NIH MedlinePlus®

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Summer 2011

the magazine

Plus, in this issue!

- **Donating Bone Marrow**
  Saving lives
- **Sneezing and Wheezing**
  How to handle seasonal allergies
- **100+ Health Careers**
  For you and yours

CNN's Dr. Sanjay Gupta:
"Children have an innate tendency to be healthy."

Studying Children's Health & the Environment

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

For Distinguished Public Service Medical Library Association Honors FNLM and *NIH MedlinePlus* Magazine

MLA President Ruth Holst presented FNLM Chairman Dr. Donald West King with the Distinguished Public Service Award at the MLA's recent national conference.

The Friends of the National Library of Medicine has a warm and mutually appreciative relationship with the Medical Library Association (MLA) and its more than 3,600 individual members, representing more than 1,100 institutions in the health sciences information field. They do wonderful work educating health information professionals, supporting and promoting health information research, and working to ensure that the best health information is available to all.

That is one reason FNLM is especially honored to have received an Award for Distinguished Public Service from the MLA at the group's recent annual conference.

As I mentioned during the MLA ceremony, part of our public service is to develop programs that reach out to minorities and encourage minority students to enter health careers. You can read about one of those efforts, Mentoring in Medicine, starting on page 22 in this issue. As the populations of African Americans and Hispanics continue to grow in the U.S., outreach to these groups will help advance the quality of medical care for all Americans.

This issue also includes a special section on improving children's health, starting on page 4, featuring observations from CNN's Dr. Sanjay Gupta and information on a landmark children's health study—the largest ever conducted in the United States. Beginning on page 13, you will find a story on how bone marrow donations and transplants are saving lives. And starting on page 18, you'll find tips to help you through allergy season.

We hope you find this issue interesting and useful. And please consider joining FNLM to support all that the Library does.

Sincerely,
Donald West King, M.D., Chairman
Friends of the National Library of Medicine

Let Us Hear From You!

We want your feedback on the magazine and ideas for future issues, as well as questions and suggestions. Please email your letters to Managing Editor Selby Bateman (sbateman@kramesstaywell.com) or send mail to Editor, *NIH MedlinePlus* magazine, P.O. Box 18427, Greensboro, NC 27419-8427. We look forward to hearing from you.

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If you or your company can help to support and expand the publication and distribution of *NIH MedlinePlus* magazine, thousands and thousands more people will gain valuable, free access to the world's best online medical library, **www.medlineplus.gov**.

For more information, please visit **www.fnlm.org** or call (202) 679-9930. Or, write to FNLM, 7900 Wisconsin Avenue, Suite 200, Bethesda, MD 20814.

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NIH MedlinePlus® the magazine

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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.

Photos: (cover) CNN, (top of page and cover inset) Jonathan Torgovnik Reportage, CNN (center), Wendy Yang, *The Charlotte Observer*, (bottom) Mentoring in Medicine, Inc.

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From the NIH Director

Photo: NIH

The Importance of Clinical Trials

Francis S. Collins, M.D., Ph.D., Director of the National Institutes of Health, led the successful effort to complete the Human Genome Project, a complex multidisciplinary scientific enterprise to map and sequence human DNA. He spoke in early June to attendees of a 2011 conference, "Clinical Trials: New Challenges and Opportunities," cosponsored by the National Library of Medicine, the Friends of the National Library of Medicine, and the American Association for the Advancement of Science.

Since its launch in 2000, Clinicaltrials.gov has grown in a breathtaking fashion. This free online database, created in response to a legislative mandate to help the public learn more about clinical trials, today contains descriptions, locations, and other vital information about more than 109,000 clinical trials.

Despite this great progress, many difficulties remain — difficulties that can delay or even thwart efforts to move scientific discoveries from the lab to the medical clinic. One of the biggest challenges is that very few Americans with common diseases are currently enrolled in clinical trials. For example, clinical trial participation stands at just 3 percent among U.S. adults with cancer.

If clinical trials are to be successful, it is critical that more people get involved. We need to spread the word about the value of participating in clinical trials. Signing up for a clinical trial may indeed benefit medical research and help future generations. But it is not strictly an altruistic endeavor. In many instances, trial participants do gain personal advantages, such as improved disease outcomes or better health. And we should not be shy about telling that story.

We also need to make it easier and more convenient for people to take part in clinical trials. One way in which we might do this is by making the process of research oversight less bureaucratic. Perhaps we need to rethink all of those 22-page consent forms that nobody reads anyway!

Furthermore, the National Institutes of Health (NIH)

needs to take a hard look at the ways in which we support clinical trials. Are we making wise choices? Are we covering the bases that most need attention in the most effective way? And, when we fund a clinical trial, are we making sure that it has sufficient power—that it will enroll enough participants—to produce a meaningful result? Small trials with uncertain endpoints may cost less than larger, well-designed trials, but may not teach us what we need to know.

Photo: National Cancer Institute

"We need to spread the word about the value of participating in clinical trials," says Dr. Collins. "Signing up for a clinical trial may benefit medical research and help future generations. But it is not strictly an altruistic endeavor. In many instances, trial participants do gain personal advantages, such as improved disease outcomes or better health."

Now is an opportune time to be asking these and other questions that lie at the heart of translational science—the field of research that seeks to use advances in biomedical knowledge to develop new and better strategies for detecting, treating, and preventing disease. In fact, we at NIH have taken bold steps aimed at revamping our thinking about this important field and underscoring its relevance.

Why now? Over the past few years, there has been a deluge of discoveries generated by basic scientists about the genetic and environmental causes of disease, findings that likely contain a wealth of new targets for combating disease. At the same time, the rate at which new drugs and other therapeutics are reaching patients has not improved. If anything, the pace of therapeutic development appears to have slowed, despite the many new opportunities uncovered by basic science.

In response to this dilemma, the Scientific Management Review Board recently recommended that NIH form a new entity, the National Center for Advancing Translational Sciences (NCATS). The mission of this new Center, which we plan to launch this fall, will be to catalyze the generation of innovative methods and technologies that will enhance the development, testing, and implementation of diagnostics and therapeutics across a wide range of diseases and conditions. Such activities will complement, and not compete with, translational research being carried out at NIH and elsewhere in the public and private sectors.

In the realm of clinical trials, NCATS will offer researchers a chance to develop and test more flexible, or adaptive, trial designs. Also, because we are learning that the best treatments for many diseases will likely consist of multiple drugs or other therapeutics, NCATS may support efforts to develop innovative trials focused on combination therapies.

Given the economic challenges facing our nation today, I want to emphasize that NCATS represents an efficient use of taxpayer dollars. It will pull together existing resources that are currently scattered across NIH and integrate them into one cohesive unit. Furthermore, NCATS will work together in partnership with academia, industry, regulators, nonprofits, and patient advocates to achieve its aim of delivering solutions to the millions of people awaiting new and better ways to detect, treat, and prevent disease.

In fact, I think the United States is very wise to invest in clinical trials, NCATS, and the many, many other types of biomedical research. Not only do such investments save lives and improve health, they can have a powerful effect on our economy. Take the case of the Human Genome Project, the publicly funded effort to read all 3 billion letters in the human DNA instruction book. A recent analysis concluded that the roughly $4 billion spent on this project generated $796 billion in economic growth within the first decade. Not a bad return on investment!

To Find Out More

- To search a free database of clinical trials being conducted across the United States and around the world, go to **clinicaltrials.gov/**.
- MedlinePlus: Clinical Trials general information and Web links. **www.nlm.nih.gov/medlineplus/clinicaltrials.html**

The National Children's Study
It's All About Our Children


Photo: iStock

Largest, longest study to uncover keys to healthy development

The largest-ever study of children's health in the United States, the National Children's Study (NCS), is enrolling 100,000 children and their families across the country. Physicians and researchers will follow them from before birth until they reach 21, examining the effects of such environmental factors as air, water, diet, sound, family dynamics, community and cultural influences, and genetics on their growth, development, and health.

As the most detailed study in U.S. history focused on children's health and development, it is comparable to long-term, ongoing studies of adult health, particularly the Framingham Heart Study, begun in 1948, and the Nurses' Health Study, from 1976. Because of its size, it is statistically valid and will permit generalizations about the nation as a whole, as well as detailed analysis of specific communities and subpopulations.

