

Trusted Health Information
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Institutes of Health

NIIH MedlinePlus

SPRING 2015

the magazine

*For those with celiac
disease, the enemy is ...*

Gluten

Actress **Jennifer Esposito**
and thousands of other
Americans with celiac
disease have a lifelong
dietary battle.

**Celiac disease is an autoimmune disorder that damages
the small intestine and can make life miserable.**

Get Vaccinated!

For your family and your community, follow the guidelines for vaccinations in childhood, adolescence, and adulthood.

Managing Hearing Loss

Research on hearing loss and a growing number of assistive hearing aids are reducing the incidence of deafness.

Watch Out for Glaucoma

Studies show that at least half of all persons with glaucoma don't know they have this potentially blinding eye disease. Here's how to find out.

Presentations on Legendary Cardiac Surgeon Dr. Michael E. DeBakey Highlight FNLN/NLM Board Dinner

Special video and in-person presentations awaited guests at the February 10 dinner for the Friends of the National Library of Medicine (FNLN) Board of Directors and the National Library of Medicine (NLM) Board of Regents in the Lister Hill building lobby.

Guests attended a preview of a new video chronicling the remarkable life and career of Michael E. DeBakey, M.D., pioneering cardiac surgeon, mentor to students young and old, and tireless champion of the National Library of Medicine. Dr. DeBakey died in 2008 at the age of 99.

The public will soon be able to view the new video on Dr. Michael E. DeBakey, streamed from the website: www.nlm.nih.gov/news/newsevents.html

Videotaped remarks by L. Thompson Bowles, M.D., a thoracic surgeon who studied under Dr. DeBakey, were also presented. Dr. Bowles was a member of the National Library of Medicine's Board of Regents from 1982-1986, and served as its chair from 1984-1986.



▲ L. Thompson Bowles, M.D., a thoracic surgeon who studied under Dr. DeBakey, discussed via video the impact of Dr. DeBakey's many achievements.

careers in medicine, health care, and or the sciences. Dr. Cotton discussed his receipt of his medical degree from Baylor College of Medicine (BCM) following his attendance at the DeBakey High School. He is now a surgeon at BCM and his wife, also a graduate of the DeBakey High School, is a practicing dentist in Houston.



▲ Dr. DeBakey (in NLM's Profiles in Science video)

Dr. Bowles also served as a consultant to NLM's Profiles in Science project, working closely with archivists and historians on the organization of the papers of Dr. DeBakey, including the selection of documents, photographs, and audiovisual materials for digitization.

An in-person presentation about Dr. DeBakey was also given by Dr. Ronald Cotton, a graduate of the DeBakey High School for Health Professions that was founded by Dr. Michael DeBakey to provide a challenging, well-balanced college preparatory program for students pursuing



▲ Ronald Cotton, M.D., is a graduate of the DeBakey High School for Health Professions that was founded by Dr. Michael DeBakey. At the FNLN/NLM dinner, Dr. Cotton spoke about Dr. DeBakey's lasting influence.



▲ Dr. DeBakey with NLM's David Nash and admiring students at the Michael E. DeBakey High School for Health Professions in Houston, Texas.

Photos this page: National Library of Medicine.

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Photos: (Cover and Top) Jennifer Esposito, (Middle) ThinkStock, (Bottom) National Eye Institute

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Celiac Disease

Changes Everything

Celiac disease is an immune disease in which people can't eat the protein gluten because it will damage their small intestine.



Photo: Jennifer Esposito

▲ Jennifer Esposito and husband Louis Dowler now run a New York City gluten-free bakery, Jennifer's Way, sparked by Esposito's struggles with celiac disease.

For actress Jennifer Esposito, going from one doctor to the next, seeking relief, and even getting a correct diagnosis of her condition, proved to be a nightmare. As her symptoms worsened, Esposito continued her busy life, while also looking for answers. She was a hard-working, award-winning actress for almost 15 years. She managed to own her own home by the age of 25. But almost everything she ate was toxic to her system. Then, finally, a doctor mentioned a term she had not heard before: celiac disease.

Celiac disease, she learned, affects each person differently. Symptoms may occur in the digestive system, or in other parts of the body. One person might have diarrhea and abdominal pain, while another person may be irritable or depressed. Today, Esposito has totally changed her diet. And while still an actress, she has also made time to start a gluten-free bakery called Jennifer's Way and written a book by the same name that details her journey with the disease and shares resources for others with the condition.

NIH MedlinePlus magazine recently asked Jennifer Esposito about her celiac disease experiences:

How long did it take you to get your condition diagnosed?

Even though my very first symptoms started at birth, with severe rashes all over my body, it wasn't until I was 15 that my journey to be diagnosed began. Although I never knew what I was looking for during the next 20 years, I did know the way I was feeling. As time went on, and I became more and more unwell, I knew there was something going on.

What were your thoughts when you were told you had celiac disease?

I was actually thrilled when I was finally diagnosed. To know that what my body was telling me and what I knew in my gut for years, that something was very wrong and it wasn't all in my head, was an absolute gift, even if that meant having a disease. The not knowing and the implications of being a hypochondriac, dramatic, crazy, hormonal, or whatever else I was told, was almost harder than the disease itself.

How difficult has it been to eliminate your intake of gluten?

Once you understand how much damage gluten is doing to you, there really isn't much of a choice. I don't choose to feel like I'm dying just to eat a piece of bread. You must realize that this isn't a change of diet, this is a change of life!

Have you found inspiration from others who have celiac disease?

The celiac community was the only place I found answers, understanding, and true compassion that only others with celiac could give, because they have experienced what I was going through. I suggest for anyone dealing with this disease—or any disease for that matter—to find others who are going through the same thing. The support from others who have been there is what will pull you through the hard times.

What advice do you have for others who have been diagnosed with celiac disease?

My suggestion for any new celiac patient is to get my book. This is not a sales pitch—you can check the book out of your local library or borrow it from a friend. But this is the book I wish I'd had when I was diagnosed. It tells you everything you need to know: what to expect, what other factors of your diet to look at, lifestyle changes, emotional aspects of the disease, and it even gives some recipes.

But, mostly what it does is make you realize, through my journey, that you are not only on the crazy ride that this autoimmune disease takes you on; it is also a gift, at such a hard time. The letters I receive from people all around the world who have been helped by my book have been overwhelming and heartwarming, to say the very least. It made me realize this disease wasn't a bad thing in my life, but a true gift.

FastFacts

- ✓ Celiac disease is an immune disorder in which people can't eat gluten or use items with gluten in them.
- ✓ Celiac disease harms the small intestine.
- ✓ People with untreated celiac disease can't get needed nutrients.
- ✓ Without treatment, people with celiac disease can develop other health problems.
- ✓ Celiac disease is diagnosed by blood tests and a biopsy of the small intestine.
- ✓ The only treatment for celiac disease is to avoid gluten.
- ✓ A dietitian can help people choose the right foods.

What is celiac disease?

Celiac disease is an immune disorder in which people can't eat gluten because it will damage their small intestine. Gluten is a protein found in wheat, rye, and barley. Gluten may also be used in products such as vitamin and nutrient supplements, lip balms, and some medicines.

Your body's natural defense system—called the immune system—keeps you healthy by fighting against things that can make you sick, such as bacteria and viruses. When people with celiac disease eat gluten, their body's immune system reacts to the gluten by attacking the lining of the small intestine. The immune system's reaction to gluten damages small, fingerlike growths called villi. When the villi are damaged, the body cannot get the nutrients it needs.

Celiac disease is hereditary, meaning it runs in families. Adults and children can have celiac disease. As many as 2 million Americans may have celiac disease, but most don't know it.

Celiac disease can be very serious. It often causes long-lasting digestive problems and keeps your body from getting all the nutrition it needs. Over time, celiac disease can cause anemia, infertility, weak and brittle bones, an itchy skin rash, and other health problems.

How common is celiac disease?

Celiac disease affects people in all parts of the world. Originally thought to be a rare childhood syndrome, celiac disease is now known to be a common genetic disorder. More than 2 million people in the United States have the disease, or about 1 in 133 people. Among people who have a first-degree relative—a parent, sibling, or child—diagnosed with celiac disease, as many as 1 in 22 people may have the disease.

Celiac disease is also more common among people with other genetic disorders including Down syndrome and Turner syndrome, a condition that affects girls' development.

What other health problems do people with celiac disease have?

People with celiac disease tend to have other diseases in which the immune system attacks the body's healthy cells and tissues. The connection between celiac disease and these diseases may be genetic. They include:

- type 1 diabetes
- autoimmune thyroid disease
- autoimmune liver disease
- rheumatoid arthritis
- Addison's disease, a condition in which the glands that produce critical hormones are damaged
- Sjögren's syndrome, a condition in which the glands that produce tears and saliva are destroyed



What are some of the symptoms of celiac disease?

Some people with celiac disease may not feel sick or have symptoms. Or, if they feel sick, they don't know celiac disease is the cause. Most people with celiac disease have one or more symptoms. Not all people with celiac disease have digestive problems. Having one or more of these symptoms does not always mean a person has celiac disease because other disorders can cause these symptoms.

- stomach pain
- gas
- diarrhea
- extreme tiredness
- change in mood
- weight loss
- a very itchy skin rash with blisters
- slowed growth

Why are celiac disease symptoms so varied?

