

NIH MedlinePlus[®]

the magazine

Trusted Health Information
from the National
Institutes of Health

Spring 2008

Eating Disorders

What you need to know

Changing Lives

Nursing research leads to
better health care

Global Health Research

- Discoveries help everyone
- How you can make a
difference

Country music
star Randy Owen
sings out for
sick kids

Preventing Childhood Diseases

The latest on keeping your child healthy

On behalf of the Friends of the National Library of Medicine (FNLM), welcome to the Spring 2008 issue of *NIH MedlinePlus* magazine. We take pride in bringing you the most up-to-date and trustworthy information you need to keep you and your family healthy. In the pages that follow, you'll find the latest advice and research discoveries direct from the scientists and medical experts who work for you at the world's leading medical and health research organization, the National Institutes of Health (NIH).

The FNLM is also working to promote and expand the availability of other important work carried out by the National Library of Medicine (NLM). One such program, GenBank—which has had a dramatic impact on medical research and health care—just celebrated its 25th year of advancing scientific discovery in April.

Scientists working to unlock our genetic code were slowed because they often didn't know what their colleagues around the world were discovering. That all changed with the creation of GenBank, the first publicly accessible worldwide database of gene sequences. This ability to share knowledge around the world played a crucial role in allowing scientists to complete the mapping of the human genome in 2003, years ahead of schedule.

The success of GenBank has helped create a whole new field of medicine, which has already led to new tests for breast cancer and holds great hope for preventing and better treating many of today's most deadly diseases. That is why we need your help to make sure that NLM programs like this are promoted and expanded. To join us in this effort, contact FNLM at the address below—and help us support the greatest medical library in the world.

Sincerely,
Paul G. Rogers, Chairman
Friends of the National Library of Medicine



Among those attending the NIH's 25th anniversary celebration of GenBank on April 7-8 were Nobel Prize winners Dr. Rich Roberts (left) and Dr. Sydney Brenner, pioneers in genetic research.



Dr. David Lipman (center), Director of the National Center for Biotechnology Information (NCBI) was among the hosts for the two-day event. Seated with him are Dr. Bruno Strasser (left), Professor of History of Science and Medicine at Yale University, and Dr. Takashi Gojobori, Director and Professor at the Center for International Biology and DNA Data Bank of Japan.

How You Can Help the Library Extend Medical Knowledge

You can be a part of the Friends' mission to help educate the health, corporate, and public communities about NIH's many vital research initiatives.

If you or your company can help to support and expand the Library's efforts by providing sponsorship and other charitable donations for *NIH MedlinePlus* magazine's publication and distribution, many more thousands of Americans 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) 719-8094. Written correspondence may be sent to FNLM, 2801 M Street NW, Washington, DC 20007.

The FNLM is classified as a 501(c)(3) nonprofit organization for federal tax purposes.

Donald A.B. Lindberg, M.D.
Director, NLM

Betsy L. Humphreys, M.L.S., A.H.I.P.
Deputy Director, NLM

Donald West King, M.D.
Deputy Director for Research
and Education, NLM

Kathleen Cravedi
Director, Office of Communications
and Public Liaison, NLM

Elliot Siegel, Ph.D.
Associate Director for Health Information
Programs Development, NLM

Naomi Miller, M.L.S.
Manager of Consumer Health Information, NLM

Patricia Carson
Special Assistant to the Director, NLM

Christopher Klose
Magazine Coordinator

Peter Reinecke
Strategic Advisor, NLM



Paul G. Rogers

Chairman, Friends of the National Library of Medicine (FNLM)

Kathy White

Co-Chair, Corporate & Annual Event Fundraising Development Committee
FNLM Board of Directors

(If you are interested in providing a sponsorship or other charitable donation to support and extend the reach of this publication, please contact Kathy White at (336) 547-8970, x 3327 or kathy.white@vitality.com)

Friends of the NLM

2801 M Street NW, Washington, DC 20007

NIH MedlinePlus Magazine Editorial Board

Don Detmer, M.D. • Jordan Cohen, M.D. • The Hon. Paul G. Rogers
Jay Sanders, M.D. • Barbara Redman, Ph.D. • Roger Bulger, M.D.
Kenneth Forde, M.D. • Leslie Kuhn, M.D.



Selby Bateman, Ginny Gaylor, Managing Editors
Jan McLean, Creative Director
Traci Marsh, Production Director

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

William G. Moore, President
Pat Blake, Controller
Pat Schrader, Administrative Assistant

Articles in this publication are written by professional journalists. All scientific and medical information is reviewed for accuracy by representatives of the National Institutes of Health. However, personal decisions regarding health, finance, exercise, and other matters should be made only after consultation with the reader's physician or professional advisor. Opinions expressed herein are not necessarily those of the National Library of Medicine. Photos without credit lines are provided by NIH.



5

Photo: St. Jude Children's Research Hospital, Seth Dixon

Inside
Front
Cover

Letter from Friends of the NLM Chairman Paul G. Rogers

2 From the Director: Elias Zerhouni, M.D.

5 Childhood Diseases: What Parents Need to Know

10-16 Special Section: Good Health Is a Global Issue

17 Understanding Eating Disorders

20 Changing Lives: The National Institute of Nursing Research

24 Then & Now: Medical Research

26 GenBank Celebrates 25 Years

29 NIH Quickfinder and NIH MedlinePlus Advisory Group



10

Photo: ICDDR,B



26

Cover Photo: Joe Hardwick

Photo: Michael Spencer, NIH

A Global Health System

Recently, NIH Director Dr. Elias Zerhouni traveled extensively in India, Africa, Pakistan, and Afghanistan, discussing with medical experts and government officials the issues of world health and NIH's global outreach. He spoke with *MedlinePlus*' Christopher Klose on these topics.



What are the major challenges facing medical research in today's increasingly interconnected world?

Dr. Zerhouni: We need a health system for the world, not a healthcare system.

We cannot continue to practice the medicine of today 30 years from now. Treatment is often too late and very expensive. Thanks to today's science, we understand that a stroke, heart attack, or cancer begins years before it occurs. We can intervene. If someone is going to develop Alzheimer's or diabetes, I would

rather find out much earlier—and do something about it. That's preemptive medicine.

With resources growing scarce, how are you going to change the old, curative model?

Dr. Zerhouni: The science has advanced to the point where we can become more preventative. Also, the landscape of disease has changed. In developing countries you now see the diseases of the rich—heart disease, high blood pressure, diabetes. We must strike

“Science knows
no frontiers.”

the people tested. Turns out they shared a certain gene the majority being tested didn't, but which happens to be common to 40 percent of Asian populations. Such discoveries will lead to more effective, less-costly treatment that is personalized and pre-emptive. But this will require global participation.



Photo: NIH

During his recent visit to India, NIH Director Dr. Elias Zerhouni (left) met with Manmohan Singh, Prime Minister of India, to discuss NIH's substantial medical research collaborations with India.

Under your leadership, NIH funding for international research has risen significantly. How does this benefit the American taxpayer?

Dr. Zerhouni: Diseases know no borders anymore. SARS [severe acute respiratory syndrome] spread through the world in a matter of days. The dangers of fast-moving infectious diseases require us to have a global vision. Without a worldwide network of well-trained, qualified scientific collaborators, we won't have the radar to protect the American public from emerging and re-emerging infections, like pandemic flu. That's why it was very important to increase our

presence around the world.

Second, the world is going to grow to nine billion people in 2050, but not equally. In the developing world, people will continue to contract diseases like malaria. They will also suffer as we do from obesity, diabetes, and heart disease.