"We will have more information than ever about how the environment and genetics affect children's health and their development," says Yvonne Maddox, Ph.D., Deputy Director, *Eunice Kennedy Shriver* National Institute of Child Health and Human Development (NICHD). "And that can make a huge impact on the generations to come." The NICHD is conducting the study with the National Institute of Environmental Health Sciences (NIEHS). Both are part of the National Institutes of Health (NIH).

Study Goal

The goal is to improve the health and well-being of children by increasing understanding of the various factors that may affect health and disease. Results will be made available—and potential benefits publicized—as the research progresses. New insights may be gained into many conditions, including birth defects and pregnancy-related problems; injuries; asthma; obesity; diabetes; and learning, behavior, and mental health disorders.

"The study provides an integrated perspective," says Steven Hirschfeld, M.D., Ph.D., the study's acting director and NICHD associate director for clinical research. "No one has tried to bring all these things together in one study to help understand what makes children healthy." The information will lead to new prevention strategies, and health and safety guidelines, as well as help guide future research.

The study is uniquely data-driven, evidence-based, and community- and participant-informed. At full enrollment, it will operate in 105 locations across the nation. They have been selected to ensure that participants come from diverse ethnic, racial, economic, religious, geographic, and social groups. There are 79 metropolitan areas (urban, suburban, and small cities), as well as 26 rural communities; 37 sites have been participating in the study's pilot phase to determine the best way to recruit women who are pregnant or expecting to become pregnant.

Says Dr. Hirschfeld, "In the pilot phase, we are working out some of the scale-up procedures before we go into the main study. This is a unique opportunity for women to learn about their families, their communities, and contribute to their children's health."

Recruiting

The recruitment strategies include:

- **Provider-based:** Potential participants are introduced to the study through their healthcare providers, such as a doctor, midwife, or public health nurse, as well as through other community outreach efforts.
- **Enhanced Household-based:** Participants join through door-to-door enrollment at their homes, as well as other community outreach efforts.
- **Two-tiered (High Intensity/Low Intensity):** Participants learn of the study through the media, including TV and radio advertising.

Photo: NICHD

"The NCS is developing a rich and extensive store of information on children's health," says Alan Guttmacher, M.D., Director of NICHD.

Participants are asked to answer questions, and not to change what they normally do. In person and via telephone, computer, and mailed questionnaire, they collect information on women's pregnancies, including their diets, environments, chemical exposures, and emotional stress. When their children are born, and periodically thereafter, researchers will collect biologic and environmental samples, like air, water, and dust, from the children's environments.

"The NCS is developing a rich and extensive store of information on children's health," says Alan Guttmacher, M.D., NICHD Director. "And we won't have to wait 20 years to learn the results. The findings from the NCS will be available as the research progresses, and the benefits will be made known to parents and health professionals as soon as possible."

The National Children's Study will seek to keep participants involved by maintaining strong relationships between study staff and the children and families involved. Success hinges on collaboration among the researchers, governmental officials, healthcare workers, social service agencies, and community groups, such as schools, churches, local governments, and others. For instance, each Study Center has an advisory board of community representatives to ensure a locally tailored effort.

A Conversation with Sanjay Gupta, M.D.

Dr. Gupta is a practicing neurosurgeon and CNN's Emmy Award-winning chief medical correspondent. He has reported on and testified before Congress on the environment and children's health. He and his wife, Rebecca Olson, a family law attorney, have three daughters. He spoke recently with *NIH MedlinePlus* Magazine Coordinator Christopher Klose about children's health and the environment, including the National Children's Study. (See accompanying story.)

Please share some of your concerns about the environment and children's health.

Dr. Gupta: We are surrounded by more chemicals now than ever before. Up to 200 chemicals are in the blood of babies before they're even born. The exact ramifications of all these chemicals are unclear. We have seen an increase in various diseases, from asthma and autism to childhood obesity. It will take a national long-term study to say for sure what these chemicals may be contributing.

The National Children's Study will be conducted over many years and look at all sorts of environmental impacts on children's health. Why is this study important to Americans?

Dr. Gupta: While there are notions of what it might show, the scientists must allow themselves to be surprised. There may be relationships we were convinced of that don't pan out and vice versa.

For example, much of what we know about heart disease comes from the Framingham Heart Study that began in 1948. It took that study to prove what we now know to be obvious—that high blood pressure and high cholesterol are risk factors for heart disease, for example.

The National Children's Study could do for toxic environmental exposures what Framingham did for heart disease. It could help explain some real mysteries, such as the increase in autism, which some pediatricians believe is due to a combination of environmental exposures.

So, you're encouraged by both the breadth and depth of the National Children's Study?

Dr. Gupta: Yes. It is a broad study, a good cross-section of America. When you participate in a study like this, there is a real opportunity to have evidence-based science. If you're a pregnant mom, you could help change science and the way we prevent some diseases of childhood.

What would you say to a would-be or young mother about kids' health these days? What about your own family?

Dr. Gupta: I have three young children. We stay away from a lot of processed foods because they may be introducing contaminants into our children's bodies. We don't always buy organic foods, but we do buy organic milk. I'm worried about growth hormones used in cows being transmitted to my children.

We always take off our shoes at home. Shoes can drag in lots of contaminants, pesticides, and all sorts of things. And young children spend a lot of time on the floor, placing them in contact with potential contaminants.

We keep lots of plants. They can filter some of the toxins that inevitably build up in the air. We also use BPA-free bottles. Many people say BPA has never been proven to cause any physical harm. The National Children's Study may bear that out, but we have decided to abide by the precautionary principle here. The same goes for water bottles.

What about children and the time they spend outside versus time inside?

Dr. Gupta: There are two reasons for children being outside. First, the air inside your home may be more problematic than the air outside. Second is that keeping kids exposed to nature allows them to build up a more consistent, reliable natural immunity to

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Dr. Gupta reports on medical
and health topics from
locations across the globe.
Photo: Jonathan Torgovnik

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things that may be allergens later in life. We let our kids play outside a lot.

What would be your top two or three ways for families to keep kids healthy?

Dr. Gupta: Here's what I believe, maybe more so as a father than a doctor. Children have an innate tendency to be healthy and do the right things for their bodies. For example, my children have healthy eating habits. They actually like healthy food, because it's what we've always given them.

Having healthy eating habits from the beginning works, because kids then never crave unhealthy foods. Part of that for us is that we have a little garden in our back yard where we grow vegetables. The kids know they come out of the ground and recognize their value because they help grow them. And they love tomatoes, for example.

I'm always struck that when their friends come over, I can tell by their questions that they may not realize that food comes out of the ground.

What about exercise?

Dr. Gupta: For the past two years, I've been in a lot of athletic competitions that entail training. I'm very busy with work, as it is, so, on weekends, to go for a long bike ride, or run or swim was taking me away from the kids even more.

This was a big discussion point with my wife. But we decided it was really good for the kids to see me doing that. I try to incorporate them into my training as much as I can. For them to see me exercise, and that it's important in my life, makes them want to do it.

So, seeing their parents exercise motivates children, too?

Dr. Gupta: Absolutely. You can find a thousand reasons not to exercise, and one is that it takes away from spending time with your children. So, it's really important for your kids to see you exercising. They will remember and incorporate it into their own lives.

Photo: CNN

When children watch their parents exercising, they also want to do it, notes Dr. Gupta, here seen in a triathlon.

To Find Out More

- **Children's Health: MedlinePlus**
  www.nlm.nih.gov/medlineplus/childrenshealth.html
- **Children's Health: National Institute of Environmental Health Sciences**
  www.niehs.nih.gov/health/topics/population/children/index.cfm
- **National Children's Study**
  www.nationalchildrensstudy.gov/Pages/default.aspx
- **What You Can Do to Protect Children from Environmental Risks**
  yosemite.epa.gov/ochp/ochpweb.nsf/content/tips.htm
- **Health and Human Development**
  www.nichd.nih.gov/health/topics/

Centers for Children's Environmental Health and Disease Prevention Research

Since their founding in 1998, the Centers for Children's Environmental Health and Disease Prevention Research have been examining the effect of environmental exposures on children's health. The Centers receive funding for their work from the National Institute of Environmental Health Sciences (NIEHS) and the U.S. Environmental Protection Agency (EPA). Researchers have laid the scientific foundation for a whole new way of thinking about children and the environment.

"The ultimate goal of the Centers for Children's Environmental Health and Disease Prevention Research program is to create a healthy and sustainable environment for every child in every community across the nation," says Linda Birnbaum, Ph.D., Director of NIEHS and the National Toxicology Program. "And the National Children's Study will not only help this generation live healthier lives, but will be a resource that scientists and parents can learn from for years to come. It will help us answer critical questions about child development. Our investments in research on children's health are yielding critically needed information that will help drive prevention and treatment options for children."