Researchers are studying the reasons celiac disease affects people differently. The length of time a person was breastfed, the age a person started eating gluten-containing foods, and the amount of gluten-containing foods one eats are three factors thought to play a role in when and how celiac disease appears. Some studies have shown, for example, that the longer a person was breastfed, the later the symptoms of celiac disease appear.

Symptoms also vary depending on a person's age and the degree of damage to the small intestine. Many adults have the disease for a decade or more before they are diagnosed. The longer a person goes undiagnosed and untreated, the greater the chance of developing long-term complications.

How is celiac disease diagnosed?

"Celiac disease can be hard to diagnose because some of its symptoms are like the symptoms of other diseases," says Dr. Griffin Rodgers, director of the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK). "If your doctor thinks you might have celiac disease, you may need a blood test and biopsy.

"Before the blood test, it is important to be on your regular diet," he says. "If not, the results could be wrong. A biopsy involves taking a tiny piece of tissue from your small intestine. The tissue will be viewed with a microscope to look for signs of celiac damage."

Blood Tests

People with celiac disease have higher-than-normal levels of certain autoantibodies—proteins that react against the body's own cells or tissues—in their blood. To diagnose celiac disease, doctors will test blood for high levels of anti-tissue transglutaminase antibodies (tTGA) or anti-endomysium antibodies (EMA). If test results are negative but celiac disease is still suspected, additional blood tests may be needed.

Before being tested, one should continue to eat a diet that includes foods with gluten, such as breads and pastas. If a person stops eating foods with gluten before being tested, the results may be negative for celiac disease, even if the disease is present.

Intestinal Biopsy

If blood tests and symptoms suggest celiac disease, a biopsy of the small intestine is performed to confirm the diagnosis. During the biopsy, the doctor removes tiny pieces of tissue from the small intestine to check for damage to the villi. To obtain the tissue sample, the doctor eases a long, thin tube called an endoscope through the patient's mouth and stomach into the small intestine. The doctor then takes the samples using instruments passed through the endoscope.

Dermatitis Herpetiformis

Dermatitis herpetiformis (DH) is an intensely itchy, blistering skin rash that affects 15 to 25 percent of people with celiac disease. The rash usually occurs on the elbows, knees, and buttocks. Most people with DH have no digestive symptoms of celiac disease.

DH is diagnosed through blood tests and a skin biopsy. If the antibody tests are positive and the skin biopsy has the typical findings of DH, patients do not need to have an intestinal biopsy. Both the skin disease and the intestinal disease respond to a gluten-free diet and recur if gluten is added back into the diet. The rash symptoms can be controlled with antibiotics such as dapsone. Because dapsone does not treat the intestinal condition, people with DH must maintain a gluten-free diet.

Screening

Screening for celiac disease means testing for the presence of autoantibodies in the blood in people without symptoms. Americans are not routinely screened for celiac disease. However, because celiac disease is hereditary, family members of a person with the disease may wish to be tested. Four to 12 percent of an affected person's first-degree relatives will also have the disease.

Four inches and seven pounds...

Much to her family's relief, Stella Ruiz, who will be five years old in October, grew four inches and gained seven pounds between last September and February—despite her celiac disease.

Her favorite foods are fresh fruit and pancakes—as long as they are gluten-free.

"Stella has celiac disease," explains her mother, Maghann. "She's a normal little girl, who goes to school, has friends, and does gymnastics."



Photos: Maghann Ruiz

▲ Maghann and Stella—managing celiac disease

"So we bought a new toaster, for example. But it's very difficult at school or restaurants, and when we travel, which we do a lot."

Maghann's solution is to make most of the family's food, being especially vigilant about sourcing ingredients from "gluten-free certified" producers. "You really have to read the labels closely to see if the product is from a gluten-free facility," she says.

"Because we have had other serious medical issues, we are used to celiac."

But it took months of stomach aches, chronic diarrhea, minimal growth, many visits to her pediatrician, and much testing before a gastrointestinal specialist finally diagnosed Stella. She's been on a strict gluten-free diet ever since, like so many thousands and thousands of other people young and old with celiac.

The biggest hurdle the family faces in managing the disease is guarding Stella's food from contamination. "Even a crumb of wheat is critical to her health," says Maghann.

Maghann's advice for those newly coming to the condition are to:

- Learn about celiac disease on www.medlineplus.gov and keep up with the latest developments
- Share what you know about celiac with your children, family, friends, caregivers, teachers—everyone
- Tell your kids never to share their friends' foods
- Create gluten-free, safe menus
- Join celiac family forums, great for mutual understanding and support, not to mention favorite gluten-free recipes.

"It is so important to learn and share with other families," Maghann emphasizes, "because we're all in this together."

"She's a normal little girl, who goes to school, has friends, and does gymnastics."

Hope through Research

The National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) conducts and supports research on celiac disease. Researchers are studying new options for diagnosing celiac disease, including capsule endoscopy, which involves patients swallowing a capsule containing a tiny video camera that records images of the small intestine.

Several drug treatments for celiac disease are being studied. Researchers are also studying a combination of enzymes—proteins that aid chemical reactions in the body—that might change gluten in ways that prevent it from causing an immune reaction before it enters the small intestine.

Scientists are also developing educational materials for standardized medical training to raise awareness among healthcare providers. The hope is that increased understanding and awareness will lead to earlier diagnosis and treatment of celiac disease.

Participants in clinical trials can play a more active role in their own health care, gain access to new research treatments before they are widely available, and help others by contributing to medical research.

For information about current studies, visit www.ClinicalTrials.gov.

How is celiac disease treated?

The only treatment for celiac disease is a gluten-free diet. Doctors may ask a newly diagnosed person to work with a dietitian on a gluten-free diet plan. A dietitian is a healthcare professional who specializes in food and nutrition. Someone with celiac disease can learn from a dietitian how to read ingredient lists and identify foods that contain gluten in order to make informed decisions at the grocery store and when eating out.

For most people, following this diet will stop symptoms, heal existing intestinal damage, and prevent further damage. Improvement begins within days of starting the diet. The small intestine usually heals in 3 to 6 months in children but may take several years in adults. A healed intestine means a person now has villi that can absorb nutrients from food into the bloodstream.

To stay well, people with celiac disease must avoid gluten for the rest of their lives. Eating even a small amount of gluten can damage the small intestine. The damage will occur in anyone with the disease, including people without noticeable symptoms. Depending on a person's age at diagnosis, some problems will not improve, such as short stature and dental enamel defects.

Some people with celiac disease show no improvement on the gluten-free diet. The most common reason for poor response to the diet is that small amounts of gluten are still being consumed. Hidden sources of gluten include additives such as modified food starch, preservatives, and stabilizers made with wheat. And because many corn and rice products are produced in factories that also manufacture wheat products, they can be contaminated with wheat gluten.

Rarely, the intestinal injury will continue despite a strictly gluten-free diet. People with this condition, known as refractory celiac disease, have severely damaged intestines that cannot heal. Because their intestines are not absorbing enough nutrients, they may need to receive nutrients directly into their bloodstream through a vein, or intravenously. Researchers are evaluating drug treatments for refractory celiac disease.

To Find Out More

- ✓ NIDDK Celiac Disease Topic
<http://www.niddk.nih.gov/health-information/health-topics/digestive-diseases/celiac-disease/Pages/facts.aspx>
- ✓ NIDDK Healthy Moments Audio Program
www.niddk.nih.gov/health-information/healthy-moments/Pages/archive.aspx
- ✓ MedlinePlus
<http://www.nlm.nih.gov/medlineplus/celiacdisease.html>
- ✓ Celiac Disease Foundation
www.celiac.org



Photo: Chris Klose

▲ Tibbie Klose raises sheep in the Hudson River Valley of New York.

Learning to Live Well with Celiac Disease

"So far, so good," says Tibbie Klose of her celiac disease. It's been nine years since she was diagnosed with the now-common illness. Nine years of watching everything she eats—at home, with family or friends, at public gatherings where food is served, and especially when traveling.

Otherwise healthy, the 75-year old sheep farmer began suffering from constant intestinal upset and debilitating weakness. Most alarming, she began to lose weight, fast: 15 pounds in two weeks.

"I went straight to my doctor," Klose recalls. "And she sent me to a gastroenterologist for a complete exam, including a colonoscopy. The diagnosis: celiac disease. It was very startling. I'd never heard of it."

The remedy? A completely new—and gluten-free—diet. No more sandwiches with wheat bread for lunch, regular pasta for dinner, or baked goods with gluten, period. Does she miss them?

"Yes and no. Celiac upset me at first, and it can be really hard on others, including people who have to serve me differently. It is very important to tell people you have celiac, for your safety and their convenience."

Now a stable 110 pounds, Klose's top tips for celiac success include:

1. Learn as much as possible about the disease, starting at www.medlineplus.gov.
2. Tell people you need gluten-free foods.
3. Look for "gluten-free" on food packages and labels.
4. Eat locally grown fresh fruits and vegetables.