From the American taxpayer's standpoint, therefore, I'm interested in what we can learn from studying countries that are where we were 30 years ago. These are natural laboratories. Perhaps, together we can discover what causes obesity and fix it. This is why we must collaborate and train scientists worldwide.

Science knows no frontiers.

Are you encouraged by what is happening around the world to improve peoples' health?

Dr. Zerhouni: On my recent trip to Africa, India, Pakistan, and Afghanistan, I was pleased to find that NIH, especially the Fogarty International Center, is playing an essential role. So many local doctors told me proudly they had been Fogarty Fellows. In Afri-

them before they take us.

This means being more predictive of knowing who is more likely to be at risk and why so that we can intervene on their behalf. But being predictive will require medicine to become personalized.

Could you give an example of personalized medicine?

Dr. Zerhouni: NIH-funded researchers discovered that a new lung cancer drug worked beautifully—but only on 10 percent of



Dr. Zerhouni receives a bouquet from Indian Minister of Health and Family Welfare Dr. Anbumani Ramadoss. Dr. Roger Glass (left) is Director of the NIH Fogarty International Center.

Photo: NIH

ca, especially, there is good news. We have the Gates Foundation and its commitment to global health. We also have the Presidential Plan for AIDS Relief and the Global Fund for AIDS, Malaria, and Tuberculosis. Billions of dollars have been mobilized to find new cures and treatments.

Most important was how dedicated the people are to their own countries and cultures, and their degree of knowledge and skills. It is essential for global health that we have such experts and that NIH continue to provide support.

Is this fulfilling what you term NIH's global responsibility to health?

Dr. Zerhouni: Absolutely. We are all responsible for making medicine different in 2030. It's a race against time, and winning depends on leadership—here and abroad—and the sense that we all benefit because we are interdependent.

A new exhibition at the National Library of Medicine, "Against the Odds: Making a Difference in Global Health," celebrates some of the key leaders in the global health revolution. How can the average American help to improve healthcare in other countries?

Dr. Zerhouni: Americans should be proud of what they do through their tax dollars and their volunteering. In Uganda, I met an oilman from Texas. He'd known nothing about infectious diseases, but had come to help because he "knew something about drilling wells." I'll say! On his own time and money, he's set up a very beneficial program. Going from village to village, he tests the water and drills the wells that provide safe drinking

water, thereby eliminating the diarrhea that ails so many, many children.

You've been quoted as saying, "Finding better ways of educating the world is the best vaccine out there." What do you mean?

Dr. Zerhouni: Yes. For example, there are regions where people believe that malaria comes from ripened fruit. A mosquito net makes absolutely no sense for protecting their children; they want it for fishing. Knowledge is power and education is essential to good public health. If you know that water conveys disease, then you know to filter the water.

How do you see communications helping to change today's healthcare into the predictive, personalized health system you envision?

Dr. Zerhouni: Medicine of the future is going to be predictive, personalized, pre-emptive, and—participatory, which means networks of like-minded people with the same disease working together, understanding and educating each other across the world. This will require people to participate in their own care to the greatest extent possible, and for communities to be committed to assuring their children don't become obese at age 12

"Finding better ways of educating the world is the best vaccine out there."

and suffer the lifelong consequences.

This cannot happen without transparent, multi-source communication, and connectedness.

Are there any examples of how communication and networking through the Internet have helped people?

Dr. Zerhouni: Cystic fibrosis is a great example of people in isolation who, by coming together and communicating, have helped the science and themselves. Their life expectancy is much longer, the quality of life much higher, and we're not giving up on a cure.

That's really what the NIH is involved in: connecting around the world.



Childhood Diseases

What Parents Need to Know

During the passage from infancy to young adulthood, all 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.

When the Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD) was established at the National Institutes of Health 45 years ago, the world of children's health was a very different place than it is today. Since then, NICHD research has helped improve the health and well being of children at every age of development.

"Since the NICHD was founded," says NICHD Director Duane Alexander, M.D., "our research has contributed to the decline in infant mortality of more than 70 percent, the 93 percent reduction in the rate of mother-to-child transmission of the AIDS virus, the elimination of five major causes of mental retardation, successful treatments for infertility, an effective intervention for reducing a major cause of premature birth, and many other benefits."

Other NIH Institutes have also contributed to those positive results. They are also mirrored in the ongoing improvements in U.S. childhood infectious disease rates, and those for non-communicable diseases in children. Today, parents and their children's doctors know far more about how to prevent and, when necessary, treat the entire range of childhood diseases.

Common Childhood Infections

Children encounter many infectious diseases, especially in the early months and years of life. Some upper respiratory viral or bacterial infections—such as colds, bronchiolitis, 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. That word is "vaccines." Vaccines have been incredibly effective in preventing childhood diseases and improving child mortality rates.

For example, vaccinating your child against diphtheria, tetanus, and pertussis can be done in one dose. Diphtheria is a serious bacterial infection that leads to breathing problems. Pertussis is another name for whooping cough, and it hinders breathing and eating. Tetanus is a serious bacterial infection that can be fatal if not prevented or treated.



Thanks to a vaccine, the United States is one of the only places in the world where polio is completely eradicated. One shot is all it takes to prevent this paralyzing condition. Getting a flu shot and a pneumonia vaccine are also recommended for infants six months or over. They are the most vulnerable when it comes to these diseases. A certain strain of pneumonia can lead to blood infections and meningitis, which is covered in the vaccine.

Similarly, the MMR vaccine protects against measles, mumps, and rubella, viral infections that cause serious symptoms. Measles and mumps often can lead to chronic conditions, such as deafness, brain damage, and reproductive problems. Rubella is also known as the German measles, and causes fever.

The vaccination chart that follows offers a simple overview of what childhood 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.

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

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

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." In the rare event that a vaccine injures a child, he or she may be compensated through the National Vaccine Injury Compensation Program (VICP); call 1-800-338-2382."