Examples of the Centers' Findings

- People differ in their ability to metabolize pesticides based on their genetic makeup. This is important during pregnancy and early childhood. Some children do not appear to be able to metabolize some pesticides even up to age 7, putting them at greater risk of adverse health effects.
- Children living close to major roadways in Southern California have a higher risk of asthma. Similarly, local exposure to freeway traffic has adverse effects on children's lung development.
- Prenatal exposure to vehicle exhaust and cigarette smoke can lower a child's score on IQ tests, and in one study were found to be related to cognitive delay at age 3.
- Mothers who take prenatal vitamins in the first three months before pregnancy or the first month of pregnancy are less likely to have a child with autism.

Emerging Areas of Research

- What is the role of environmental factors in the epidemic of obesity among our nation's children?
- How are widespread exposures to chemicals that interfere with the body's endocrine system affecting children, particularly during vulnerable windows of development? These chemicals, sometimes called endocrine disruptors, include the plastic component BPA.
- How do genetically transmitted changes to DNA from diet, aging, stress, or environmental exposures affect our children—or our grandchildren?
- How do bacteria in infants' gastrointestinal tract affect children's later health and behavior? What is the role of these germs in lifelong health or disease, and how does it interact with environmental exposures, including diet, antibiotic use, and chemicals?

Photo: NIEHS

Linda Birnbaum, Ph.D., NIEHS Director:

"Our investments in research on children's health are yielding critically needed information that will help drive prevention and treatment options for children."

The 30th Anniversary of the First Reported Cases of AIDS

In the 30 years since the first reported cases of a mysterious illness now known as AIDS, researchers have made extraordinary advances in understanding, treating, and preventing the disease. Here, we offer an overview about those advances from two of the world's leaders in AIDS research: Dr. Anthony S. Fauci, director of the National Institute of Allergy and Infectious Diseases (NIAID), and Dr. Jack Whitescarver, NIH associate director for AIDS Research and the director of the NIH Office of AIDS Research (OAR).

Dr. Anthony S. Fauci


Dr. Jack Whitescarver

Photos: NIAID and OAR

The First Reports

On June 5, 1981, an article concerning five previously healthy, young gay men in Los Angeles diagnosed with *Pneumocystis carinii* pneumonia, an infection that usually appears only in individuals with substantial immune system damage, appeared in the *Morbidity and Mortality Weekly Report*, a publication of the Centers for Disease Control and Prevention (CDC).

Soon, more cases like these appeared, at first mainly in gay men, but then also in injection drug users, hemophiliacs, and other recipients of blood and blood products, heterosexual men and women, and babies who acquired the infection from their mothers during birth or breastfeeding. We and our colleagues quickly began to confront the reality of a deadly new disease that would change the world. The disease ultimately would be referred to as AIDS.

30 Years of Research

Thirty years later, we are gratified by the progress that has been made in understanding, treating, and preventing HIV/AIDS. We could not have imagined these advances during the early days of AIDS, when all we could do was provide palliative care to waves of dying patients. Whereas survival was once measured in weeks or months from the time of diagnosis, today, the critical discovery of antiretroviral drugs and their use in combination regimens have resulted in greatly improved life expectancy—decades, rather than months—for many HIV-infected people who have access to these medicines and adhere to treatment.

We take pride in the contributions of NIH-supported scientists who have been central to the investigation of the HIV disease process, the development of new therapies for HIV/AIDS, and the design and validation of methods of HIV prevention.

- NIH scientists played a key role in demonstrating that HIV causes AIDS and in developing a diagnostic test for the virus. The ability to test the blood supply for HIV has nearly eliminated the risk of HIV transmission through blood transfusion.
- NIH has supported basic and clinical research that provided pivotal data for many of the more than 30 drugs that have been approved by the Food and Drug Administration to treat HIV infection, as well as for strategies to address its associated opportunistic infections, malignancies, and clinical complications.

"Thirty years later, we are gratified by the progress that has been made in understanding, treating, and preventing HIV/AIDS," write Dr. Anthony Fauci and Dr. Jack Whitescarver.

- Clinical trials funded by NIH have helped determine the most effective combinations of these drugs to slow or halt the progression of HIV disease.
- NIH-supported studies were instrumental in designing effective strategies to virtually eliminate mother-to-child HIV transmission in developed nations and to dramatically reduce HIV transmission from an infected mother to her newborn or nursing child in the developing world.
- Many of these clinical trials were designed with the involvement and advice of HIV-affected communities, establishing a model for the conduct of clinical trials for other diseases.

NIH-supported, large-scale clinical trials have resulted in other notable achievements in HIV prevention. These studies sought answers to questions of critical importance to the global public health community. They proved that:

- Medically supervised adult male circumcision more than halves the risk of female-to-male sexual HIV transmission.

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Selections From the AIDS*info* Glossary

The AIDS*info* Glossary is a comprehensive resource designed to help health professionals, researchers, and people living with HIV/AIDS and their families and friends to understand the complex web of HIV/AIDS terminology. The complete glossary is available online as a searchable database, a downloadable PDF, and an iPhone app.

For more terms and definitions, visit **aidsinfo.nih.gov/Glossary/GlossaryDefaultCenterPage.aspx**

- **Acquired Immunodeficiency Syndrome (AIDS)**
  A disease of the immune system due to infection with the human immunodeficiency virus (HIV). HIV destroys the CD4 cells of the immune system, leaving the body vulnerable to life-threatening infections and cancers. AIDS is the most advanced stage of HIV infection.

- **Acute HIV Infection**
  Also known as: Primary HIV Infection
  Early stage of HIV infection that extends approximately 2–4 weeks from initial infection until the body produces a detectable level of HIV antibodies. Because the virus is replicating rapidly, HIV is highly infectious during this stage of the disease.

- **Antiretroviral (ARV)**
  A drug that interferes with the ability of a retrovirus, such as HIV, to make more copies of itself. (See "Retrovirus" below.)

- **Antiretroviral Therapy (ART)**
  Treatment with drugs that inhibit the ability of retroviruses, such as HIV, to multiply in the body. The antiretroviral therapy recommended for HIV infection is referred to as highly active antiretroviral therapy (HAART), which uses a combination of drugs to attack HIV at different points in its life cycle.

- **Human Immunodeficiency Virus (HIV)**
  The virus that causes Acquired Immunodeficiency Syndrome (AIDS). HIV is in the retrovirus family, and two types have been identified: HIV-1 and HIV-2. HIV-1 is responsible for most HIV infections throughout the world, whereas HIV-2 is found primarily in West Africa.

- **Retrovirus**
  A type of virus that stores its genetic information in a single-stranded RNA molecule, and constructs a double-stranded DNA version of its genes using a special enzyme called reverse transcriptase. The DNA copy is then integrated into the host cell's own genetic material. HIV is an example of a retrovirus.

"As the single largest public funder of HIV/AIDS research in the world, NIH is committed to advancing a comprehensive program of basic, clinical, translational, and behavioral and social science research toward controlling and ultimately ending this modern plague."

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- Needle and syringe exchange programs can reduce HIV transmission without increasing injection drug use.
- A vaccine can achieve modest protection against HIV infection.
- Taking an antiretroviral drug daily can reduce the risk of HIV acquisition in men who have sex with men.
- Most recently, an NIH-funded clinical trial demonstrated that an HIV-infected individual can dramatically reduce the risk of transmitting the virus to an uninfected heterosexual partner by starting treatment when his or her immune system is relatively healthy.
- NIH also helped train the scientists and establish the infrastructure for an important clinical trial funded by the U.S. Agency for International Development showing that a vaginal gel containing an anti-HIV drug can help protect women from HIV infection.

These multiple achievements are important because it is clear that controlling—and ultimately ending—the HIV/AIDS pandemic will require a combination of scientifically proven HIV prevention tools.

The Challenge and the Future

As gratified as we are by these accomplishments, we are sobered by some grim realities and remaining challenges. Despite the global public health community's best efforts to prevent new infections, 2.6 million people around the world became newly infected with HIV in 2009 alone. In developing nations, only about one-third of the 15 million people who need anti-HIV drugs have access to them. In addition, a growing proportion of patients receiving long-term antiretroviral therapy are experiencing treatment failure, drug toxicities, side effects, and drug resistance. In this regard, recent studies have noted an increased incidence of malignancies, cardiovascular and metabolic complications, and premature aging associated with long-term HIV disease or antiretroviral therapy.