Living Gluten-Free

Allowed Foods

- amaranth
- arrowroot
- buckwheat
- cassava
- corn
- flax
- Indian rice grass
- Job's tears
- legumes
- millet
- nuts

- potatoes
- quinoa
- rice
- sago
- seeds
- sorghum
- soy
- tapioca
- teff
- wild rice
- yucca

Foods to Avoid

- wheat
 - including einkorn, emmer, spelt, kamut
 - wheat starch, wheat bran, wheat germ, cracked wheat, hydrolyzed wheat protein barley
- rye
- triticale (a cross between wheat and rye) bromated flour
- durum flour
- enriched flour
- farina
- graham flour
- phosphated flour
- plain flour
- self-rising flour
- semolina
- white flour

- bouillon cubes
- brown rice syrup
- candy
- chips/potato chips
- cold cuts, hot dogs, salami, sausage
- communion wafers
- French fries
- gravy
- imitation fish
- matzo
- rice mixes
- sauces
- seasoned tortilla chips
- self-basting turkey
- soups
- soy sauce
- vegetables in sauce



Processed Foods
that May Contain Wheat,
Barley, or Rye

Wheat and Wheat Products

Managing Hearing Loss

Symptoms, Causes, Assistive Devices, and Prevention

**Approximately 15 percent
of American adults ages
18 and over (37.5 million)
report some trouble
hearing.**

Types of Hearing Loss

Hearing loss comes in many forms. It can range from a mild loss in which a person misses certain high-pitched sounds, such as the voices of women and children, to a total loss of hearing. It can be hereditary or it can result from disease, trauma, certain medications, or long-term exposure to loud noises.

Sensorineural hearing loss occurs when there is damage to the inner ear or the auditory nerve. This type of hearing loss is usually permanent.

Conductive hearing loss occurs when sound waves cannot reach the inner ear. The cause may be earwax build-up, fluid, or a punctured eardrum. Medical treatment or surgery can usually restore conductive hearing loss.

A common problem is age-related hearing loss (presbycusis), which gradually occurs in many people as they grow older. Approximately one in three people in the United States between the ages of 65 and 74 has hearing loss, and nearly half of those older than 75 have difficulty hearing. Having trouble hearing can make it hard to understand and follow a doctor's advice, respond to warnings, and hear phones, doorbells, and smoke alarms. Hearing loss can also make it hard to enjoy talking with family and friends.

Age-related hearing loss is gradual, so you may not realize that you've lost some of your ability to hear. There are many causes of age-related hearing loss. Most commonly, it arises from complex changes along the nerve pathways from the ear to the brain.

Many people may have a combination of both noise-induced hearing loss and hearing loss from aging. Noise-induced hearing loss can be prevented by lowering the volume, moving away from the noise, or wearing hearing protectors, such as earplugs or earmuffs.

Hearing Loss Can Lead to Other Problems

Some people may not want to admit they have trouble hearing. Older people who can't hear well may become depressed or may withdraw from others to avoid feeling frustrated or embarrassed about not understanding what is being said. Sometimes, older people are mistakenly thought to be confused, unresponsive, or uncooperative just because they don't hear well.

Hearing problems that are ignored or untreated can get worse. If you have a hearing problem, you can get help. See your doctor. Hearing aids, special training, certain medicines, and surgery are some of the choices that can help people with hearing problems, but they are not a cure.

Tinnitus: A Common Symptom

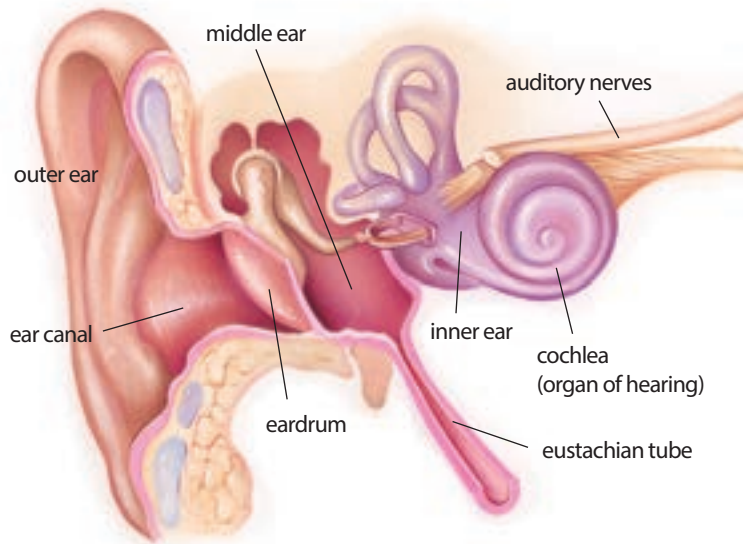
Tinnitus, common in older people, is a ringing, roaring, clicking, hissing, or buzzing sound. It can come and go. It might be heard in one or both ears and be loud or soft. Tinnitus is also common in members of the military who have been exposed to hazardous levels of noise.

Tinnitus is a symptom, not a disease. It can accompany any type of hearing loss. It can be a side effect of medications. Something as simple as a piece of earwax blocking the ear canal can cause tinnitus, but it can also be the result of a number of health conditions.

If you think you have tinnitus, see your primary care doctor. You may be referred to an otolaryngologist—a doctor who specializes in ear, nose, and throat diseases (commonly called an ear, nose, and throat doctor, or an ENT). The ENT will physically examine your head, neck, and ears, and test your hearing to determine the appropriate treatment.

Anatomy of the Human Ear

The ear is made up of outer, middle, and inner ear structures.



NIH Research to Results

- Teams of scientists, supported by the National Institute on Deafness and Other Communication Disorders (NIDCD), are the first to demonstrate, in a variety of animal models, the mechanistic process that occurs during the growth and regeneration of inner ear tip links. Tip links are tiny tethers that connect sensory projections on inner ear hair cells that convert sound into electrical signals. Although tip links break easily, they can repair themselves mostly. The discovery offers a possible mechanism for interventions that could preserve hearing in people whose hearing loss is caused by genetic disorders related to tip link dysfunction.
- How is it that we can focus on a single speaker in a crowded room where others are also speaking? This so-called “cocktail party” effect is the subject of NIDCD-supported research that has shown how the brain processes speech and how we focus only on the intended speaker. Understanding how the brain encodes speech sounds will inform future studies on management of disorders of hearing, attention, speech, and language.

Symptoms

You may have hearing loss without realizing it. Or you may have symptoms such as

- Earache
- A feeling of fullness or fluid in the ear
- Ringing in your ears (called tinnitus)

Causes

- Aging
- Certain infections, diseases, or conditions (heart conditions or stroke, diabetes, tumors)
- Certain medicines
- Genetic disorders
- A severe blow to the head
- Loud noise

Assistive Devices

- **Hearing aids**—Small electronic devices worn in or behind the ear to help people hear more in both noisy and quiet situations. Hearing aids enable people with hearing loss to listen, communicate, and participate more fully in daily life
- **Cochlear implants**—Small, complex electronic devices that can help to provide a sense of sound to people who are profoundly deaf or severely hard-of-hearing. They consist of an external portion that sits behind the ear and a second portion that is surgically placed under the skin.
- **Assisted listening devices (ALDs)**—Devices that enable better communicating in day-to-day situations. ALDs can be used with or without hearing aids to overcome distance, background noise, or poor room acoustics. An example is a telephone-amplifying device.

Prevention

- Know how much noise is too much.
- Sounds at or above 85 decibels (dB) can damage your ears. Normal conversation is about 60 dB. Chainsaws, hammers, drills, and bulldozers can be at 100dB or louder.
- Protect your hearing from loud music from personal music devices and concerts.
- Wear ear plugs or special earmuffs to prevent hearing loss from dangerously high noise levels.

To Find Out More

- ✓ For more information on hearing loss, visit www.medlineplus.gov
- ✓ www.nidcd.nih.gov

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. Collaborations with the Centers for Disease Control and Prevention, the Health Resources and Services Administration, and other national organizations were key to success.



NIDCD research reveals the basic mechanisms of how we hear.



NIDCD research develops and improves technology for hearing devices such as hearing aids and cochlear implants.



NIDCD research finds genetic causes of profound hearing loss and deafness, which account for most cases.

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 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 about hearing and screening for children and devices that can help, 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
- Hearing Aids
- 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.



How Loud Is Too Loud?

Protect Your Hearing

Know which noises can cause damage. Protect your hearing by lowering the volume, moving away from the noise, or wearing hearing protectors, such as earplugs or earmuffs. Sponsored by the NIDCD, *It's a Noisy Planet. Protect Their Hearing*® aims to raise awareness among youth ages 8-12, their parents, and health professionals and educators about the causes and prevention of noise-induced hearing loss.



A program of the National Institutes of Health

110 Decibels

Regular exposure of more than 1 minute risks permanent hearing loss.

100 Decibels

Limit your exposure to noises at or above 100 decibels to less than 15 minutes.

85 Decibels

Prolonged exposure to any noise at or above 85 decibels can cause gradual hearing loss.

150	Firecracker
120	Ambulance siren
110	Chain saw, rock concert
105	Personal stereo system at maximum level
100	Wood shop, snowmobile
95	Motorcycle
90	Power mower
85	Heavy city traffic
60	Normal conversation
40	Refrigerator humming
30	Whispered voice

Get sound advice. For more information, visit www.noisyplanet.nidcd.nih.gov

The High Cost of Noise Exposure

Kurt Evers of Montgomery Village, Maryland, started driving fire engines in the early 1980s, when firemen typically didn't use ear protection. By the late 1990s, he often couldn't hear his wife talking to him. In 2004, even with digital hearing aids, he was unable to pass National Fire Protection Association hearing standards.

Too many loud sirens over too many years had taken their toll: Evers was forced to retire.

Now co-owner of a fireplace company, he is among the approximately 15 percent of Americans (26 million people) between the ages of 20 and 69 who have high frequency hearing loss due to exposure to noise at work or during leisure activities, according to NIDCD estimates. And he never misses an opportunity to warn against its dangers.