Childhood Vaccine Schedule

When to Vaccinate	What Vaccine	Why
Birth (or any age if not previously immunized)	Hepatitis B (HBV) (three doses)— HepB	Prevents hepatitis B, a type of liver disease that can lead to liver scarring, cancer, or failure
1 to 4 Months	HepB	
2 Months	Diphtheria, tetanus and acellular pertussis— DTaP	Prevents: Diphtheria, a serious bacterial infection that can lead to breathing problems Tetanus, a bacterial illness that causes a painful tightening of the muscles, such as “lock jaw” Pertussis (Whooping cough), an infectious bacterial disease that causes uncontrollable coughing
	Haemophilus influenza type b vaccine (three doses)— Hib	Protects against illnesses like meningitis, pneumonia, and infections of the blood, bones, and joints
	Inactivated poliovirus vaccine— IPV	Protects against polio, a contagious, paralyzing, and life-threatening disease
	Pneumococcal conjugate vaccine— PCV	Protects against the pneumococcal bacterium, the leading cause of infections such as pneumonia, blood infections, and bacterial meningitis
	Rotavirus vaccine (three doses)— RV	Protects against severe diarrhea, mostly in babies and young children
4 Months	DTaP, Hib, IPV, PCV, RV	
6 Months and Annually	Influenza – Flu vaccine or flu “shot” (two doses, one month apart, for those under 9 getting a flu shot for the first time)	Protects against seasonal flu
6 Months	DTaP, Hib, PCV, RV	
6 – 18 Months	Hep B, IPV	
12 – 15 Months	Hib, PCV	
	Measles, mumps and rubella (German measles) vaccine— MMR	A “3 in 1” vaccine against three potentially life-threatening diseases: Measles, a virus that causes a rash, cough, runny nose, eye irritation, and fever Mumps, a virus causing fever, headache, and swollen glands; can lead to deafness, meningitis, swollen testicles or ovaries, and death in some cases Rubella, also known as German measles. A generally mild disease, it can cause serious birth defects in the child of a woman who becomes infected while pregnant
	Varicella (chickenpox) vaccine— Var Note: In February 2008, the Advisory Committee on Immunization Practices (ACIP) changed its recommendations. It had recommended giving the MMR and Varicella vaccines at the same time. Now it does not express a preference for giving them separately or at the same time.	Protects against chickenpox, a usually mild infectious disease characterized by an uncomfortable, itchy rash, fever, and headache; in adults, can cause shingles and other serious problems
12 – 23 Months	Hepatitis A vaccine (two doses)— Hep A	Protects against a type of liver disease
15 – 18 Months	DTaP	
4 – 6 Years	DTaP, MMR, IPV, Var	
11 – 12 Years	Human papillomavirus vaccine— HPV	In young girls, prevents most cases of genital warts and cervical cancer
	Tetanus, diphtheria and pertussis booster— Tdap	
	Meningitis vaccine— MCV	Protects against meningitis, an inflammation of the thin tissue surrounding the brain and spinal cord; there are several types of meningitis
College Entrants	Meningitis vaccine for college aged— MCV4	Protects against meningitis, recommended for previously unvaccinated college entrants planning to live in dormitories.

(Sources: medlineplus.gov; U.S. Centers for Disease Control; CDC Advisory Committee on Vaccine Practices)



Randy Owen spends many hours visiting with the children receiving treatments at St. Jude Children's Research Hospital.

The Friends of the National Library of Medicine (FNLN) recently presented Randy Owen their Paul G. Rogers Public Service Award. This award was created to honor individuals who are demonstrated leaders in increasing awareness and support of important health issues today. The FNLN is pleased to honor Randy Owen for his many years of dedication to St. Jude Children's Research Hospital and children's health issues.

Photo: St. Jude Children's Research Hospital, Seth Dixon

“Braid My Hair”

Randy Owen sings out for sick children

For more than 25 years, Randy Owen led one of country music's most popular groups, Alabama. After selling more than 73 million albums with 42 number one singles, Owen has begun a solo career.

Owen is about more than music, however. In 1989, he helped start the Country Cares for St. Jude Kids® program after meeting Danny Thomas, founder of St. Jude Children's Research Hospital®. The Country Cares radio fundraising events have raised \$315 million in the past 19 years.

Owen's debut performance of his latest song, “Braid My Hair,” was the highlight during this year's Songwriter's Dinner held annually at St. Jude.

A Special Song

“Braid My Hair” is the first single from Owen's new solo album,

One to One. The song is about a young girl who has lost her hair due to illness. Chris Gray and Brent Wilson wrote the song. Gray had been a teacher at St. Jude helping kids there who were being treated for cancer and other catastrophic childhood diseases. He knew firsthand the effects chemotherapy had on kids and that many of the girls longed to have hair to braid again. The songwriters managed to get the song to Owen's mother, who recommended her son listen to it.

One hundred percent of the song's publishing royalties will be donated to St. Jude Children's Research Hospital. “It's an incredible story done in song,” says Owen. “To kick this album off with this song is definitely the right way to go.”

It is easy to see that Owen's commitment to St. Jude is ongoing. He was honored last June by Danny Thomas' son, Tony, with the hospital's Founders Award. In accepting the award, Owen celebrated Danny Thomas' work, saying “I didn't have the chance

Good News About Childhood Cancer

There has been a vast improvement in survival rates for children with cancer. There is now a five-year survival rate of more than 85 percent for the most common form of childhood cancer (acute lymphoblastic leukemia or ALL).

During the last 20 years both the five-year survival rates and death rates have declined for most childhood cancers. Both decreases are due to major progress in treatment. These decreases are even more impressive when they are considered with the fact that the rate of children diagnosed with all forms of invasive cancer has actually increased during the same time period.

Still more than 1,500 children die every year from cancer while about 10,400 children under 15 are diagnosed with the disease. Cancer remains the leading cause of death by disease among U.S. children 1 to 14 years of age.

Current childhood cancer research at St. Jude includes: gene therapy, bone marrow transplant, chemotherapy, the biochemistry of normal and cancerous cells, radiation treatment, blood diseases, resistance to therapy, hereditary diseases and the psychological effects of catastrophic diseases.

The Latest Research

The National Cancer Institute (NCI) funds a large number of studies that look at the causes of and the most effective treatments for childhood cancers. Ongoing investigations at NCI include:

- Studies to identify causes of the cancers that develop in children
- Monitoring of U.S. and international trends in incidence and death rates for childhood cancers
- Studies to better understand the biology of childhood cancer
- Preclinical studies (animal studies) of new agents to identify promising anticancer drugs that can be evaluated in clinical trials
- Projects designed to improve the health status of survivors of childhood cancers
- Clinical trials to identify better treatments for childhood cancers
- Evaluations of new drugs that may be more effective against childhood cancers and that may have less toxicity for children

to know him as well as some of you, but it shows you how a good man can inspire you in just a brief time.”

Hospitals for Children

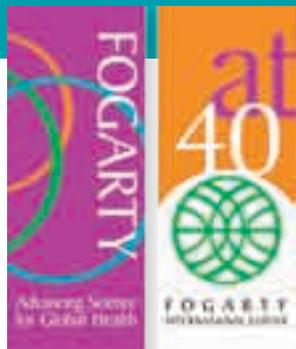
In all there are about 250 children’s hospitals in the United States. For more information on children’s hospitals, visit www.childrenshospitals.net, the Web site for the National Association of Children’s Hospitals and Related Institutions (NACHRI). NACHRI is an organization of children’s hospitals with 218 members in the United States, Canada, Australia, the United Kingdom, Italy, China, Mexico, and Puerto Rico.

To Find Out More

Visit www.countrycares.org to hear Randy Owen sing his new single “Braid My Hair.”



Former Alabama lead singer Randy Owen sings his new song, “Braid My Hair.”