NIH research will continue to address these issues, as well as the causes of HIV-related health disparities, their role in disease transmission and acquisition, and their impact on treatment access and effectiveness. These include disparities among racial and ethnic populations in the United States; disparities between developed and resource-constrained nations; and disparities based on gender, age, or sexual identity. NIH research also will continue to play a critical role in providing the scientific foundation to achieve the goals of the President's National HIV/AIDS Strategy.

Among the important scientific challenges that remain are the development of a safe and effective vaccine that can take its place among the combination of prevention tools, as well as the possibility of curing at least a proportion of HIV-infected individuals.

The HIV/AIDS pandemic will remain one of the most serious public health crises of our time until better, more effective, and affordable prevention and treatment regimens are developed and universally available. As the single largest public funder of HIV/AIDS research in the world, NIH is committed to advancing a comprehensive program of basic, clinical, translational, and behavioral and social science research toward controlling and ultimately ending this modern plague. In memory of the patients, friends, loved ones, and colleagues we have lost over these three decades, we wholeheartedly embrace this responsibility and opportunity, knowing that history will judge us as much for what we accomplish during the coming years as for what we have achieved thus far.

To Find Out More

- **National Library of Medicine**
  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

David Lindsay, now 40 and playing here with his children, is alive today because of a bone marrow transplant he received while in college. His sister, who was just 7 at the time, donated the bone marrow. They were a perfect match.

Photo: Wendy Yang, *Charlotte Observer*

"Another Possibility at Life"

Bone marrow donation and transplantation offer some a new lease on life.

By Christopher Klose

"I was a senior in high school, on a nationally ranked basketball team," recalls David Lindsay, 40, of Charlotte, N.C. "But during practices, I felt really fatigued and achy. So, before our first game, I went to my doctor for what I thought would be iron pills.

"But when he saw me, he said I looked like Casper the Ghost, and took some blood tests. Two hours later, I was diagnosed with acute lymphoblastic leukemia (ALL). That was the end of my glory days."

Leukemia is cancer of the white blood cells, which are formed in the body's bone marrow and help to fight infection. According to the National Cancer Institute (NCI), cancer in children and adolescents is rare. But ALL is the most common cancer in children, representing 23 percent of cancer diagnoses among those younger than 15. It occurs in about one of every 29,000 children in the United States each year.

In quest of a cure, Lindsay began six months of intensive chemotherapy. And, by the following summer of 1989, "feeling

FASTFACTS

- Bone marrow is the spongy tissue inside some of your bones, such as your hip and thigh bones. It contains immature cells, called stem cells. The stem cells can develop into the red blood cells that carry oxygen through your body, the white blood cells that fight infections, and the platelets that help with blood clotting.
- If there is a problem with your bone marrow, a transplant can give you healthy new marrow. You could need a transplant because of a disease, such as bone marrow diseases or cancers like leukemia or lymphoma. Or you might need one if a strong cancer treatment kills your healthy blood cells.
- People with cancer sometimes donate bone marrow before treatment to be transplanted later. But often the new marrow comes from a donor, either a close family member or someone unrelated.
- Bone-marrow transplants prolong the life of patients who might otherwise die. As with all major organ transplants, however, it is difficult to find bone-marrow donors, and the cost of surgery is very high. The donor is usually a sibling with compatible tissue.

Photo: Calvin Jackson

Calvin Jackson (right) volunteered to be a bone marrow donor, and later joined the board of the National Marrow Donor Program.

terrific" and with his hair grown back, he started his freshman year at Davidson College. Through weekly blood tests and monthly bone marrow checks, everything went well. Then, at exam time, the cancer came back.

"It was a shock. That's when the doctors told us that my best—and only—chance for a cure was a bone marrow transplant," says Lindsay. In a transplant, a patient's diseased bone marrow is destroyed, then replaced with healthy bone marrow from a donor.

Most times, donors must have the same genetic typing as the patient, so that their blood-forming cells in the marrow "match" the patient's. Typically, a patient's full brothers and sisters have the highest chance—25 percent each—of being a perfect match.

In Lindsay's case, his then 7-year old sister, Lee, now 28 and a social worker in Raleigh, proved a perfect match. "It's become happy family lore that Lee and I are twins, 12 years apart!" Lindsay smiles. Two months later, on February 28,1990, at the University of Minnesota Hospitals in Minneapolis, Lindsay got his transplant from Lee.

Another long year would pass before DNA testing finally confirmed that the bone marrow in David's body was 100 percent Lee's, and he was cured.

"The only chance he had was my bone marrow. I donated two bags," Lee recalls. "He was my big brother hero, and he needed me. Bone marrow transplants are another possibility at life."

Thanks to his sister, David has led a full life. He's married, the proud father of two children, and now serves as the executive director of Project Life, a non-profit organization that educates college students about the promise of bone marrow transplantation and facilitates their joining the National Marrow Donor Program (NMDP).

Would Lee donate her bone marrow again? "Look at David. I can't think why anyone wouldn't do it," she says. "It's an opportunity to save someone's life. It's beyond amazing."

Calvin Jackson, 52-year old chief of the NIH News Media Branch, couldn't agree more. As a 35-year-old reporter for *NIH Radio News*, he'd done a story on the need for more people, especially minorities, to join the NMDP.

"I joined, gave a blood sample, and then got the call—two years later. I'd forgotten, but I answered, 'Yes, I'll donate,'" he recalls, despite his wife's concern about possible side effects. Unfortunately, the man who received Jackson's bone marrow did not survive his bout with leukemia. Despite the failure, Jackson was profoundly moved by the experience.

"I wouldn't hesitate to donate again," says Calvin Jackson. "It's an overwhelmingly positive experience." Jackson is particularly concerned that minorities be encouraged to donate, because their need is so great.

He readily agreed to join the NMDP's Board of Directors, subsequently serving two terms. "At first, it was intimidating because I was not a physician, just an average donor," he says. But, it soon became clear that everyone on the Board has the same goal ... to help facilitate transplants and save lives. He became an advocate for donors, dedicated to patient safety.

"I wouldn't hesitate to donate again. It's an overwhelmingly

(continued on page 16)

What Happens During a Bone Marrow Transplant?

A bone marrow transplant is a blood and marrow stem cell transplant. This replaces a person's abnormal stem cells with healthy ones from another person (a donor). This procedure allows the recipient to get new stem cells that work properly. Stem cells are found in bone marrow, and they develop into the three types of blood cells that the body needs:

- Red blood cells, which carry oxygen through the body
- White blood cells, which fight infection
- Platelets, which help the blood clot

Small numbers of stem cells also are found in the blood and in the umbilical cord (the cord that connects a fetus to the mother's placenta).

Another type of stem cell, called an embryonic stem cell, can develop into any type of cell in the body. These cells are not found in bone marrow.

Overview

Doctors use stem cell transplants to treat people who have:

- Certain cancers, such as leukemia. The high doses of chemotherapy and radiation used to treat some cancers can severely damage or destroy bone marrow. A transplant replaces the stem cells that the treatment destroyed.
- Severe blood diseases, such as thalassemias, aplastic anemia, and sickle cell anemia. The body doesn't make enough red blood cells, or they don't work properly.
- Certain immune-deficiency diseases that prevent the body from making some kinds of white blood cells. Without these cells, a person can develop life-threatening infections. A transplant provides stem cells to replace the missing white blood cells.

Types of Transplants

The two main types of stem cell transplants are autologous (from your own stem cells) and allogenic (from a donor). For an autologous transplant, your own stem cells are collected and stored for use later. This works best when you still have enough healthy stem cells, even though you're sick. If you have cancer, the cancer cells are removed or destroyed from the collected cells.

For an allogenic transplant, you get stem cells from a donor. The donor can be a relative (like a brother or sister) or, sometimes, an unrelated person. You also may get stem cells from umbilical cord blood donated by an unrelated person. To prevent problems, the donor's stem cells should match yours as closely as possible. Donors and recipients are matched through a blood test called HLA tissue typing.