Loud noises, such as sirens, damage the hair cells in our inner ear. These tiny structures convert sound waves into electrical energy. Our auditory nerve sends this energy to the brain, which perceives it as sound. Our bodies cannot

replace damaged hair cells. Once they are gone, hearing declines—permanently.

Although hearing loss tends to increase as we age, young people are vulnerable, too. Doctors, parents, and educators worry about portable music players and other noisy gadgets damaging hearing in children and young adults. Just how much depends on both loudness and time—the longer the exposure, the more likely the damage.

In addition, the louder the sound, the less time it takes to cause harm. Exposure to loud noise also can cause tinnitus, a continuous ringing, roaring, or clicking sound in the ears.

"Our goal is to make it second nature for people to use protective hearing techniques when they're exposed to loud noise, just like using sunscreen at the beach or wearing a helmet when you go biking," says James F. Battey, Jr., M.D., Ph.D., director of the National Institute on Deafness and Other Communication Disorders (NIDCD).

10 Ways to Identify Hearing Loss

If you are 18 to 64 years old, the following questions will help you determine if you need to have your hearing evaluated by a health professional. Answer **YES** or **NO**.



For more information about your hearing health, contact the NIDCD Information Clearinghouse:
Voice: (800) 241-1044
TTY: (800) 241-1055
E-mail: nidcdinfo@nidcd.nih.gov
Internet: www.nidcd.nih.gov



Does a hearing problem cause you to feel embarrassed when you meet new people?

Yes No

Does a hearing problem cause you to feel frustrated when talking to members of your family?

Yes No

Do you have difficulty hearing or understanding co-workers, clients, or customers?

Yes No

Do you feel slowed down by a hearing problem?

Yes No

Does a hearing problem cause you difficulty when visiting friends, relatives, or neighbors?

Yes No

Does a hearing problem cause you difficulty in the movies or in the theater?

Yes No

Does a hearing problem cause you to have arguments with family members?

Yes No

Does a hearing problem cause you difficulty when listening to TV or radio?

Yes No

Do you feel that any difficulty with your hearing limits or hampers your personal or social life?

Yes No

Does a hearing problem cause you difficulty when in a restaurant with relatives or friends?

Yes No

If you answered "yes" to three or more of these questions, you may want to see an otolaryngologist (an ear, nose, and throat specialist) or an audiologist for a hearing evaluation.

Source: NIDCD



Watch Out for Glaucoma!

A tonometer is used to check eye pressure for signs of glaucoma.

Glaucoma is a group of diseases that damages the eye's optic nerve, which carries visual signals to the brain. The most common form—primary open-angle glaucoma—often has no symptoms in its early stages. Untreated, it can lead to vision loss or blindness. By the time many people are diagnosed, they've already begun to lose some of their side, or peripheral, vision.

Some types of glaucoma result from infections, injuries, or medications that increase pressure in the eye, damaging the optic nerve. Increased eye pressure is a risk factor for primary open-angle glaucoma, but doesn't necessarily cause it.

Anyone can get glaucoma, but people at higher risk include African Americans age 40 and older, everyone over 60, especially Hispanic Americans, and those with a family history of the disease.

"Studies show that at least half of all persons with glaucoma don't know they have this potentially blinding eye disease," says National Eye Institute (NEI) Director Dr. Paul A. Sieving. "The good news is that glaucoma can be detected in its early stages through a comprehensive dilated eye exam."

In a comprehensive dilated eye exam, an eye care professional uses eye drops to dilate (widen) the pupil to examine the optic nerve for signs of disease. Detected early, glaucoma can be controlled through medications or surgery.

Glaucoma Symptoms

At first, open-angle glaucoma has no symptoms. It causes no pain. Vision stays normal. Glaucoma can develop in one or both eyes.

Without treatment, people with glaucoma slowly lose their peripheral vision. They may miss objects to the side and out of the corner of their eye. They seem to be looking through a tunnel. Over time, straight-ahead (central) vision may decrease until no vision remains.

To Find Out More

- ✓ National Eye Institute (NEI)
www.nei.nih.gov/health/glaucoma/glaucoma_facts
- ✓ MedlinePlus
www.medlineplus.gov Type "glaucoma" in the Search box.



Eye-to-Eye with Dr. Rachel Bishop

“Every ophthalmologist has probably seen this more than a few times ... and even once is too many. A new patient comes in because they scratched their eye while working in the yard, or they think they need glasses, or maybe they’ve just been diagnosed with diabetes, and their doctor sent them. Let’s say this person is in their 60s and has never had a complete eye exam.

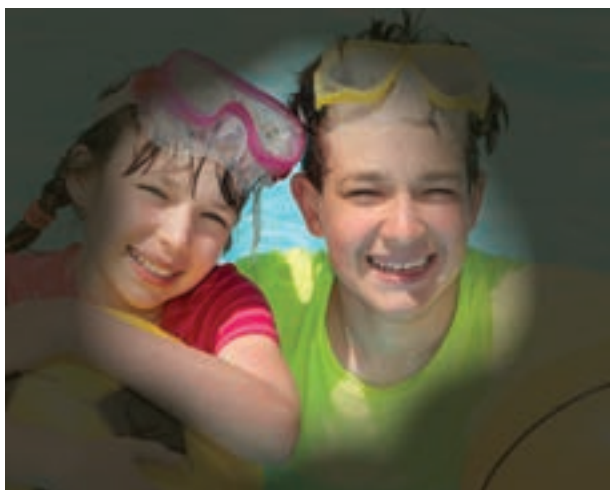
“Lo and behold, we discover the optic nerves are pale and cupped—signs of advanced glaucoma. Yet the patient wasn’t aware of any problem. Why? Because glaucoma causes no pain. And the loss of vision is so gradual that most people don’t notice until the damage is severe. Although we start treatment immediately, the nerve tissue that is lost cannot be recovered. Situations like this can be avoided with early detection and treatment.

“We advise everyone to get a comprehensive dilated exam by the time they’re 40, and again at age 50.”

Dr. Rachel Bishop, National Eye Institute

A specialist in general ophthalmology and cataract surgery, Dr. Rachel Bishop is chief of Consult Services at the National Eye Institute (NEI), National Institutes of Health (NIH). She examines the eyes of people participating in clinical trials at the NIH. This includes monitoring patients for medication and treatment effects, managing eye diseases, and performing surgeries.

“We advise everyone to get a comprehensive dilated exam by the time they’re 40, and again at age 50.”



▲ Glaucoma slowly and silently clouds vision, without any pain.

Glaucoma Treatment

Glaucoma treatment includes medicines, laser and conventional surgery, or a combination of these. While these treatments may save remaining vision, they do not restore any lost sight.

Eye drops are the most common early treatment for glaucoma. Taken regularly as directed, they can lower eye pressure, which can help prevent further damage to the nerve. Before beginning treatment, tell your eye care professional about your other medicines and supplements because the drops sometimes can interfere with them.

Because glaucoma often has no symptoms, people may be tempted to stop taking, or forget to take, their medicine. Regular use is very important.

Questions to ask your eye care professional

You can protect yourself against vision loss by working in partnership with your eye care professional. Ask questions and get the information you need about glaucoma to take care of yourself and your family.

- What is my diagnosis?
- What caused my condition?
- Can my condition be treated?
- What is the treatment for my condition?
- When will the treatment start and how long will it last?
- What are the benefits of this treatment and how successful is it?
- What kinds of tests will I have?
- What can I expect to find out from these tests?
- When will I know the results?

See more questions to ask here:
www.nei.nih.gov/health/glaucoma/glaucoma_facts

Promising Research: Contact Lens for Glaucoma

A tiny donut-shaped wafer containing a common glaucoma medicine is sandwiched inside this specially designed contact lens. In laboratory experiments, the lens, which can also correct vision, releases the eyesight-saving medication at a steady rate for up to a month. Its design offers numerous potential advantages over standard glaucoma treatments and may have additional applications, such as delivering anti-inflammatory drugs or antibiotics to the eye.

What makes the new lens different from other prototypes is the many-layered construction that places a ring of drug-releasing film in standard, FDA-approved contact lens materials. Other designs most often use a pre-made lens dipped in a drug solution, which then leaches out into the eye rapidly and inconsistently.



▲ An experimental contact lens releases a glaucoma medicine at a steady rate for up to a month.

During testing in an animal model, the new lens delivered glaucoma medication safely and consistently for four weeks, at concentrations comparable to those achieved with daily eye drops.

Potential Cause of Glaucoma Identified

A multi-institution research team has found that glaucoma appears to result from defects in the cells that control the flow of aqueous humor—the fluid that nourishes the eye and maintains its proper pressure. These cells are called endothelial cells. They line a canal-like structure that controls the flow of aqueous humor out of the eye.

The researchers found that endothelial cells from eyes with glaucoma are stiffer than those from healthy eyes. They theorized that this limits the amount of aqueous humor that can flow from the eye. Pressure would then increase and eventually cause damage to the optic nerve at the back of the eye.

“There is no cure for glaucoma, which affects more than two million Americans,” observes Mark Johnson, professor of biomedical and mechanical engineering at Northwestern University’s McCormick School of Engineering and Applied Science. Johnson led the research, supported by NIH and other institutions. “Our work shows that cells of this endothelial layer act as mechanical gates. Therapeutic strategies that alter the stiffness of these cells potentially could lead to a cure for this debilitating disease.”