Good Health Is a Global Issue

NIH-supported medical research and training advance health worldwide

Changing Patterns of Disease

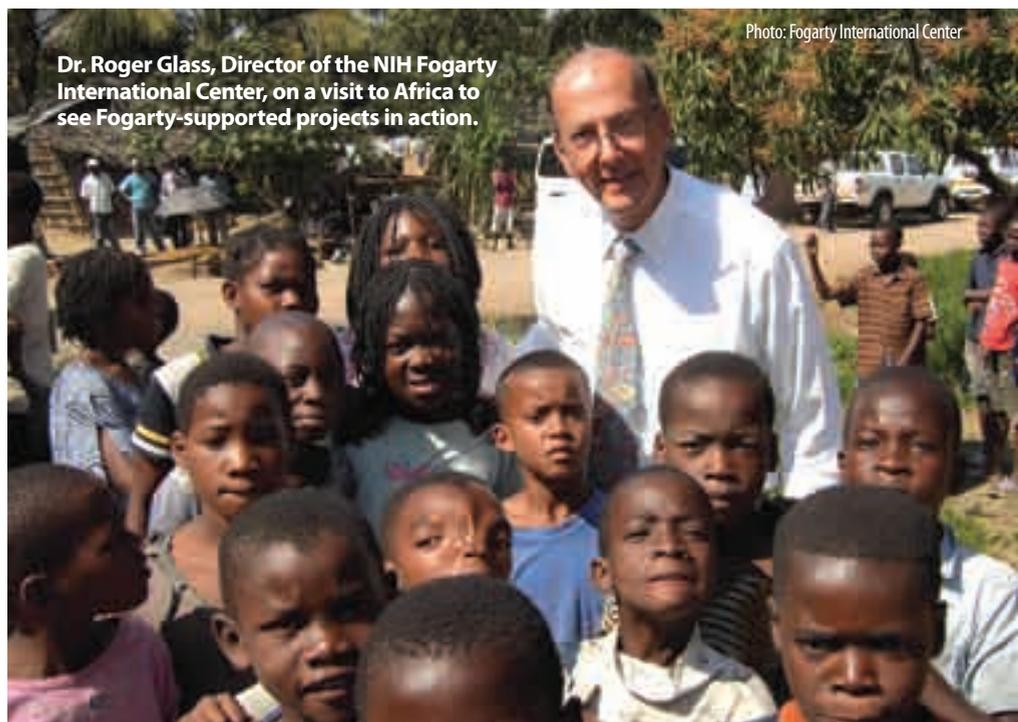
Today, thanks to public health measures and biomedical advances worldwide, life expectancy and prosperity are generally increasing across the developing world. The major exception is sub-Saharan Africa, which continues to be heavily affected by AIDS, malaria, tuberculosis, childhood diarrhea, and respiratory diseases.

But along with getting older, people are becoming vulnerable to non-communicable chronic diseases, including cancer, diabetes, heart disease, and the risk factors that cause them. Social and economic changes, such as migration to cities, adoption of more sedentary lifestyles, rich diets, smoking, and addictions add further risk factors to a healthy life.

For those reasons, many of the research efforts related to global health must now deal with these non-communicable and chronic diseases, in addition to the traditional infectious diseases in the developing world.

Fogarty at 40

For the past four decades, the Fogarty International Center at the National Institutes of Health has been a leader in promoting and funding international medical research and training. The benefits for everyone—including Americans—have been many. Now, health problems and priorities are changing, and Fogarty is helping to train medical researchers around the globe to meet new challenges. The idea that the United States could benefit from international research was central to the creation of the Fogarty



Dr. Roger Glass, Director of the NIH Fogarty International Center, on a visit to Africa to see Fogarty-supported projects in action.

Photo: Fogarty International Center

International Center in 1968. John E. Fogarty, the Rhode Island Congressman for whom the Center is named, predicted that international studies in the health sciences would pay double dividends: the research would help build healthier, more politically and economically stable societies overseas, and U.S. citizens would reap the benefits of international discoveries.

Today, Fogarty funds approximately 400 projects awarded to both foreign and U.S. institutions. About 20 percent of Fogarty awards are made directly to highly capable research institutions in developing countries. In many of the Fogarty programs, scientists in the United States collaborate with colleagues in foreign institutions, mostly in the developing world. About one-third of Fogarty grants focus on scientific discovery; the remaining two-thirds provide support to train research scientists in global health.

Dr. Roger Glass, Director of the Fogarty International Center discusses worldwide health and NIH research and training.

Although Roger I. Glass, M.D., Ph.D., was named Director of the Fogarty International Center and NIH Associate Director for International Research just two years ago, he has been contributing to the study of global health for decades. Dr. Glass's research interests are in the prevention of gastroenteritis from rotaviruses and noroviruses through the application of novel scientific research. He has maintained field studies in India, Bangladesh, Brazil, Mexico, Israel, Russia, Vietnam, China, and elsewhere. He is fluent and often lectures in any of five different languages. *MedlinePlus* Managing Editor Selby Bateman shares Dr. Glass's thoughts on global health.

Why should Americans care about global health research? Do Americans also benefit?

Dr. Glass: First, from a moral standpoint, as citizens of the wealthiest country in the world, we have a responsibility to share our scientific knowledge and medical advances to benefit those less fortunate than ourselves. Second, in this increasingly "flat" world, health issues impact us all. The recent outbreak of SARS and the ongoing bird flu epidemic in Asian poultry both show that diseases don't respect borders. Globalization has increased the movement of people and products around the world, which means diseases can spread more quickly.

Finally, Americans benefit enormously from research that has taken place elsewhere. Many parents rely on products such as Pedialyte when their children have diarrhea. This kind of oral rehydration therapy was originally developed by scientists working in Bangladesh who wanted to learn to treat cholera, which can kill quickly.

What is "implementation science" and what role does it play in global health?

Dr. Glass: There is an enormous gap between health discoveries and their delivery to communities, particularly in poor countries. For example, nearly 14,000 people in Africa and Asia die each day from HIV, malaria, and diarrheal disease, even though we can prevent, treat, and in some cases eliminate those diseases in wealthy countries like ours.

What we call "implementation science" takes proven treatments and adapts them for practical use in the field. Implementing treatments becomes very complicated when you consider the challenges of working in the

developing world. We like to say "one-size-does-not-fit-all" in global health.

For instance, one of our research grantees was part of a team that recently discovered male circumcision can significantly decrease HIV transmission. That has the potential to prevent millions of deaths across Africa. But how should that knowledge be applied? What are the cultural beliefs and practices that will need to be considered in each community? These are the kinds of questions that must be studied.

How is the global health picture changing as populations in developing countries live longer and adopt a more western life style?

Dr. Glass: The good news is that—with the terrible exception of the toll HIV/AIDS is taking in Africa—life expectancy has risen substantially in many parts of the world. In China, for instance, the average person will reach 70, compared to about 40 in 1960.

“Americans benefit enormously from research that has taken place elsewhere . . .”

As populations in the developing world age and adopt the western evils of fast food, cigarettes, and a more sedentary urban lifestyle, they show symptoms of the same conditions that plague us—obesity, diabetes, heart disease, and cancer.

If no action is taken, some 388 million people worldwide will die premature deaths from these conditions in the next decade, according to the World Bank.

Why is it important to train local researchers in the developing world?

Dr. Glass: It used to be common practice for U.S. scientists to "parachute" into a community in the developing world, gather a few samples from people who were suffering from an infection, and take them home to be studied in an American lab. But that doesn't do very much to create a long-term solution that will improve that population's health.

At Fogarty, we've made it a priority to cultivate local research expertise. Many of the scientists around the globe who were trained through Fogarty's programs have gone on to assume leadership positions in their home countries. Our vision is a world where scientific advances are implemented equally—reducing disease, promoting health, and extending the lives of all people.



Worldwide Discoveries Help People Everywhere

Global health research, like that funded by the Fogarty International Center, leads to improvements in health care in the United States and the rest of the world. The chart below shows examples of discoveries and their impact.