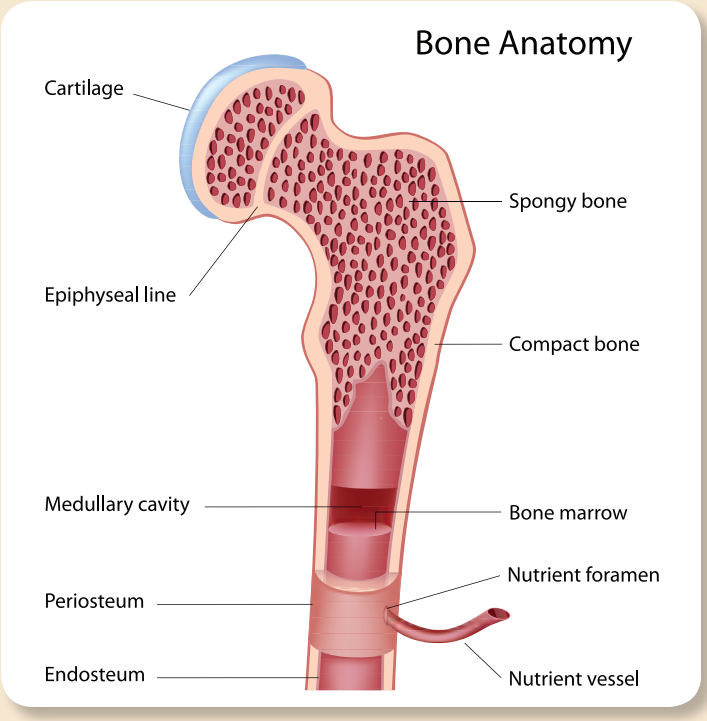


Illustration: Fotosearch

Collection Process

Stem cells used in transplants are collected from donors in several ways. A procedure called apheresis may be used. For this procedure, a needle is placed in the donor's arm to draw blood. Then, his or her blood is passed through a machine that removes the stem cells from the blood. The rest of the blood is returned to the donor.

Stem cells may be collected directly from a donor's pelvis. This procedure isn't used very much anymore because it must be done in a hospital using local or general anesthesia. For this procedure, a hollow needle is inserted repeatedly into the pelvis, and marrow is sucked out of the bone.

Blood containing stem cells may be collected from an umbilical cord and placenta after a baby is born. The blood is frozen and stored at a cord blood bank for future use.

Outlook

Stem cell transplants have serious risks. Some complications are life threatening. For some people, however, stem cell transplants are the best hope for a cure or a longer life.

Thirty-eight thousand people in the U.S. develop a blood cancer every year, and, for 16,000 of them, a bone marrow transplant is the best treatment option, notes Susan F. Leitman, M.D., (at right) Chief of the Blood Services Section at the NIH Department of Transfusion Medicine.

(continued from page 14)
positive experience. I jump at every opportunity to talk about the program." Jackson is particularly concerned that minorities be encouraged to donate because their need is so great. Whatever their ethnic background, he tells everyone, "There is no reason not to give!"

The NIH's Warren G. Magnuson Clinical Center Department of Transfusion Medicine operates a Marrow Donor Center for the education, recruitment, and testing of healthy persons interested in becoming potential bone marrow or blood stem cell donors. The NMDP and the NIH Marrow Donor Center are especially committed to increasing the number of potential donors of minority background to allow more minority patients to find their "perfect match."

"African Americans have the most difficulty finding a match," points out Susan F. Leitman, M.D., Chief of the Blood Services Section at the Department of Transfusion Medicine. "They have a much greater diversity of HLA (human leukocyte antigen) types, which are the blood proteins—or markers—used to genetically match patients and donors. We need many more African American donors."

According to Dr. Leitman, 38,000 people in the U.S. develop a blood cancer every year, and for 16,000 of them a bone marrow transplant is the best treatment option. Some 5,000 of these find suitably matched, related donors, while another 5,000 transplants are facilitated through the NMDP Be The Match Registry.

"Unfortunately," Dr. Leitman says, "this leaves 6,000 people a year needing a donor match. Many of these patients have healthy, unrelated HLA-matched donors in the U.S. population, she explains, adding, "It's so easy to join the donor program; just a couple of swabs with a Q-tip from inside your cheek, then send them to an NMDP testing laboratory for typing.

"When they're told they are a match for someone, people tell me they feel like they've hit the jackpot. How often do you get a chance to save a life!" she exclaims.

Photo: NIH Clinical Center

Susan F. Leitman, M.D., Chief of the Blood Services Section at the NIH Department of Transfusion Medicine

To Find Out More

- **MedlinePlus: Bone Marrow Diseases**
  www.nlm.nih.gov/medlineplus/bonemarrowdiseases.html
- **MedlinePlus: Bone Marrow Transplantation**
  www.nlm.nih.gov/medlineplus/bonemarrowtransplantation.html
- **National Cancer Institute: Bone Marrow Transplantation**
  www.cancer.gov/cancertopics/factsheet/Therapy/bone-marrow-transplant
- **Warren G. Magnuson Clinical Center: Marrow Donor Center**
  clinicalcenter.nih.gov/blooddonor/donationtypes/marrow.html
- **National Marrow Donor Program: Be the Match Registry**
  www.marrow.org
- **Center for International Blood and Marrow Transplant Research**
  www.cibmtr.org

The National Marrow Donor Program and Be The Match Registry

Creating connections. Saving lives.

Founded in 1987 by the federal government, the National Marrow Donor Program (NMDP) and its Be The Match Registry are nonprofit organizations dedicated to creating an opportunity for all patients to receive the bone marrow or umbilical cord blood transplant they need, when they need it.

Mission

Every year, thousands of people of all ages are diagnosed with leukemia and other life-threatening diseases. Many of them will die unless they get a bone marrow or cord blood transplant from a matching donor. Seventy percent of people do not have a donor in their family and depend on the Be The Match Registry to find a match to save their lives.

Today

Be The Match Registry has grown to 9 million donors and nearly 145,000 umbilical cord blood units, the largest and most racially and ethnically diverse registry of its kind in the world. Medical advances are making marrow and umbilical cord blood transplants available to more patients all the time. Since 1987, more than 43,000 transplants have provided patients a second chance at life. Today, Be The Match facilitates more than 5,200 transplants a year.

To help people of every racial and ethnic background live longer, healthier lives, the registry:

- Offers people the unique opportunity to save a life through Be The Match.
- Adds more members and donated umbilical cord blood to its Be The Match Registry every day.
- Supports patients with resources and services to reduce barriers to transplant and improve their quality of life after transplant.
- Educates doctors about transplant advances and patient care after transplant.
- Conducts and supports cutting-edge research to advance the science of transplant.
- Helps any eligible family who may benefit from a related donor cord blood transplant.
- Develops innovative tools, systems, and services to increase the number of patients served.

More information at www.marrow.org

Latest NIH Research

- **Working together for better transplant outcomes**
  Researchers keep working to learn more about the best treatments to improve outcomes for transplant patients. The National Marrow Donor Program conducts and supports research to help more patients get a transplant and to improve transplant results. Research is also conducted by two affiliate organizations, the Center for International Blood and Marrow Transplant Research (CIBMTR), at www.cibmtr.org; and the Blood and Marrow Transplant Clinical Trials Network (BMT CTN). These are funded by the National Heart, Lung, and Blood Institute (NHLBI) and the National Cancer Institute (NCI).

  Sixteen core clinical medical centers and other centers conduct the transplant trials. You can learn more about the Blood and Marrow Transplant Clinical Trials Network at the BMT CTN Web site, www.bmtctn.net.

- **Patients helping patients**
  The medical advances that help transplant patients today were gained with the help of transplant patients of the past. New drugs and treatment approaches are developed through patients' participation in clinical trials and studies of treatment results over time.

  As a patient, you will likely have chances to be part of both types of research. You may be asked to think about joining a clinical trial for a new drug or some other part of your treatment. Your doctor may also ask permission to share the results of your transplant with the NMDP and the CIBMTR. For either type of research, you will be included only if you agree (give informed consent).

  The NMDP and CIBMTR and other researchers publish the results of their studies in medical journals. Doctors then use the information to better treat patients. Being part of a clinical trial may not help you directly, but it is an important way for doctors to gain knowledge that may help future patients.

Managing the Sneezing Season

Seasonal allergies, and what to do about them

Allergic reactions occur when the body defends itself against something that is not present. A normal immune system remembers and defends against invading bacteria and viruses. During allergic reactions, however, the immune system fights generally harmless allergens, such as pollen or mold, with production of a special class of antibody called immunoglobulin E (IgE).