Photo: Peter Mallen, Massachusetts Eye and Ear Laboratory/ Kohane Laboratory, Boston Children’s Hospital



VACCINES

What You Need to Know

Most children get sick at some point. For most American children, however, sickness is much less frequent, traumatic, and life threatening than it was just several decades ago. Research by a number of NIH institutes and centers is continuing to improve the outlook for childhood diseases every day. That is now the case for teens, as well.

Children encounter many infectious diseases, especially in the early months and years of life. Some upper respiratory viral or bacterial infections—such as colds, bronchitis, or croup—are quite common and difficult to avoid. The same can be said for ear infections, sinusitis, impetigo (skin infection), and conjunctivitis (pinkeye).

Beyond these childhood infections, however, there is one word that stands for much of the progress in battling children's infectious diseases: vaccines. Vaccines have been incredibly effective in preventing childhood diseases and improving child mortality rates.

For example, measles is one highly contagious disease for which we have a highly effective vaccine, notes Dr. Anthony Fauci, director of the National Institute of Allergy and Infectious Diseases (NIAID).

"Measles is one of the most contagious viruses that infect man, and it can cause serious disease," says Dr. Fauci. "There are two important facts about the measles vaccine. Number one, the measles vaccine is one of the most highly effective vaccines we have against any microbe, and number two, it is a very safe vaccine. Not vaccinating your children puts them at risk, and that is really a shame.

"For some people, the idea of not vaccinating their child is based on the misperception that the risk of the vaccine is greater than the risk of the disease, and therefore, they don't want to expose their child to the vaccine," he says.

"That is not good for the child, and it is not good for the community. So, it really is unfortunate that some people have this misperception about vaccines."—Dr. Anthony Fauci

One important vaccine the CDC recommends for children is the DTaP vaccine, which protects against diphtheria, tetanus, and pertussis (also known as whooping cough). Diphtheria is a serious bacterial infection that leads to breathing problems. Pertussis can cause violent and rapid coughing and hinder breathing, and tetanus is a serious bacterial infection that most commonly causes spasms of the jaw muscles and can be fatal if not prevented or treated.

Thanks to a highly effective vaccine, 80 percent of the world's population—including the U.S.—lives in certified polio-free regions, according to the World Health Organization (WHO). The CDC recommends children in the U.S. receive four doses of the

Continued on page 18



inactivated polio vaccine (IPV), starting at two months of age. Other important childhood vaccines include the PCV vaccine, which protects against pneumococcus, and the seasonal flu shot. Young children are at a greater risk of getting seriously ill from the flu, especially infants younger than six months who are too young to be vaccinated. A certain strain of pneumonia can lead to blood infections and meningitis, which is covered in the vaccine.

Children should also receive the MMR vaccine to protect against measles, mumps, and rubella. The CDC recommends one dose at 12 through 15 months of age and a second dose at four through six years of age. Measles infection typically causes a high fever and rash, and about one of four people who gets measles will be hospitalized. The infection can lead to ear infections, hearing loss, and in rarer cases, brain swelling and death. Mumps is known for the swelling of the cheeks and jaw and can occasionally lead to serious complications, such as encephalitis and deafness. Rubella, also known as the German measles, causes fever and rash.

Additional recommended immunizations for young children include HepB (protects against hepatitis B), HepA (protects against hepatitis A), RV (protects against rotavirus), Hib (protects against *Haemophilus influenzae* type b), and Varicella (protects against chicken pox).

The vaccination charts that follow offer a simple overview of what childhood and teen vaccines to take, when to take them, and why.

To Find Out More

- ✓ Search for "childhood immunization" or "shots" on medlineplus.gov. Or visit the Centers for Disease Control and Prevention at www.cdc.gov/vaccines for more information.

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. Vaccine-preventable diseases have many social and economic costs: sick children miss school and can cause parents to lose time from work. These diseases also result in doctor's visits, hospitalizations, and even premature deaths.

Thanks to vaccines, some diseases (like polio and diphtheria) are very rare in the United States. Unless we have completely eliminated a disease, immunization is crucial. 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. For example, smallpox vaccinations are no longer required because the disease has been completely eradicated. If we keep vaccinating now, parents in the future will not live with the fear that diseases like polio and meningitis will affect their children.

Vaccine Safety

In light of recent questions about vaccine safety, the Centers for Disease Control and Prevention (CDC) has offered the following information for parents:

"Vaccines are held to the highest standard of safety. The United States currently has the safest, most effective vaccine supply in history. Law requires years of testing before a vaccine can be licensed. Once in use, vaccines are continually monitored for safety and efficacy. Immunizations, like any medication, can cause side effects. However, a decision not to immunize a child also involves risk. It is a decision to put the child and others who come into contact with him or her at risk of contracting a disease that could be dangerous or deadly. The CDC and the Food and Drug Administration (FDA) continually work to make already safe vaccines even safer."



2015 Recommended Immunizations for Children from Birth Through 6 Years Old



Is your family growing? To protect your new baby and yourself against whooping cough, get a Tdap vaccine to the third trimester of each pregnancy. Talk to your doctor for more details.

Shaded boxes indicate the vaccine can be given during shown age range.

NOTE: If your child misses a shot, you don't need to start over; just go back to your child's doctor for the next shot. Talk with your child's doctor if you have questions about vaccines.

FOOTNOTES:

- Two doses given at least four weeks apart are recommended for children aged 6 months through 8 years of age who are getting an influenza (flu) vaccine for the first time and for some other children in this age group.
- Two doses of HepB vaccine are needed for lasting protection. The first dose of HepB vaccine should be given between 12 months and 23 months of age. The second dose should be given 6 to 18 months later. HepB vaccination may be given to any child 12 months and older to protect against HepB. Children and adolescents who did not receive the HepB vaccine and are at high risk, should be vaccinated against HepB.

If your child has any medical conditions that put him at risk for infection or is traveling outside the United States, talk to your child's doctor about additional vaccines that he may need.

SEE YOUR PEDIATRICIAN FOR MORE INFORMATION ON VACCINES. PREVENTABLE DISEASES ARE THE MOST COMMON CAUSE OF DEATH AND DISABILITY IN THE U.S.

For more information, call toll free 1-800-CDC-INFO (1-800-232-4636) or visit <http://www.cdc.gov/vaccines>



U.S. Department of Health and Human Services
Centers for Disease Control and Prevention

AMERICAN ACADEMY OF FAMILY PHYSICIANS
STRONG MEDICINE FOR AMERICA

American Academy of Pediatrics
DEDICATED TO THE HEALTH OF ALL CHILDREN

Vaccine-Preventable Diseases and the Vaccines that Prevent Them

Disease	Vaccine	Disease spread by	Disease symptoms	Disease complications
Chickenpox	Varicella vaccine protects against chickenpox.	Air, direct contact	Rash, tiredness, headache, fever	Infected blisters, bleeding disorders, encephalitis (brain swelling), pneumonia (infection in the lungs)
Diphtheria	DTaP** vaccine protects against diphtheria.	Air, direct contact	Sore throat, mild fever, weakness, swollen glands in neck	Swelling of the heart muscle, heart failure, coma, paralysis, death
Hib	Hib vaccine protects against <i>Haemophilus influenzae</i> type b.	Air, direct contact	May be no symptoms unless bacteria enter the blood	Meningitis (infection of the covering around the brain and spinal cord), intellectual disability, epiglottitis (life-threatening infection that can block the windpipe and lead to serious breathing problems), pneumonia (infection in the lungs), death
Hepatitis A	HepA vaccine protects against hepatitis A.	Direct contact, contaminated food or water	May be no symptoms, fever, stomach pain, loss of appetite, fatigue, vomiting, jaundice (yellowing of skin and eyes), dark urine	Liver failure, arthritis (joint pain), kidney, pancreatic, and blood disorders
Hepatitis B	HepB vaccine protects against hepatitis B.	Contact with blood or body fluids	May be no symptoms, fever, headache, weakness, vomiting, jaundice (yellowing of skin and eyes), joint pain	Chronic liver infection, liver failure, liver cancer
Flu	Flu vaccine protects against influenza.	Air, direct contact	Fever, muscle pain, sore throat, cough, extreme fatigue	Pneumonia (infection in the lungs)
Measles	MMR** vaccine protects against measles.	Air, direct contact	Rash, fever, cough, runny nose, pinkeye	Encephalitis (brain swelling), pneumonia (infection in the lungs), death
Mumps	MMR** vaccine protects against mumps.	Air, direct contact	Swollen salivary glands (under the jaw), fever, headache, tiredness, muscle pain	Meningitis (infection of the covering around the brain and spinal cord), encephalitis (brain swelling), inflammation of testicles or ovaries, deafness
Pertussis	DTaP** vaccine protects against pertussis (whooping cough).	Air, direct contact	Severe cough, runny nose, apnea (a pause in breathing in infants)	Pneumonia (infection in the lungs), death
Polio	IPV vaccine protects against polio.	Air, direct contact, through the mouth	May be no symptoms, sore throat, fever, nausea, headache	Paralysis, death
Pneumococcal	PCV vaccine protects against pneumococcus.	Air, direct contact	May be no symptoms, pneumonia (infection in the lungs)	Bacteremia (blood infection), meningitis (infection of the covering around the brain and spinal cord), death
Rotavirus	RV vaccine protects against rotavirus.	Through the mouth	Diarrhea, fever, vomiting	Severe diarrhea, dehydration
Rubella	MMR** vaccine protects against rubella.	Air, direct contact	Children infected with rubella virus sometimes have a rash, fever, swollen lymph nodes	Very serious in pregnant women — can lead to miscarriage, stillbirth, premature delivery, birth defects
Tetanus	DTaP** vaccine protects against tetanus.	Exposure through cuts in skin	Stiffness in neck and abdominal muscles, difficulty swallowing, muscle spasms, fever	Broken bones, breathing difficulty, death

* DTaP combines protection against diphtheria, tetanus, and pertussis.