Diseases	Discoveries	The Benefits for All Americans
Huntington's Disease	Venezuela—A gene for Huntington's Disease (HD) is identified in an extended family, all descended from a single woman immigrant from Europe in the early 1800s.	Prenatal diagnosis now possible for more than 30,000 Americans with HD and over 200,000 who carry the gene.
Diarrheal Diseases	Bangladesh/India—U.S. and local scientists pioneered development of oral rehydration therapy (ORT) for treatment of cholera.	ORT prevents over a million deaths per year, is the first-line treatment for childhood dehydration worldwide, and is recommended for treatment of every American child with diarrhea.
Breast Cancer	Nigeria—High fatality rates and ineffectiveness of treatment of African women with breast cancer, compared with Caucasian women in the United States, was linked to three genes.	In addition to several other factors such as poor access to care, genes play a key role in the poor prognosis of breast cancer and the lower success rates of treatment of the disease in African American women. Knowledge of genetic markers can facilitate personalization of treatment for African Americans.
Hepatitis B	Australia—Hepatitis B antigen discovered in blood samples of Australian aboriginals led to discovery of the virus, development of a vaccine, and the prevention of related liver cancer.	All American children and many in the developing world are currently immunized against hepatitis B. It's the first cancer vaccine—a model for other viral associated cancers (e.g., cervical cancer and papilloma virus).
Malaria	China—A traditional medicine made from wormwood, <i>Artemisia annua</i> , is found to be highly effective for treatment of malaria.	More than 1 million Africans, mostly children under 5 years old, die from malaria each year. More than 1,000 American travelers infected annually and hundreds of thousands at risk. Artemisinin-derived medicines are the treatment of choice for saving lives.
Tuberculosis Treatment	India—Adherence of patients to long-term treatment for tuberculosis enhanced by a program of directly observed therapy (DOT), a strategy that also reduces the emergence of drug-resistance.	Success of this program abroad has led to adoption of DOT TB treatment in the United States, where close to 14,000 new cases were reported in 2006.

NIH Abroad

“Pictures Are Crowd Pullers ...”

Art, culture, and the Internet combine to intervene against malaria in Uganda

“Pictures are crowd pullers,” says William Lubega, a fourth-year medical student in Uganda. “They look at the pictures and get the message.”

The message: Mosquitoes cause malaria. Not ripe mangoes. Not witchcraft.

The images and words, which speak directly to local beliefs in villages in eastern Uganda, may be about to turn the tide against malaria there and, perhaps eventually, throughout sub-Saharan Africa. They are part of the first MedlinePlus Tutorial on Malaria for Africa (www.nlm.nih.gov/medlineplus/Africa/malaria.html).

The tutorial was developed by a team of students, including Lubega, faculty and artists from the Faculty of Medicine, University of Makerere, in Kampala, working with Julia Royall, chief of international programs at the National Library of Medicine and Fulbright Scholar to Uganda, 2007-08. A team from the NLM Public Services Division collaborated on the project through the Internet.

“We wanted to see if such a ‘health information intervention’ from NLM through medlineplus.gov could make a difference,” says Royall. In addition to the online materials, available to anyone with access to the Internet, health workers use a laminated presentation to explain how malaria works. Colorful poster versions of the tutorial attract mothers, too, and an audio version in four languages is available for radio broadcast.

Both treatable and preventable, malaria kills as many as 110,000 Ugandan children under five every year. Over time, the Makerere University researchers will be able to tell whether they’ve made a difference in the fight against malaria.

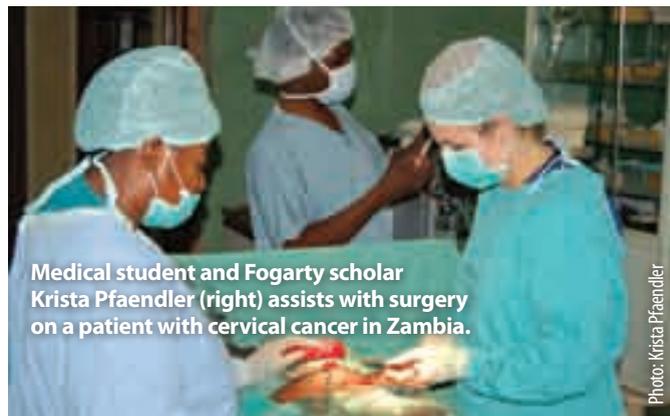


Photo: Julia Royall

NLM’s Julia Royall and Makerere University medical student-members of the international team that developed a tutorial on malaria for Africa.

Inspiring the Next Generation of Global Health Researchers

Fogarty scholar helps Zambians fight cervical cancer



Medical student and Fogarty scholar Krista Pfaendler (right) assists with surgery on a patient with cervical cancer in Zambia.

Photo: Krista Pfaendler

An innovative Fogarty Center program provides graduate-level students the opportunity to spend a year doing research at a site in the developing world.

One recent graduate of this Fogarty International Clinical Research Scholars Program spent a year in Zambia helping to build a cervical cancer screening and treatment initiative. Cervical cancer is the deadliest form of cancer among African women. Those infected with HIV/AIDS are five times more likely to develop cervical cancer. Since women account for more than half of those living with AIDS in Zambia, the problem is enormous.

Krista Pfaendler, a third-year medical student from the University of Pittsburgh, spent a year in Zambia helping to build a cervical cancer screening and treatment program.

Pfaendler and her colleagues at the Centre for Infectious Disease Research in Zambia implemented a number of innovative ideas, including the use of inexpensive digital cameras for cervical photography and a low-cost method of visual inspection using acetic acid, which is essentially household vinegar. “It was important that we integrate these practices into the public health system that already existed in Zambia, rather than reinventing everything,” she said.

During her 10-month stint, 15 nurses were trained and more than 8,800 cervical exams were conducted. Of the nearly 1,500 women referred for further testing, about 150 were diagnosed with cancer.

For Pfaendler, the experience has changed her life and the focus of her career, she says. “Human interaction has always been important to me, but working with these patients in Zambia lit a fire in me.”

“Against the Odds,” a new exhibition at the National Library of Medicine, showcases the remarkable changes that are occurring in global health and some of the pioneers who have been creating these changes.



Photo: CDDR, B

the Against the Odds

**MAKING A DIFFERENCE
IN GLOBAL HEALTH**



A revolution in global health is taking place in villages and towns around the world. Communities are collaborating with scientists, advocates, governments, and international organizations to help prevent disease and improve quality of life.

“Against the Odds: Making a Difference in Global Health” is a new exhibition at the National Library of Medicine in Bethesda, Md., that looks at this revolution and some of the milestones that have occurred along the way. Through the use of historical photos, first-person accounts, and examples of successful interventions and campaigns, the exhibition traces a remarkable story of achievement against great odds.

Components of the exhibition include community health projects from South Africa to post-Katrina New Orleans, anti-obesity campaigns in Brazil, a history of the AIDS epidemic and the global response by the World Health Organization, and campaigns to ban land mines, prevent nuclear war, and end malaria, polio, and smallpox, among other topics.

Recognizing the many factors that cause illness, people are working on a wide range of issues—from community health to conflict, disease to discrimination. This exhibition will introduce you to some of individuals who have made a difference—working together, against the odds, for the benefit of all.

Oral Rehydration Therapy

Oral rehydration therapy (ORT) is an inexpensive, life-saving treatment for dehydration. Wherever access to clean water and sanitation is limited, diarrheal diseases like cholera threaten lives, especially those of babies and young children. ORT, which is essentially a mixture of salt, water, and sugar, has earned the label “a simple solution” because it is made from basic, inexpensive ingredients, and can be easily learned.



Dr. D. A. Henderson (second from left) helped lead the World Health Organization's global campaign to eradicate smallpox. The disease was eliminated in 1977 thanks to an extensive vaccination program.

Photo: Ethiopia, ca. 1972, courtesy WHO

Smallpox and Polio

The successful campaign against smallpox inspired confidence that other diseases could also be eliminated. In 1985, the Pan American Health Organization (PAHO) launched a campaign to eradicate polio from the Americas. At the time, Central Americans faced major health problems due to ongoing conflict in Guatemala, El Salvador, and Nicaragua. As well as injuries caused by the violence, the warfare had a devastating impact on living conditions and health services. PAHO worked with government leaders, combatants, and local organizations to create Health as a Bridge for Peace—a plan to end hostilities and provide medical care.