Photo: iStock

FASTFACTS

- Allergies are reactions of your immune system to one or more things.
- Pollens and mold spores can cause seasonal allergic reactions.
- The immune system is your body's defense system. In most allergic reactions, however, it is responding to a false alarm.
- Allergies cause runny noses, sneezing, itching, rashes, swelling, hives, abdominal pain, or asthma. Allergies typically make you feel bad. However, a severe reaction, called anaphylaxis, is life threatening.

— Source: National Institute of Allergy and Infectious Diseases

A Pollen Primer

Several types of pollen cause mild to severe seasonal respiratory allergy, including allergic rhinitis and asthma. But helpful defenses are available, according to researchers at the National Institute of Environmental Health Sciences (NIEHS).

Plant 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 and10:00 in the morning, 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

- Have someone else mow your lawn. If you mow, wear a mask.
- Keep grass short.
- Grow ground covers that don't produce much pollen, such as moss.
- Treat respiratory allergy with antihistamines, topical nasal steroids, cromolyn sodium, decongestants, or immunotherapy (see page 20 for details).
- Use an air purifier with high efficiency air filters (HEPA) or an electrostatic air filter.

Photos: iStock

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. Some common ones are catalpa, elm, hickory, sycamore, and walnut.

Protecting yourself

Plant species that do not aggravate allergies, such as 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 is considered the most sensitive testing method and provides rapid results. 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

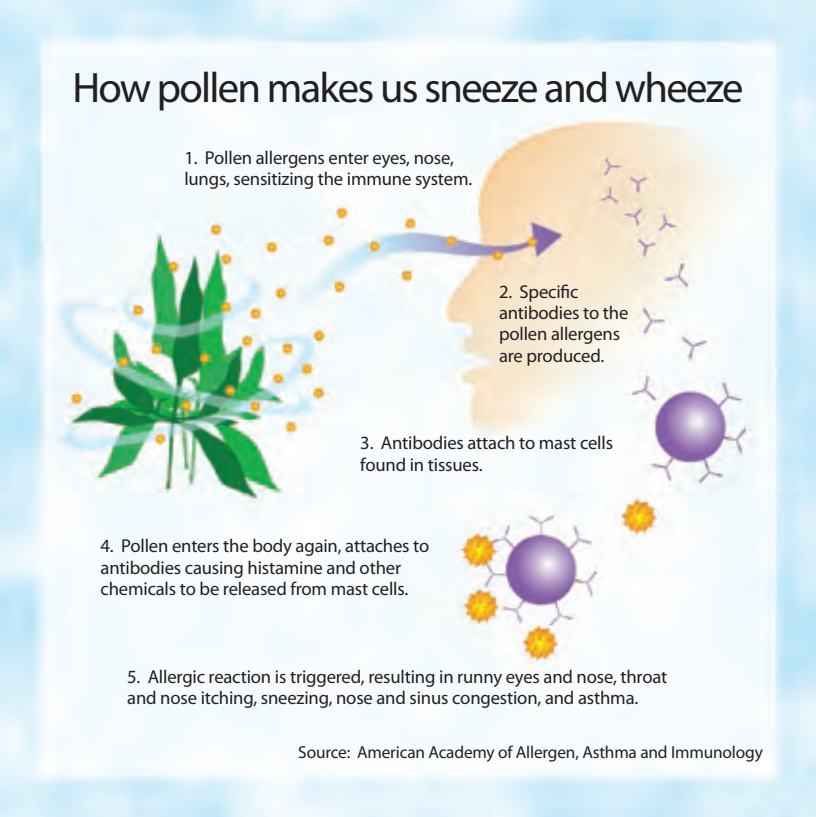
For allergy sufferers, the best treatment is to avoid the offending allergens altogether. This may be possible if the allergen is a specific food, like peanuts, which can be cut out of the diet, but not when the very air we breathe is loaded with allergens, such as ragweed pollen. Air purifiers, filters, humidifiers, and conditioners provide varying degrees of relief, but none is 100 percent effective. Various over-the-counter or prescription medications offer relief, too.

- **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 first generation of antihistamines, but the newest drugs do not cause such a problem.
- **Nasal steroids.** These anti-inflammatory sprays help decrease inflammation, swelling, and mucus production. They work well in combination with antihistamines and, in low doses for brief periods of time, are relatively free of side effects.
- **Cromolyn sodium.** A nasal spray, cromolyn sodium can help stop hay fever, perhaps by blocking release of histamine and other symptom-producing chemicals. It has few side effects.
- **Decongestants.** Available in capsule and spray form, decongestants thin nasal secretions and can 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) might provide relief for patients who don't find relief with antihistamines or nasal steroids. They alter the body's immune response to allergens, thereby helping to prevent allergic reactions. Current immunotherapy treatments are limited because of potential side effects.

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	▪ Antihistamines ▪ Decongestants ▪ Nonsteroidal anti- inflammatory medicines	▪ Antihistamines ▪ Nasal steroids ▪ Decongestants
Prevention	▪ Wash your hands often with soap and water ▪ Avoid close contact with anyone with a cold	▪ Avoid those things that you are allergic to, such as pollen, house dust mites, mold, pet dander, cockroaches
Complications	▪ Sinus infection ▪ Middle ear infection ▪ Asthma exacerbation	▪ Sinus infection ▪ Asthma exacerbation

Source: National Institute of Allergy and Infectious Diseases



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 the 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 are allergic.
- **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. Allergic asthma is responsible for almost 80 percent of all asthma diagnoses. It presents the same symptoms as nonallergic asthma, but differs in that it is set off primarily by an immune response to specific allergens. In most people with allergic asthma, the culprit allergens are those found indoors, such as pets, house dust mites, cockroaches and mold.

Seasonal Allergy Research at NIH

- **Allergen and T-Cell Reagent Resources for the Study of Allergic Diseases:** This National Institute of Allergy and Infectious Diseases (NIAID) program is to identify the portion of a molecule to which an antibody binds, and to develop immune-based therapeutics.
- **Asthma and Allergic Diseases Cooperative Research Centers:** In 1971, 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 an international consortium of investigators in the United States, Canada, Europe, and Australia dedicated to the development and evaluation of novel, tolerance-inducing therapies in such disorders as asthma and allergies.
- **Inner-City Asthma Consortium:** Since 1991, the NIAID has funded research on asthma in inner-city areas with the goal of improving the treatment of children living in environments where the prevalence and severity of asthma is particularly high.

To 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/allergyandasthma/
- **National Survey of Lead and Allergens in Housing (NSLAH)**
  www.niehs.nih.gov/research/clinical/join/studies/riskassess/nslah.cfm

From childhood, Dr. Lynne Holden dreamed of becoming a doctor. Today, she has realized that dream and is helping others discover healthcare careers.

Photos: Dr. Lynne Holden

Mentoring in Medicine Program Encourages

Careers in Health

"We firmly believe the way to address healthcare disparities is to help increase the diversity of the healthcare workforce," says Dr. Lynne Holden. "One way to do that is to introduce students to health professional role models."

Many years before Lynne Holden, M.D., became a medical doctor, she dreamed about it. As a child, she was fascinated by the care and concern of patients she saw in the television series *Marcus Welby, M.D.* And one holiday season, she found a copy of the human anatomy textbook, *Gray's Anatomy*, under the Christmas tree—a gift from her parents. She followed that dream through college and medical school, and is now an associate professor of clinical emergency medicine at the Albert Einstein College of Medicine in New York City, and practices as an emergency medicine physician at Montefiore Medical Center in the Bronx.

Today, Dr. Holden and several colleagues are helping other youngsters—chiefly disadvantaged African American and Hispanic—fulfill their own medical dreams and learn about possible careers in health care through a nonprofit organization she and three colleagues founded in 2006 called Mentoring in Medicine, Inc. (MIM). Among the supporters of MIM—through grants, sponsorships, and active involvement—are the National Library of Medicine (NLM) and the Friends of the National Library of Medicine (FNLM).

"We wanted to honor those heroes who helped us succeed and on whose shoulders we now stand," Dr. Holden says. "We firmly believe that the way to address healthcare disparities is to help increase the diversity of the healthcare workforce. One way to do that is to introduce students to health professional role models."

MIM does its work in disadvantaged areas with

At a Mentoring in Medicine workshop, students learn about how to dissect pig hearts, under the guidance of medical professionals.