** MMR combines protection against measles, mumps, and rubella.

Last updated January 26, 2013 • CDC/NIH/AA

2015 Recommended Immunizations for Children from 7 Through 18 Years Old

7-10 YEARS	11-12 YEARS	13-18 YEARS
 These shaded boxes indicate when the vaccine is recommended for all children unless your doctor tells you that your child cannot safely receive the vaccine.	 These shaded boxes indicate the vaccine should be given if a child is catching-up on missed vaccines.	 These shaded boxes indicate the vaccine is recommended for children with certain health conditions that put them at high risk for serious diseases. Note that healthy children can get the HepA series ⁶ . See vaccine-specific recommendations at www.cdc.gov/vaccines/pubs/ACIP-list.htm .
 Tdap ¹	 Tetanus, Diphtheria, Pertussis (Tdap) Vaccine	 Tdap
 MCV4 ²	 Human Papillomavirus (HPV) Vaccine (3 Doses) ³	 HPV
 Pneumococcal Conjugate Vaccine (PCV13) Boost 1 ⁴	 Pneumococcal Conjugate Vaccine (PCV13) Boost 1 ⁴	 PCV13 Boost 1 ⁴
 Influenza (Yearly) ⁵	 Influenza (Yearly) ⁵	 Influenza (Yearly) ⁵
 Pneumococcal Vaccine ⁶	 Pneumococcal Vaccine ⁶	 Pneumococcal Vaccine ⁶
 Hepatitis A (HepA) Vaccine Series ⁶	 Hepatitis A (HepA) Vaccine Series ⁶	 Hepatitis A (HepA) Vaccine Series ⁶
 Hepatitis B (HepB) Vaccine Series	 Hepatitis B (HepB) Vaccine Series	 Hepatitis B (HepB) Vaccine Series
 Inactivated Polio Vaccine (IPV) Series	 Inactivated Polio Vaccine (IPV) Series	 Inactivated Polio Vaccine (IPV) Series
 Mumps, Measles, Rubella (MM, M+V, M+V2) Vaccine Series	 Mumps, Measles, Rubella (MM, M+V, M+V2) Vaccine Series	 Mumps, Measles, Rubella (MM, M+V, M+V2) Vaccine Series
 Varicella Vaccine Series	 Varicella Vaccine Series	 Varicella Vaccine Series

FOOTNOTES

¹ Tdap vaccine is recommended at age 11 or 12 to protect against tetanus, diphtheria and pertussis. If your child has not received any or all of the DTaP vaccine series, or if you don't know if your child has received these shots, your child needs a single dose of Tdap when they are 7-10 years old. Talk to your child's health care provider to find out if they need additional catch-up vaccines.

² All 11 or 12 year olds – both girls and boys – should receive 3 doses of HPV vaccine to protect against HPV-related disease. The full HPV vaccine series should be given as recommended for best protection.

³ Meningococcal conjugate vaccine (MCV) is recommended at age 11 or 12. A booster shot is recommended at age 16. Teens who received MCV for the first time at age 13 through 15 years will need a one-time booster dose between the ages of 16 and 18 years. If your teenager missed getting the vaccine altogether, ask their health care provider about getting it now, especially if your teenager is about to move into a college dorm or military barracks.

⁴ Everyone 6 months of age and older—including preteens and teens—should get a flu vaccine every year. Children under the age of 9 years may require more than one dose. Talk to your child's health care provider to find out if they need more than one dose.

⁵ Pneumococcal Conjugate Vaccine (PCV13) and Pneumococcal Polysaccharide Vaccine (PPSV23) are recommended for some children 6 through 18 years old with certain medical conditions that place them at high risk. Talk to your healthcare provider about pneumococcal vaccines and what factors may place your child at high risk for pneumococcal disease.

⁶ Hepatitis A vaccination is recommended for older children with certain medical conditions that place them at high risk. HepA vaccine is licensed, safe, and effective for all children of all ages. Even if your child is not at high risk, you may decide you want your child protected against HepA. Talk to your healthcare provider about HepA vaccine and what factors may place your child at high risk for HepA.

For more information, call toll free 1-800-CDC-INFO (1-800-232-4636) or visit <http://www.cdc.gov/vaccines/teens>



U.S. Department of
Health and Human Services
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STRONG MEDICINE FOR AMERICA

Vaccine-Preventable Diseases and the Vaccines that Prevent Them

Diphtheria (Can be prevented by the vaccine)

Diphtheria is a very contagious bacterial disease that affects the respiratory system, including the lungs. Diphtheria bacteria can be spread from person to person by direct contact with droplets from an infected person's cough or sneeze. When people are infected, the diphtheria bacteria produce a toxin (poison) in the body that can cause weakness, sore throat, low-grade fever, and swollen glands in the neck. Effects from this toxin can also lead to swelling of the heart muscle and, in some cases, heart failure. In severe cases, the illness can cause coma, paralysis, and even death.

Hepatitis A (Can be prevented by the vaccine)

Hepatitis A is an infection in the liver caused by hepatitis A virus. The virus is spread primarily person-to-person through the fecal-oral route. In other words, the virus is taken in by mouth from contact with objects, food, or drinks contaminated by the feces (stool) of an infected person. Symptoms include lower fever, loss of appetite, nausea, abdominal discomfort, dark urine, and jaundice (yellowing of the skin and eyes). An infected person may have no symptoms, may have mild illness for a week or two, or may have severe illness for several months that requires hospitalization. In the U.S., about 100 people a year die from hepatitis A.

Hepatitis B (Can be prevented by the vaccine)

Hepatitis B is an infection of the liver caused by hepatitis B virus. The virus spreads through exchange of blood or other body fluids, for example, from sharing personal items, such as razors or shaving soaps. Hepatitis B causes a flu-like illness with loss of appetite, nausea, vomiting, rashes, joint pain, and jaundice. The virus stays in the liver of some people for the rest of their lives and can result in severe liver diseases, including liver cancer.

Human Papillomavirus (Can be prevented by the vaccine)

Human papillomavirus is a common virus. HPV is most common in people in their teens and early 20s. It is the major cause of cervical cancer in women and genital warts in women and men. The strains of HPV that cause cervical cancer and genital warts are spread during sex.

Influenza (Can be prevented by annual flu vaccine)

Influenza is a highly contagious viral infection of the nose, throat, and lungs. The virus spreads easily through droplets when an infected person coughs or sneezes and can cause mild to severe illness. Typical symptoms include a sudden high fever, chills, a dry cough, headache, runny nose, sore throat, and muscle and joint pain. Extreme fatigue can last from several days to weeks. Influenza may lead to hospitalization or even death, even among previously healthy children.

Measles (Can be prevented by the vaccine)

Measles is one of the most contagious viral diseases. Measles virus is spread by direct contact with the airborne respiratory

droplets of an infected person. Measles is so contagious that just being in the same room after a person who has measles has already left can result in infection. Symptoms usually include a rash, fever, cough, and red, watery eyes. Fever can persist, such as last for up to a week, and coughing can last about 10 days. Measles can also cause pneumonia, seizures, brain damage, or death.

Meningococcal Disease (Can be prevented by the vaccine)

Meningococcal disease is caused by bacteria and is a leading cause of bacterial meningitis (infection around the brain and spinal cord) in children. The bacteria are spread through the exchange of nose and throat droplets, such as when coughing, sneezing or kissing. Symptoms include nausea, vomiting, sensitivity to light, confusion and sleepiness. Meningococcal disease also causes blood infections. About one of every ten people who get the disease dies from it. Survivors of meningococcal disease may lose their arms or legs, become deaf, have problems with their nervous systems, become developmentally disabled, or suffer seizures or strokes.

Mumps (Can be prevented by the vaccine)

Mumps is an infectious disease caused by the mumps virus, which is spread in the air by a cough or sneeze from an infected person. A child can also get infected with mumps by coming in contact with a contaminated object, like a toy. The mumps virus causes fever, headache, painful swelling of the salivary glands under the jaw, fever, muscle aches, sore throat, and loss of appetite. Severe complications for children who get mumps are uncommon, but can include meningitis (infection of the covering of the brain and spinal cord), encephalitis (inflammation of the brain), permanent hearing loss, or swelling of the testes, which rarely can lead to sterility in men.

Pertussis (Whooping cough) (Can be prevented by the vaccine)

Pertussis is caused by bacteria spread through direct contact with respiratory droplets when an infected person coughs or sneezes. In the beginning, symptoms of pertussis are similar to the common cold, including runny nose, sneezing, and cough. After 1-2 weeks, pertussis can cause spells of violent coughing and choking, making it hard to breathe, drink, or eat. This cough can last for weeks. Pertussis is most serious for babies, who can get pneumonia, have seizures, become brain damaged, or even die. About two-thirds of children under 1 year of age who get pertussis must be hospitalized.