Photo: Courtesy PAHO/WHO

Childhood Immunization

As part of a campaign to prevent the spread of infectious diseases across Central America in the 1980s, healthcare workers promoted childhood immunization against polio, diphtheria, whooping cough, tetanus, and measles.



Mother and child visiting a clinic in Ecuador, 2005

Visit the Exhibition Online!

“Against the Odds: Making a Difference in Global Health” opened April 17, 2008. Admission is free and open to the public. Visit the exhibition online at www.fnlm.org, and click on “Against the Odds.”

“Against the Odds” Exhibition Opens

“Against the Odds” is a remarkable story of achievement and the challenges that remain.”

— Library Director Dr. Donald A.B. Lindberg

On April 17, Dr. Donald Lindberg officially opened the exhibition, “Against the Odds: Making a Difference in Global Health” at the National Library of Medicine on the campus of the National Institutes of Health in Bethesda, Md.



NIH Director Dr. Elias Zerhouni addresses visitors to the opening of the exhibition.



Brothers Niko and Theo Milonopoulos encourage young people to prevent gun violence through their Kidz Voice LA and Vox Populi organizations.

At the exhibition, HIV and AIDS were topics addressed by Dr. Victoria Cargill (right), Director of Clinical Studies and Director of Minority Research of the NIH Office of AIDS Research in Bethesda.



Photos: Bill Branson

Anorexia, Bulimia, and Binge-Eating

Understanding Eating Disorders



Eating disorders, such as anorexia nervosa, bulimia nervosa, and binge eating, are among the most frustrating and difficult-to-treat conditions anyone can face. Research efforts at several NIH institutes are helping health care professionals and their patients better understand what can be done to deal with these conditions.

Eating disorders can affect girls and boys, women and men, people of all races and backgrounds. But because of the stigma or misperceptions, some people may not get the help they need. Mental health experts say it is important for people to understand what eating disorders are and what they are not. Eating disorders are not a silly desire to be thin, a figment of one's imagination, or a failing.

"The most important thing to recognize is that these are real disorders that require treatment," says Dr. Thomas Insel, the director of the National Institute of Mental Health (NIMH).

Eating disorders are serious, even life-threatening, medical illnesses that have biological and psychological causes. They are treatable. Recovery is possible.

"I tell my patients they are fighting an uphill battle against their biology. That does not mean it is not a fightable battle, because it is," says Cynthia Bulik, Ph.D. director of the eating disorders program at the University of North Carolina at Chapel Hill, which receives NIH funding for research.

What Are Eating Disorders?

Eating disorders are marked by extremes. People with an eating disorder may severely reduce the amount of food they

eat, or eat an unusually large amount of food, or be extremely concerned about their weight or shape. They may start out simply eating smaller or larger portions than usual, but at some point the urge to eat more or less spirals out of control.

There are three main types of eating disorders: anorexia nervosa, bulimia nervosa, and binge-eating disorder. People with anorexia nervosa see themselves as overweight even though they are dangerously thin from starving themselves. People with bulimia nervosa eat unusually large amounts of food (binge eat) and then compensate by purging (vomiting, taking laxatives or diuretics), fasting or excessive exercise. People with binge-eating disorder binge but do not purge, and they often become overweight or obese. Eating disorders may occur along with depression, substance abuse, or anxiety disorders, and can cause heart and kidney problems, even death. The disorders show up most frequently during teenage years, but there are indications they may develop earlier or later in life.

Dr. Bulik and others in the field say they have seen an increase in adult women with eating disorders. At any given time, more than half the women in her program are older than 30, which was not the case 10 or 20 years ago, she adds. Dr. Bulik notes



Males and Eating Disorders

Eating disorders primarily affect girls and women, but boys and men also are vulnerable. Boys with eating disorders show the same types of emotional, physical, and behavioral signs and symptoms as girls, but for a variety of reasons, boys are less likely to be diagnosed with what is often considered a stereotypically “female” disorder. Males account for an estimated 5 percent to 15 percent of patients with anorexia or bulimia and an estimated 35 percent of those with binge-eating disorder.

Like females who have eating disorders, males with the illness have a distorted sense of body image and often have muscle dysmorphia, a type of disorder characterized by an extreme concern with becoming more muscular. Some boys with the disorder want to lose weight, while others want to gain weight or “bulk up.” Boys who think they are too small are at a greater risk for using steroids or other dangerous drugs to increase muscle mass.

that environmental triggers, like the expectation to lose weight quickly after pregnancy, or to look young, can lead to extreme dieting or exercise.

“There are such extraordinary pressures on us not to let age show on our body,” she says. “So, we are seeing more women caught up in extreme behaviors, and it’s those behaviors that can trigger an eating disorder in a vulnerable individual.”

There are clues as to what makes people likely to develop an eating disorder.

“There have been a number of studies showing that people who develop anorexia nervosa have certain traits in childhood that put them at risk, such as anxiety and perfectionism. If people do not have those traits, they are probably less likely to develop an eating disorder,” says Walter Kaye, M.D. He directs the eating disorders program at the University of California, San Diego and also receives NIH funding for his research.

Studies also show eating disorders run in families. But is it nature or nurture, inherited or learned behavior? Studies of

twins suggest that genes play a role. To help further research into the genetics of eating disorders, Drs. Kaye, Bulik, and other researchers are collecting DNA and blood samples from people in families where more than one person has anorexia nervosa. NIMH is supporting the research and will maintain a bank of the DNA and cell lines collected, so they can be used by researchers trying to identify variations in genes that affect the risk for anorexia and bulimia nervosa.

“By identifying these factors, we could see who is at risk, intervene early, and prevent people from coming into the emergency room,” says Dr. Insel.

In addition to studying genes, researchers are using sophisticated imaging tools to see what is, or is not, happening in the brains of people with eating disorders.

“When it comes to hunger, it’s hard for most people to stay on a diet. But, people with anorexia nervosa can diet every day and die from starvation. Why don’t systems kick in that make them want to eat?” says Dr. Kaye. By uncovering

Symptoms and Warning Signs

Anorexia Nervosa

- emaciation (extremely thin from lack of nutrition)
- relentless pursuit of thinness; unwilling to maintain a normal or healthy weight
- distorted body image; intense fear of gaining weight
- lack of menstruation among girls and women
- repeatedly weighing him/herself
- portioning food carefully, eating only small amounts of only certain foods
- excessive exercise, self-induced vomiting, misuse of laxatives, diuretics, or enemas

Other symptoms that may develop over time:

- thinning bones
- brittle hair and nails
- dry, yellowish skin
- growth of fine hair over the body
- mild anemia and muscle weakness and loss
- severe constipation
- low blood pressure, slowed breathing and pulse
- feeling cold all the time
- lethargy

Bulimia Nervosa

- frequently eating large amounts of food (binge-eating)
- feeling a lack of control over the eating
- compensating for binge-eating with self-induced vomiting, misuse of laxatives and diuretics, fasting, and excessive exercise
- bingeing and purging in secret; feelings of shame and disgust
- intensely unhappy with body size and shape despite normal height and weight

Other symptoms include:

- chronically inflamed and sore throat
- swollen glands in neck and below jaw
- worn tooth enamel from exposure to stomach acids
- gastroesophageal reflux disorder
- intestinal distress from laxative abuse
- kidney problems from diuretic abuse
- severe dehydration from purging

Binge Eating Disorder

- frequently eating large amounts of food (binge-eating)
- feeling unable to control the eating behavior
- feelings of guilt, shame, and/or distress about the behavior, which can lead to more binge-eating

and understanding the differences in the brain circuitry and genes of people with eating disorders, researchers can work to develop new treatments.