Photos: Mentoring in Medicine

At a Mentoring in Medicine (MIM) event, a possible future medical professional gets the chance to model a lab coat with a MIM mentor.

students in three different phases, from third grade through health professional schools, including:

- **Recruitment**—large conferences and symposia that educate pre-high school students and their parents about medicine, nursing, and allied healthcare professional career opportunities;
- **High School**—after-school and in-school curricula on advanced biology concepts, organ systems, diseases, and an introduction to healthcare concepts and health career pathways; and
- **College/Post-Baccalaureate**—mentoring and strategic planning for school admission, including study skills, test preparation, and internships.

MIM ignites an interest in the health professions among these students. The organization also helps prepare students to become competitive applicants to—and graduates from—schools in medicine, nursing, and other health professions.

A medical mentoring program ... is opening new windows of career possibilities for disadvantaged minority youth and helping to increase diversity in health care.

"Our goal is to expand their world," says Dr. Holden. "We want to help students who have a dream but don't know how to realize that dream."

MIM currently is under way in New York City, Atlanta, and Oakland, Calif., operating programs that provide academic enrichment, leadership development, and mentoring. Plans are to expand the program to more cities around the country. More than 6,200 students have participated since the program's start, and more than 560 health professional volunteers have taken part. The results have been encouraging.

"I had the interest but not the confidence to apply to medical school," says Chinedu 'Kingsley' Nwabuobi, a second-year medical student at Einstein College of Medicine. "My MIM family believed in me and were voices of strength, encouraging me and helping me to achieve my goals. I know that I can't give up because they won't give up on me."

To Find Out More

- **Mentoring in Medicine**
  www.medicalmentor.org
- **MedlinePlus: Health Professions**
  www.nlm.nih.gov/medlineplus/healthoccupations.html
- **NIH Office of Science Education: LifeWorks Health Careers**
  science.education.nih.gov/LifeWorks.nsf/feature/index.htm

LifeWorks: Explore Health and Medical Science Careers

Explore more than 100 health and medical careers that need men and women to join their ranks all the time—from aides and counselors to technicians and therapists. The NIH Office of Science Education has a Web site that lists and describes many of them, and includes information about the education required, median salaries, and personal stories. There are also videos of men and women who explain why they chose a particular health-related career, what they do, and why they like it.

Here is a small sampling of their stories. Find much more at science.education.nih.gov/LifeWorks

Darryl Lowery
Emergency Medical Technician

"I chose to become an emergency medical technician because of a great volunteer experience. When I was 16, I volunteered at the local fire department along with three of my best friends from high school. Early on, I took the necessary classes and became certified in cardiovascular pulmonary resuscitation (CPR), and advanced first aid. I continued working there while I finished high school. Many times I would go to the firehouse after school on Friday and stay there most of the weekend through Sunday. We had a lot of fun.

"After high school, I began to take emergency medical services courses at the University of Maryland. In a few years, I completed 144 classroom hours and 20 hours of clinical training through the Maryland Fire and Rescue Institute (MFRI) program at College Park, Maryland. They are one of the largest fire and rescue training groups on the East Coast. After completing the training, I sat for and passed the state certification test. It is necessary to recertify every three years, by taking a refresher course and another test."

All photos: NIH Office of Science Education

Vivian Morales
Medical and Clinical Laboratory Technologist

"I chose to become a Medical Technologist because I always knew I wanted a career in health care. My parents were both teachers, and education was always a priority in our house. They encouraged my brother and me to pursue higher education and consider careers in top fields, such as engineering, law, and medicine. During high school, I started to look for possibilities in the healthcare system. I discovered the Post Bachelor program for Medical Technology (MT) at the University of Puerto Rico. I liked the curriculum; it was a short but intense program that would allow me to have a professional career in a few years. It was also very competitive to get into the program. In order to meet the prerequisite courses necessary to apply, I worked toward a degree in biology. Because my father wanted to make sure I had an alternative career in case the MT program did not work out, I decided to minor in education, to teach science as an alternative. After completing my biology degree, the MT applications, and interviews, I was accepted into the program. I'll never forget the first time I put on a lab coat while in the MT program. I knew then that I was on my way to a very exciting career."

Barry Weidner
Fitness Instructor

"I chose to become a fitness instructor because I've always liked physical activity and sports. I started exercising and working out in the gym when I was 12 years old. My older brother was my inspiration, and he taught me a lot about fitness and sports. Ever since then, I've had a passion for fitness. You only have one body, and it is great to build it up and set and achieve goals for yourself."

Christopher Beadle
Dental Assistant

"I chose to become a dental assistant after entering the Navy and undergoing testing to identify my skills and abilities and determine where they might best be applied.

From College to Work to Navy

"After graduating from high school, I started college at Pennsylvania State University. After a few months, I decided that college didn't suit me, and I returned home. I found a job in a battery plant, and later worked as a material handler for a direct mail company. After three years, I realized that I wanted better career opportunities. With the encouragement of my brother (who was in the Navy and worked as a cook in the White House), I joined the Navy.

Naval Training

"I went through military boot camp in Chicago. Then I was sent to the Naval School of Health Sciences at Shepherd Air Force Base in Texas, where I trained as a dental assistant for four months. After training, the Navy sent me to Naples, Italy, for two years to give dental care to the military in that area. While taking care of the military personnel, I became fluent in Italian and proficient as an Italian cook. On my return to the U.S., I was assigned to the White House and had the privilege of providing dental care to the First Family.

Angi M. Christensen
FBI Forensic Scientist

"I chose to become a forensic scientist because it is an interesting and challenging field that allows me to combine my passion for anthropology, love of puzzles, and compassion to help others. I was interested in science from a very young age. My parents and teachers nurtured this interest, and I never lost it. As a kid, I wanted to be an astronaut or an archaeologist. My favorite subjects in school were always science, sociology, and math. My interest in science was so well known that in high school, I was voted most likely to become a scientist.

"What I like best about my work is that almost every day is different and rewarding. Every case is unique and presents new challenges, which keeps me thinking and stimulated. The idea that everything I do is helping to solve a crime and/or provide closure for loved ones is very rewarding."

To Find Out More

- NIH Office of Science Education
  science.education.nih.gov/LifeWorks
- LifeWorks alphabetical listing of health and medical careers
  science.education.nih.gov/LifeWorks.nsf/alpha.htm
- LifeWorks E-mentoring: Where students e-connect with health professionals
  science.education.nih.gov/LifeWorksEmentoringHome.nsf/index.htm
- Career Finder, NIH Office of Science Education
  science.education.nih.gov/LifeWorks.nsf/CareerFinder.htm

Free information for the public from NLM's Lister Hill National Center for Biomedical Research

A Leader in Clinical Trials, Medical Data, & Electronic Health Information

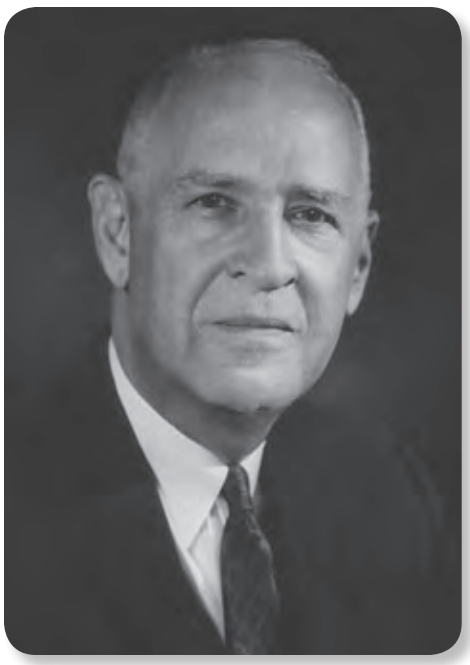


Photo by Bachrach

Senator Lister Hill

This year marks the175th anniversary of the National Library of Medicine (NLM). To strengthen the Library's mission to collect and disseminate the latest advances in medical knowledge, Congress in 1968 authorized establishment of the Library's Lister Hill National Center for Biomedical Research.

"We must develop a communications system so that the miraculous triumphs of modern science can be taken from the laboratory to all in need."

—Senator Lister Hill, 1894-1984, longtime healthcare champion

As the Library's research and development division, the Lister Hill Center seeks to improve worldwide access to biomedical information. It conducts and supports research and development in high-quality imagery, medical language processing, high-speed access to biomedical information, intelligent database systems, multimedia visualization, knowledge management, data mining, and machine-assisted indexing.

The following profiles highlight some of the free public resources available from the Lister Hill Center.

ClinicalTrials.gov

Up-to-date information on federal and private research studies (www.clinicaltrials.gov).

