241-1044 (voice)
  1-800-241-1055 (TTY)
- **National Institute of Dental and Craniofacial Research (NIDCR)** www.nidcr.nih.gov
  (301) 480-4098
- **National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK)** www.niddk.nih.gov
  Diabetes 1-800-860-8747
  Digestive disorders 1-800-891-5389
  Overweight and obesity 1-877-946-4627
  Kidney and urologic diseases 1-800-891-5390
- **National Institute on Drug Abuse (NIDA)**
  www.nida.nih.gov (301) 443-1124
- **National Institute of Environmental Health Sciences (NIEHS)** www.niehs.nih.gov
  (919) 541-3345
- **National Institute of General Medical Sciences (NIGMS)** www.nigms.nih.gov
  (301) 496-7301
- **National Institute of Mental Health (NIMH)**
  www.nimh.nih.gov 1-866-615-6464
- **National Institute on Minority Health and Health Disparities (NIMHD)** www.nimhd.nih.gov
  (301) 402-1366
- **National Institute of Neurological Disorders and Stroke (NINDS)** www.ninds.nih.gov
  1-800-352-9424
- **National Institute of Nursing Research (NINR)**
  www.ninr.nih.gov (301) 496-0207

Centers & Offices

- **Fogarty International Center (FIC)**
  www.fic.nih.gov (301) 402-8614
- **National Center for Complementary and Alternative Medicine (NCCAM)**
  www.nccam.nih.gov 1-888-644-6226
- **National Center for Advancing Translational Research (NCATS)**
  www.ncats.nih.gov (301) 435-0888
- **NIH Clinical Center (CC)**
  www.cc.nih.gov (301) 496-2563
- **Office of AIDS Research (OAR)**
  http://www.oar.nih.gov (301) 496-0357
- **Office of Behavioral and Social Sciences Research (OBSSR)**
  http://obssr.od.nih.gov (301) 402-1146
- **Office of Rare Diseases Research (ORDR)**
  http://rarediseases.info.nih.gov
  Genetic and Rare Disease Information Center
  1-888-205-2311
- **Office of Research on Women's Health (ORWH)**
  http://orwh.od.nih.gov (301) 402-1770

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