Current treatment options may include mental health therapy, nutritional counseling, and medicines. One large-scale study suggests an online-intervention program may help some college-aged women who are at high risk of developing an eating disorder. The program includes online discussion groups moderated by psychologists, as well as reading and writing assignments.

Researchers are also studying the effectiveness of “family-based therapy” to treat children and teens with anorexia and bulimia. In family-based therapy, parents play an important and active role in a child’s treatment. Additionally, a study is starting to see how this type of approach could be applied to adult couples in which one partner has anorexia nervosa.

Because eating disorders are complex and affect a variety of people in a number of ways, several institutes at NIH are

To Find Out More

Additional information on eating disorders, resources, and clinical trials is available here:

- **English** <http://medlineplus.gov/> ;
- **Spanish** <http://medlineplus.gov/spanish/>
- **The National Institute of Mental Health at** www.nimh.nih.gov
- **Clinical trials at** <http://clinicaltrials.gov/>

funding research. The National Institute of Mental Health supports the majority of research, but studies also are supported by the National Institute of Diabetes and Digestive and Kidney Diseases, and the Eunice Kennedy Shriver National Institute of Child Health and Human Development.

Changing Lives

How can patients receive improved care during the transition from hospital to home care? How can teenagers with Type 1 diabetes be taught to improve their own skills at coping with the disease? What strategies can reduce HIV risk among young minority women? How can end-of-life care be more supportive and less stressful?

These are just four of the many important areas that the National Institute of Nursing Research (NINR) has researched and supported for more than two decades. Their research has led directly to results that have been widely implemented in many health care situations.

While many Americans are familiar with nursing, most are not aware of the crucial health care contributions made by nurse scientists across the nation. As our national health care system continues to evolve, it is clear that nurses at every level are playing a vital part in many traditional and emerging health care venues. This comes at a very important time for the American public, notes NINR Director Patricia A. Grady, Ph.D., RN, FAAN.

“Our health care system will face new and significant challenges as the 21st century progresses and our population continues to grow, age, and become more diverse,” she says. “Many diseases that were once acute and life-threatening, such as heart disease, diabetes, and HIV, are now long-term chronic conditions.”

Finding ways to help treat these chronic conditions is a part of the four focal areas for nursing research. These include:

- promoting health and preventing disease
- improving quality of life for patients
- finding solutions to health disparities (inequalities among different populations)
- discovering ways to make end-of-life care better.



From childbirth to end-of-life care, nursing research is aimed at helping patients across the entire lifespan, notes Dr. Patricia A. Grady, Director of the National Institute of Nursing Research.

Photo: National Institute of Nursing Research

Nurses—from the operating room to the wellness clinic, from the nursing home to the birthing center, from the school health office to the intensive care unit—we count on them to give the shot, hold the hand, manage the care, answer the questions, and give trusted advice. Nurses play a central role in nearly every aspect of the health care we depend on for ourselves, our families, friends, and loved ones.



Improve Hospital-to-Home Transitions

Our current health care system tends to focus on hospital care, with less emphasis on recovery and rehabilitation in the home. The result is often readmission to the hospital. One study found that seniors hospitalized with heart failure often have multiple medical conditions, and they have the highest hospital readmission rate of all adult patient groups. This indicates a serious breakdown during the transition from the hospital to home care.

Nurse scientist Dr. Mary Naylor, a professor at the University of Pennsylvania, was part of an interdisciplinary research team addressing this breakdown. They used a model of care in which advanced practice nurses worked with the seniors to develop discharge plans and coordinate care in the transition from hospital to home. In the year after their discharge, those who received this transitional care had fewer hospital readmissions, hospital days, and deaths, along with a higher quality of life and greater satisfaction with their care, than those who continued in standard care. In addition, their total health care costs were lower by almost \$5,000 per patient. A major national health insurer is further evaluating the success of transitional care.



Madeleine Kuhn, 18, doesn't let her own Type 1 diabetes slow her down.

Photo: Madeleine Kuhn

Reduce HIV Risk

Infection with the human immunodeficiency virus (HIV), which can lead to AIDS, is a significant health problem worldwide. Cases of HIV/AIDS are increasing among younger people from 13 to 30 years of age. The key to defeating HIV lies with prevention. Educational programs must reach and convince young people to reduce unsafe sexual practices.

Dr. Loretta Sweet Jemmott, professor at the University of Pennsylvania and Director of the NINR Hampton-Penn Center to Reduce Health Disparities, has spent many years in the field of HIV/AIDS prevention. Among her research ventures in this field have been educational programs that delivered information on sexual abstinence and safe-sex practices to inner-city black middle school students. Based on the success of those programs the Centers for Disease Control and Prevention (CDC) has used them as models, and Dr. Jemmott was invited to South Africa to help decrease HIV/AIDS there.

“For the past 15 years, I have observed how the HIV/AIDS epidemic has disproportionately impacted the African American community,” says Dr. Jemmott. “I became convinced that the incidence could be reduced if people changed their sexual behaviors. Our research has demonstrated remarkable success in reducing HIV risk-associated sexual behaviors among African American adolescents and adults.”

Help Teens Manage Diabetes

Type 1 diabetes is one of the most common chronic conditions among youth, affecting over 200,000 children and adolescents in the United States. However, management of diabetes—which involves frequent testing of blood sugar levels and injections of insulin—often proves very difficult for teenagers.

Dr. Margaret Grey, dean of the Yale University School of Nursing, developed and tested a program called Coping Skills Training (CST) as a part of routine diabetes management. Its aim is to improve diabetic teens' coping and communication skills, healthy behaviors, and conflict resolution. The CST training helps diabetic teens to make good decisions when it comes to managing food choices, making decisions about drugs and alcohol, and facing personal conflicts. Those teens who receive CST maintain better metabolic control and consistent sugar levels.

“Nursing research is about helping people deal with the hand that they've been dealt,” says Dr. Grey. “What we try to do is to develop ways that help diabetic teens and their families manage very difficult situations better. That leads to better outcomes for families and for the children.”

Enhance End-of-Life Care

When it comes to the end of a human life, few individuals, family members, and other loved ones are prepared for the many decisions that must be made prior to that final moment. But new studies—many of them by NIH's

National Institute of Nursing Research (NINR)—are showing that future end-of-life care can be greatly improved.

NINR has taken the lead at NIH in end-of-life care research. NINR funds studies aimed at improving the care of the dying, as well as communication among patients, their families, and their health care professionals. The goal of this research is to decrease the stress and anxiety during this delicate time.