Pneumococcal Disease

(Can be prevented by the pneumococcal vaccine)

Pneumonia is an infection of the lungs that can be caused by the bacteria called pneumococcus. This bacteria can cause other types of infections too, such as ear infections, sinus infections, meningitis (infection of the covering around the brain and spinal

cord), bacteremia and sepsis (blood stream infection). Sepsis and ear infections are usually mild and are much more common than the more severe forms of pneumococcal disease. However, in some cases pneumococcal disease can be fatal or result in long-term problems, like brain damage, hearing loss and limb loss. Pneumococcal disease spreads when people cough or sneeze. Many people have the bacteria in their nose or throat at one time or another without being ill—this is known as being a carrier.

Polio (Can be prevented by the vaccine)

Polio is caused by a virus that lives in an infected person's throat and intestines. It spreads through contact with the feces (stool) of an infected person, and through droplets from a sneeze or cough. Symptoms typically include sudden fever, sore throat, headache, muscle weakness, and pain. In about 1% of cases, polio can cause paralysis. Among those who are paralyzed, up to 5% of children may die because they become unable to breathe.

Rubella (German Measles) (Can be prevented by the vaccine)

Rubella is caused by a virus that is spread through coughing and sneezing. In children rubella usually causes a mild illness with fever, swollen glands, and a rash that lasts about 3 days. Rubella rarely causes serious illness or complications in children, but can be very serious to a baby in the womb. If a pregnant woman is infected, the result to the baby can be devastating, including miscarriage, serious heart defects, mental retardation and loss of hearing and eye sight.

Tetanus (Lockjaw) (Can be prevented by the vaccine)

Tetanus is caused by bacteria found in soil. The bacteria enters the body through a wound, such as a deep cut, when people are infected, the bacteria produce a toxin (poison) in the body that causes serious, painful spasms and stiffness of all muscles in the body. This can lead to "locking" of the jaw so a person cannot open his or her mouth, swallow, or breathe. Complete recovery from tetanus can take months. Three of ten people who get tetanus die from the disease.

Varicella (Chickenpox) (Can be prevented by the vaccine)

Chickenpox is caused by the varicella zoster virus. Chickenpox is very contagious and spreads very easily from infected people. The virus can spread from either a cough, sneeze, it can also spread from the blisters on the skin, either by touching them or by breathing in these viral particles. Typical symptoms of chickenpox include an itchy rash with blisters, tiredness, headache and fever. Chickenpox is usually mild, but it can lead to severe skin infections, pneumonia, encephalitis (brain swelling), or even death.

If you have any questions about your child's vaccines, talk to your healthcare provider.

NLM Grantee's "HealthMap" Helps Uncover Measles Vaccination Gap



▲ Dr. John Brownstein's "HealthMap" can map and track infectious diseases across the U.S. and around the world.

Inadequate vaccine coverage is likely a driving force behind the ongoing Disneyland measles outbreak, according to calculations by a research team at Boston Children's Hospital, using a recently developed "HealthMap" mapping and tracking resource.

Dr. John Brownstein, the principal investigator on a National Library of Medicine (NLM) grant, collaborated with the Web Communications Division at the U.S. Department of Health and Human Services (DHHS) to implement HealthMap.

The research indicates that vaccine coverage among the exposed populations is far below that necessary to keep the virus in check, and is the first to positively link measles vaccination rates and the ongoing outbreak.

The HealthMap team has released an interactive model illustrating how differing rates of vaccine coverage could affect the growth of a measles outbreak over time. The model, available at healthmap.org/measlesoutbreak, puts the effects of vaccination into stark relief. If a population is fully vaccinated against the virus, the model predicts that one case of measles will give rise to only two additional cases over 70 days. By contrast, if only 60 percent of a population is vaccinated, more than 2,800 cases will occur over the same time period.

"Our data tell us a very straightforward story--that the way to stop this and future measles outbreaks is through vaccination," says Brownstein, a digital epidemiologist and co-founder of HealthMap and VaccineFinder, an online service that allows users to search for locations offering a variety of vaccinations, including

the MMR vaccine that protects against measles. "The fundamental reason why we're seeing the number of cases we are is inadequate vaccine coverage among the exposed.

"We hope these data encourage families to ensure they and their loved ones are vaccinated and help local public health officials in their efforts to control this outbreak," he adds.

The researchers were led by Maimuna Majumder, M.P.H., and Brownstein, Ph.D., of Boston Children's Informatics Program. Their report was published online by *JAMA Pediatrics*.

"... The way to stop this and future measles outbreaks is through vaccination."

"HealthMap can also bring together outbreak data from informal sources, such as social media, with formal sources like the Centers for Disease Control and Prevention," says Valerie Florence, Ph.D., associate director for Extramural Programs at the National Library of Medicine. "This provides public health officials at the state and local levels with 'early warning' data they can use to plan prevention strategies. Public health surveillance is an important part of prevention."

More on NLM grants program: www.nlm.nih.gov/ep/Grants.html.

Managing Your Seasonal Allergies

Allergic reactions occur when the body wrongly defends itself against something that is not dangerous.

A healthy immune system defends against invading bacteria and viruses. During allergic reactions, however, the immune system fights harmless materials, such as pollen or mold, by producing a special class of antibody called immunoglobulin E (IgE).

FastFacts:

- ✓ Allergies are reactions of your immune system to one or more things in the environment.
- ✓ The immune system is your body's defense system. In allergic reactions, however, it is responding to a false alarm.
- ✓ Pollens and mold spores can cause seasonal allergies.
- ✓ Allergies from pollens and molds can cause runny and blocked noses, sneezing, nose and eye itching, runny and red eyes, or asthma. Allergies typically make you feel bad.

Source: National Institute of Allergy and Infectious Diseases

Be Smart:

Treat respiratory allergy with antihistamines, topical nasal steroids, cromolyn sodium, decongestants, or immunotherapy.



Weed Pollen

Ragweed and other weeds, such as curly dock, lambs quarters, pigweed, plantain, sheep sorrel, and sagebrush are prolific producers of pollen allergens.

Ragweed season runs from August to November, but pollen levels usually peak by mid-September in many areas in the country. Pollen counts are highest in the morning, and on dry, hot, windy days.



Protecting yourself

- Between 5:00 and 10:00 a.m., stay indoors. Save outside activities for late afternoon or after a heavy rain, when pollen levels are lower.
- Keep windows in your home and car closed to lower exposure to pollen. Keep cool with air conditioners. Don't use window or attic fans.
- Use a dryer, not a line outside; dry your clothes and avoid collecting pollen on them.

Grass Pollen

Grass pollens are regional as well as seasonal. Their levels also are affected by temperature, time of day, and rain. Only a small percentage of North America's 1,200 grass species cause allergies, including:

- Bermuda grass
- Johnson grass
- Kentucky bluegrass
- Sweet vernal grass
- Timothy grass
- Orchard grass



Protecting yourself

- Between 5:00 and 10:00 a.m., stay indoors. Save outside activities for late afternoon or after a heavy rain, when pollen levels are lower.
- Keep windows in your home and car closed to lower exposure to pollen. Keep cool with air conditioners. Don't use window or attic fans.
- Use a clothes dryer, not a line outside, to avoid collecting pollen on them.
- Have someone else mow your lawn. If you mow, wear a mask.

Tree Pollen

Trees produce pollen earliest, as soon as January in the South, and as late as May and June in the Northeast. They release huge amounts that can be distributed miles away. Fewer than 100 kinds of trees cause allergies. The most common tree allergy is against oak, but others include elm, hickory, sycamore, and walnut.



Protecting yourself

- Follow the same protective strategies related to time of day, closed windows, and clothes dryers noted in "Protecting yourself" under Grass Pollen, to the left.
- Plant species that do not aggravate allergies, include crape myrtle, dogwood, fig, fir, palm, pear, plum, redbud, and redwood trees, or the female cultivars of ash, box elder, cottonwood, maple, palm, poplar, or willow trees.

Diagnosis

Testing for Allergies

Knowing exactly what you are allergic to can help you lessen or prevent exposure and treat your reactions. There are several tests to pinpoint allergies:

- **Allergy skin tests**—Allergy skin testing provides rapid results within a few minutes. The most common test is the “prick test,” which involves pricking the skin with the extract of a specific allergen, then observing the skin’s reaction.
- **Serum-specific IgE antibody testing**—These blood tests provide information similar to allergy skin testing.

Treatment for Allergies:

For allergy sufferers, it is worth trying to avoid the offending allergens. This may be difficult, however, when the very air we breathe is loaded with allergens, such as ragweed pollen. Various over-the-counter or prescription medications can relieve symptoms.

- **Antihistamines.** These medications counter the effects of histamine, the substance that makes eyes water and noses itch and causes sneezing during allergic reactions. Sleepiness was a problem with the oldest antihistamines, but the newest drugs do not cause such a problem. Antihistamines come as pills or nose sprays.
- **Nasal steroids.** These anti-inflammatory sprays reduce the sensitivity of the nose to allergens and decrease inflammation, swelling, and mucus production. They work well alone and in combination with antihistamines, particularly antihistamine nasal sprays; in recommended doses, they are relatively free of side effects.
- **Cromolyn sodium.** A nasal spray, cromolyn sodium may reduce symptoms, perhaps by blocking release of histamine and other symptom-producing chemicals. It has few side effects, but requires frequent dosing.
- **Decongestants.** Available in pill and spray form, decongestants reduce swelling and sinus discomfort. Intended for short-term use, they are usually used in combination with antihistamines. Long-term usage of spray decongestants can actually make symptoms worse, while decongestant pills do not have this problem.
- **Immunotherapy.** Immunotherapy (allergy shots or tablets that dissolve under the tongue) might provide relief for patients who don’t find relief with antihistamines or nasal steroids. Immunotherapy alters the body’s immune response to allergens, thereby helping to prevent allergic reactions. It is the only form of treatment that can induce long-lasting protection after therapy is stopped. Allergy shots can be used for many other allergies, seasonal and non-seasonal. Allergy shots can sometimes cause allergic reactions, which may go beyond local itching and swelling. In rare instances, these reactions can be severe. Immunotherapy, with under-the-tongue, self-dissolving tablets, is only available for ragweed and grass, but it is a very safe form of treatment.