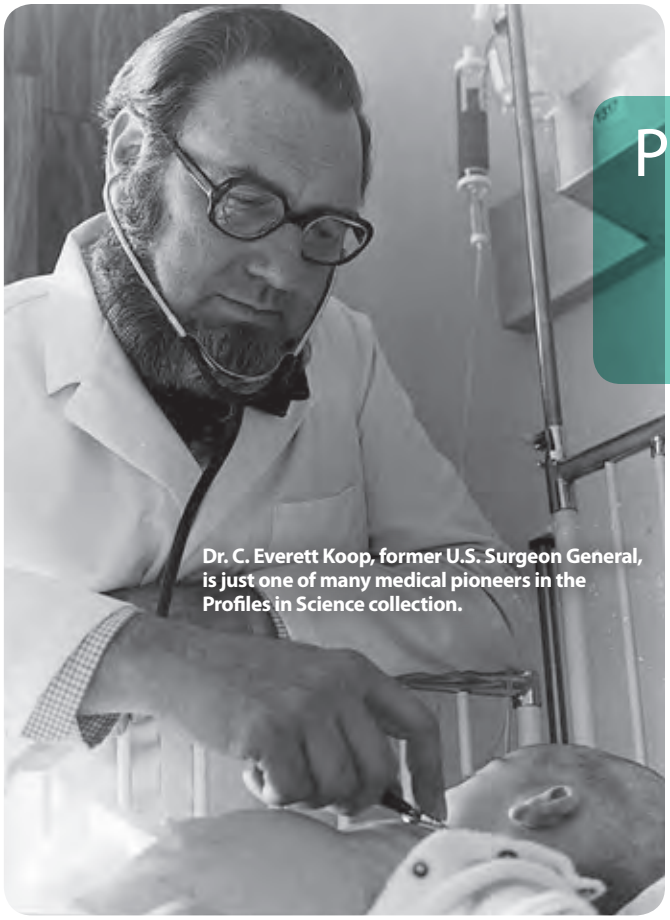
Since its launch in February 2000, ClinicalTrials.gov has provided the latest, most complete information about clinical trials in the United States and abroad. It is a free, online public service from the National Institutes of Health (NIH).

Clinical trials are scientific studies to find better ways to prevent, screen for, diagnose, or treat disease. They may also compare new treatments to ones already available.

Daily, some 65,000 people visit the Web site, and there are more than 50 million page views per month. There is information on more than 106,000 trials funded by the NIH, other federal agencies, and private industry. Trials are conducted in all 50 states and in 174 countries.

Since September 2008, ClinicalTrials.gov also has reported results for trials of federally approved drugs and medical devices. There is information about the types of participants, a statistical summary of the main results, and a listing of adverse events that occurred during the trial, as well as links to published articles about the trial.

On the ClinicalTrials.gov Web site, you can search for a trial by the name of the disease, its location, type of treatment, or the sponsoring institution. You can see what studies are under way and whether a trial is seeking volunteers. You can also learn the purpose of the study, when it will take place, the eligibility criteria, and whom to contact for more information.



Dr. C. Everett Koop, former U.S. Surgeon General, is just one of many medical pioneers in the Profiles in Science collection.

Photo: Profiles in Science

Profiles in Science

The Profiles in Science Web site (www.profiles.nlm.nih.gov) celebrates outstanding figures in biomedical research and public health.

Begun in 1998, the Profiles in Science Web site is an archival collection celebrating the lives and achievements of prominent physicians, scientists, and public health pioneers. Visitors to the Profiles Web site can view the papers of C. Everett Koop, the former Surgeon General; Charles Drew, the "father of the blood bank"; Rosalind Franklin, the co-discoverer of the structure of the DNA molecule; and many other notables. The collections contain numerous published and unpublished items, including books, journal volumes, pamphlets, diaries, letters, manuscripts, photographs, audiotapes, video clips, and other materials. It is maintained by the Lister Hill Center in collaboration with the Library's History of Medicine Division.

The Visible Human Project

The Visible Human Project provides digitally photographed cross-sections of the Visible male and Visible female that can be converted into full-color, three-dimensional images.

The Visible Human Project was a remarkable effort that began in 1989 and resulted in creation of complete, anatomically detailed, three-dimensional representations of the normal male and female human bodies. This included the acquisition of transverse CT, MR, and cryosection images of representative male and female cadavers. The male was sectioned at one-millimeter intervals, the female at one-third of a millimeter intervals. The Visible Human datasets are divided into six slightly overlapping subsets entitled Head, Thorax, Abdomen, Pelvis, Thighs, and Feet.

The images from the Visible Human have been put to many uses, from teaching anatomy to medical students to helping develop virtual colonoscopy. To see a sample of the images, visit www.nlm.nih.gov/research/visible/visible_gallery.html.

Almost 3,200 individuals and institutions in 61 countries have licensed the data for a wide range of educational, diagnostic, treatment planning, virtual reality, and industrial uses.

Photo: National Library of Medicine

The Visible Human male and female representations have been used by institutions in 61 countries for educational, diagnostic, virtual reality, and industrial purposes.

The NLM Personal Health Record (PHR)

The Lister Hill Center researches next-generation electronic health records to facilitate individualized patient care and better clinical treatment.

This project aims to help individuals who are caring for their elderly parent(s) and/or young children. The PHR allows users to enter and track key measurements and test results, prescriptions, problems, and immunizations. Digital and paper copies of its contents are available in various formats.

Currently the PHR provides access to MedlinePlus information resources about prescriptions. Soon, such information will be available through one click on the name of a recorded medication or problem. The PHR can remind the caregiver about important tasks, such as getting the loved one's annual flu shots, or asking the doctor about his or her cholesterol-lowering drug.

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 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 on Minority Health and Health Disparities (NCMHD)** www.ncmhd.nih.gov
  (301) 402-1366
- **National Center for Research Resources (NCRR)**
  www.ncrr.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

NIH MedlinePlus Advisory Group

ClinicalTrials.gov

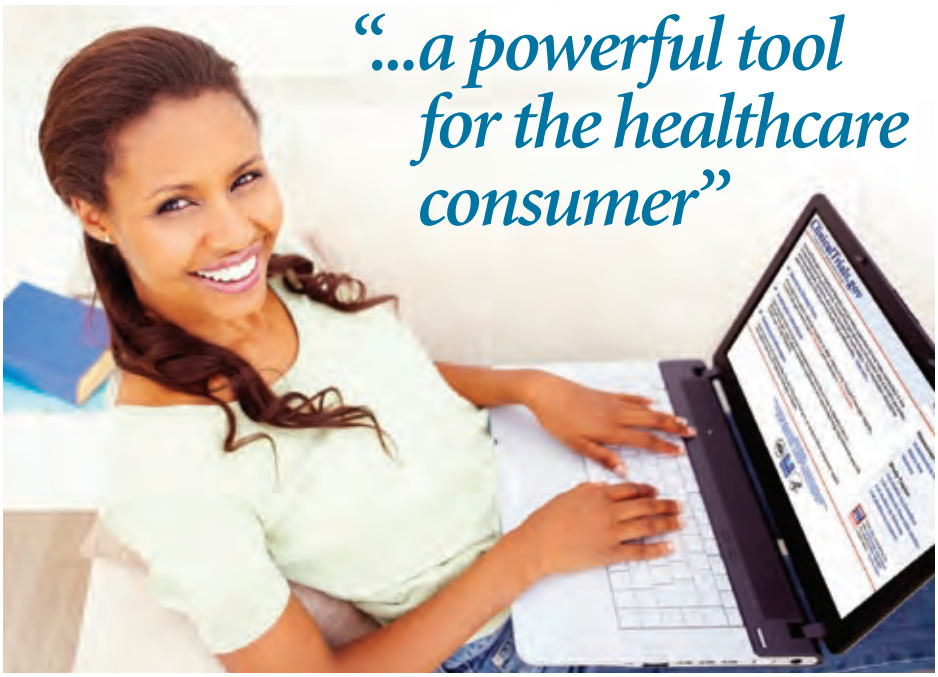


Photo: Shutterstock

Clinical trials are research studies that use volunteers to help medical professionals test new treatments for a wide array of diseases and health conditions.

Find out more information and how YOU can volunteer to help with a clinical trial:

Visit
www.clinicaltrials.gov

Brought to you by the National Library of Medicine (NLM), part of the National Institutes of Health (NIH), U.S. Department of Health and Human Services.