Is It a Cold or an Allergy?

Symptoms	Cold	Airborne Allergy
Cough	Common	Sometimes
General Aches, Pains	Slight	Never
Fatigue, Weakness	Sometimes	Sometimes
Itchy Eyes	Rare or Never	Common
Sneezing	Usual	Usual
Sore Throat	Common	Sometimes
Runny Nose	Common	Common
Stuffy Nose	Common	Common
Fever	Rare	Never
Duration	3 to 14 days	Weeks (for example, 6 weeks for ragweed or grass pollen seasons)
Treatment	<ul style="list-style-type: none"> ■ Decongestants ■ Nonsteroidal anti-inflammatory medicines 	<ul style="list-style-type: none"> ■ Antihistamines ■ Nasal steroids ■ Decongestants ■ Cromolyn ■ Immunotherapy
Prevention	<ul style="list-style-type: none"> ■ Wash your hands often with soap and water ■ Avoid close contact with anyone with a cold 	<ul style="list-style-type: none"> ■ Avoid those things that you are allergic to, such as pollen, house dust mites, mold, pet dander, cockroaches
Complications	<ul style="list-style-type: none"> ■ Sinus infection ■ Middle ear infection ■ Asthma exacerbation 	<ul style="list-style-type: none"> ■ Sinus infection ■ Asthma exacerbation



NIH/ID

Seasonal Allergy Research at NIH

- **Asthma and Allergic Diseases Cooperative Research Centers:** In 1971, the National Institute of Allergy and Infectious Diseases (NIAID) established its Asthma and Allergic Diseases Centers to conduct basic and clinical research on the mechanisms, diagnosis, treatment, and prevention of asthma and allergic diseases.
- **Immune Tolerance Network (ITN):** The ITN is a consortium of investigators, dedicated to the development and evaluation of novel, tolerance-inducing therapies for disorders of the immune system, including asthma and allergic rhinitis.
- **Inner-City Asthma Consortium:** Since 1991, the NIAID has funded research on asthma in low-income, urban areas with the goal of improving the treatment of children living in environments where asthma is a major health problem. The Inner City Asthma Consortium also conducts research on nasal allergy.
- **Allergen Epitope Research and Validation Centers:** The goal of this NIAID program is to identify the portions of allergy-inducing molecules that immune system cells and IgE antibodies recognize, and to develop therapies that block these portions from causing allergic reactions.

Seasonal Allergies: Nuisance or Real Health Threat?

For most people, hay fever is a seasonal problem—something to endure for a few weeks once or twice a year. But for others, such allergies can lead to more serious complications, including sinusitis and asthma.

- Sinusitis is one of the most commonly reported chronic diseases and costs almost \$6 billion a year to manage. It is caused by inflammation or infection of the four pairs of cavities behind the nose. Congestion in them can lead to pressure and pain over the eyes, around the nose, or in the cheeks just above the teeth. Chronic sinusitis is associated with persistent inflammation and is often difficult to treat. Extended bouts of hay fever can increase the likelihood of chronic sinusitis. But only half of all people with chronic sinusitis have allergies.
- Asthma is a lung disease that narrows or blocks the airways. This causes wheezing, shortness of breath, coughing, and other breathing difficulties. Asthma attacks can be triggered by viral infections, cold air, exercise, anxiety, allergens, and other factors. Almost 80 percent of people with asthma have allergies, but we do not know to what extent the allergies trigger the breathing problems. However, some people are diagnosed with allergic asthma because the problem is set off primarily by an immune response to one or more specific allergens. Most of the time, the culprit allergens are those found indoors, such as pets, house dust mites, cockroaches, and mold. Increased pollen and mold levels have also been associated with worsening asthma.

Find Out More

- ✓ MedlinePlus: Allergy
www.nlm.nih.gov/medlineplus/allergy.html
- ✓ MedlinePlus: Hay Fever
www.nlm.nih.gov/medlineplus/hayfever.html
- ✓ National Institute of Allergy and Infectious Diseases
www.niaid.nih.gov/topics/allergicdiseases/Pages/default.aspx
- ✓ National Survey of Lead and Allergens in Housing (NSLAH)
www.niehs.nih.gov/research/clinical/join/studies/riskassess/nslah.cfm



Study Finds Peanut Consumption in Infancy Prevents Peanut Allergy

Introducing peanut products into the diets of infants at high risk of developing peanut allergy was safe and led to an 81 percent reduction in the subsequent development of the allergy, an NIH-funded clinical trial has found. The study was supported primarily by the National Institute of Allergy and Infectious Diseases (NIAID) and was conducted by the NIAID-funded Immune Tolerance Network (ITN), a clinical research consortium. The results appeared in the February 26, 2015 *New England*

Journal of Medicine and were presented at the annual meeting of the American Academy of Allergy, Asthma and Immunology.

Researchers led by Gideon Lack, M.D., of King's College London, designed a study called Learning Early About Peanut Allergy (LEAP), based on observations that Israeli children have lower rates of peanut allergy compared to Jewish children of similar ancestry residing in the United Kingdom. Unlike children in the UK, Israeli children begin

consuming peanut-containing foods in infancy. The study tested the hypothesis that the very low rate of peanut allergy in Israeli children was a result of regular consumption of large amounts of peanuts beginning in infancy.

"Food allergies are a growing concern, not just in the United States but around the world," said NIAID Director Anthony S. Fauci, M.D. "For a study to show a benefit of this magnitude in the prevention of peanut allergy is without precedent. The results are transforming the way we approach prevention of other allergic diseases and have the potential to change clinical practice and pediatric dietary guidelines."

Full press release is at:
<http://www.nih.gov/news/health/feb2015/niaid-23.htm>.

Study Reveals Many Americans at Risk for Alcohol-Medication Interactions

Nearly 42 percent of U.S. adults who drink also report using medications known to interact with alcohol, based on a study from the National Institutes of Health released today. Among those over 65 years of age who drink alcohol, nearly 78 percent report using alcohol-interactive medications. (Such medications are widely used, prescribed for common conditions such as depression, diabetes and high blood pressure.) Based on recent estimates, about 71 percent of U.S. adults drink alcohol.

The research is among the first to estimate the proportion of adult drinkers in the United States who may be mixing alcohol-interactive medications with alcohol. The resulting

health effects can range from mild (nausea, headaches, loss of coordination) to severe (internal bleeding, heart problems, difficulty breathing).

"Combining alcohol with medications often carries the potential for serious health risks," said Dr. George Koob, director of the National Institute on Alcohol Abuse and Alcoholism (NIAAA). "Based on this study, many individuals may be mixing alcohol with interactive medications and they should be aware of the possible harms."

It is recommended that people taking medications talk to their doctor or pharmacist about whether they should avoid alcohol.

The study, led by Dr. Rosalind Breslow, Ph.D., appeared in the February 2015 issue of *Alcoholism: Clinical and Experimental Research*.

For more on alcohol-medication interactions, see this NIAAA fact sheet:

<http://pubs.niaaa.nih.gov/publications/Medicine/medicine.htm>.

White House "Precision Medicine Initiative" Details Released

Earlier this year, President Obama announced a \$215 million Precision Medicine Initiative. Instead of "one size fits all" health care, this project aims to accelerate progress toward a new medical model, with medical decisions, practices, and products tailored to the individual patient. To tell how it might all unfold, NIH Director Francis Collins, M.D., Ph.D., and National Cancer Institute Director Harold Varmus, M.D., wrote a piece in the February 26, 2015 *New England Journal of Medicine*.

Actually, precision medicine is not new, they explained. Blood typing, for example, has been used for more than 100 years to divide patients into various types.

The new initiative has two main parts: a near-term one that will focus on cancer and a longer-term one that will concentrate on other types of disease. "Both components are now within our reach because of advances in basic research, including molecular biology, genomics, and bioinformatics," Collins and Varmus wrote.

While initial pilot studies will take advantage of existing studies and trials, the ultimate goal is to assemble a group of at least 1 million U.S. participants who will volunteer to share genomic information, biological specimens, and clinical and lifestyle data to inform research and their own health decisions.

Full article is at:
<http://www.nejm.org/doi/full/10.1056/NEJMp1500523>.



Info to Know

NIH Quickfinder

For more information or to contact any of the following NIH Institutions, 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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Safe Sleep For Your Baby



Learn how to reduce the risk of Sudden Infant Death Syndrome (SIDS) and other sleep-related causes of infant death.

- Always place baby on his or her back to sleep for all sleep times, including naps.
- Room share—keep baby's sleep area in the *same* room next to where you sleep.
- Use a firm sleep surface, free from soft objects, toys, blankets, and crib bumpers.

1-800-505-CRIB

<http://safetosleep.nichd.nih.gov>



Eunice Kennedy Shriver National Institute
of Child Health and Human Development