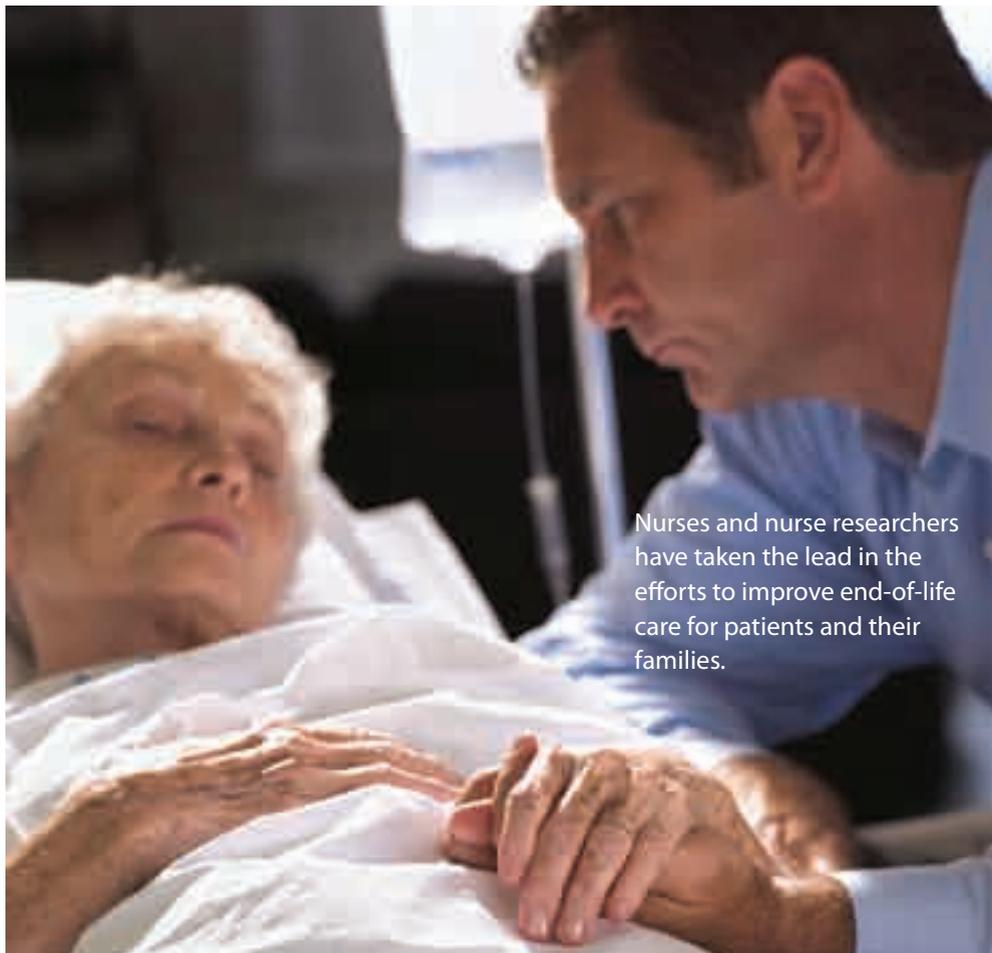
“Nurses are involved with people at every stage of life and across the full range of health and illness,” says NINR Director Patricia A. Grady. “So, it is only natural that nurses and nurse scientists would take the lead on the sensitive and vital issues surrounding care at the end of life.”

End-of-life care involves more than simply the care provided to a dying patient. It includes palliative care (easing symptoms, such as pain) for those faced with a serious illness or other decline in health who continue to live. Ideally, all health care planning should include palliative care at the time of diagnosis of any life-threatening illness.

“Patients and families often don't think about it until it's too late for them to benefit from it; that's the problem,” says Diane Meier, M.D., and Director of the Center to Advance Palliative Care (CAPC) in New York City.

The future of research in this field involves continuing to develop and test new ways to improve care provides to more patients and families. In addition, researchers agree there is a growing need to teach palliative care to future generations of nurses, doctors, and other health care professionals.

“We must continue to strengthen our research efforts,” says Dr. Grady. “Further research on the assessment, planning, and treatment of pain and other symptoms will improve quality of care and contribute to a healthier lifestyle.”



Nurses and nurse researchers have taken the lead in the efforts to improve end-of-life care for patients and their families.

To Find Out More

To learn more about NINR and its ongoing research, visit www.ninr.nih.gov. A PDF of NINR's booklet, *Changing Practice, Changing Lives: 10 Landmark Nursing Research Studies*, from which these capsule research stories were taken, is available on the site. For more information on any of the related health topics, also visit www.medlineplus.gov.

Then & Now:

Research Pays Off for All Americans

Mildred Ray Harrison was born in New Orleans on December 17, 1886, the youngest of nine brothers and sisters. She and her sister, Daisy, six years older, lived into their 90s. Their seven siblings – Claude, Stella May, Claudia, “infant daughter, unnamed,” Pearl, Stella Claudia, and May weren’t so lucky. Before their eleventh birthdays, each had died—taken victim by cholera, in childbirth or by yellow fever.

Thanks to advances in basic sanitation, public health and medical research, most Americans are immune to such tragedy today. But yesterday’s infectious diseases still claim the lives of tens-of-millions each year around the world, especially in developing countries. And they are accompanied by new, emerging scourges that threaten us all in the interconnected world of the 21st century.



Photos: Courtesy, Juanita Standiff Kuhn

The Fight against Infectious Killers in the Developing World

Public Health Enemy #1: Lower Respiratory Infections

Deaths Worldwide: 4 million people each year

Types: Pneumonia, influenza, and other related diseases

Treatment/Prevention: The best way to prevent seasonal flu is to get a flu shot every year. Stop germs by washing hands frequently, cover coughs and sneezes, and take anti-viral drugs, if prescribed.

Sources: Medlineplus.gov, Centers for Disease Control and Prevention, World Health Organization, Reuters AlertNet



Emergency hospital during 1918-19 influenza (“Spanish Flu”) epidemic, Camp Funston, Kansas. In 25 weeks, the Spanish Flu claimed up to 50 million lives worldwide, including 675,000 Americans.



Public Health Enemy #3: Malaria

Deaths Worldwide: 1 million to 2.5 million each year, with 300 million to 500 million new infections. About 60 percent of malaria cases and more than 80 percent of malaria deaths occur in Africa south of the Sahara. Children under five and pregnant women are especially at risk.

Treatment/Prevention: No vaccine; treated with drugs that interfere with the parasite's life cycle. Prevention is based on



avoiding exposure to Anopheles mosquitoes and aggressively treating infected people. If traveling where malaria is common, take anti-malarial drugs exactly as prescribed and prevent mosquito bites by closing windows at night, sleeping under insecticide-

treated mosquito nets, covering up your body as much as possible with clothing, and applying insect repellent to all exposed areas of the body.

Public Health Enemy #5: Tuberculosis

Deaths Worldwide: 2 million every year; 2 billion of world's 6.5 billion people are infected, with 8 million new cases reported annually. In 2006, 13,779 cases reported in the U.S., the lowest number since national record keeping began in 1953. Babies, young children and people with compromised immune systems, especially those with AIDS are particularly at risk.

Treatment/Prevention: The BCG-vaccine is the most commonly used preventative against TB in the developing world, but drug-resistant strains are on the rise. The internationally recommended approach to TB control uses health workers who closely monitor treatment to ensure that patients complete the full course of medication. This helps prevent new strains of drug-resistant TB from developing.

Public Health Enemy #2: HIV/AIDS

Deaths Worldwide: 2.1 million in 2007; 33.2 million living with HIV; 2.5 million newly infected, 1.7 million in sub-Saharan Africa, the region which remains most severely affected, with an estimated 22.5 million people living with HIV. Eight countries in this region now account for almost one-third of all new HIV infections and AIDS deaths globally.

Treatment/Prevention: There is no cure, but there are many medicines to fight both HIV infection and the infections and cancers that come with it. People can live with the disease for many years if receiving appropriate treatment.



Public Health Enemy #4: Diarrhea

Deaths Worldwide: 2.2 million a year, mostly due to dehydration from intestinal infections by bacteria, viruses or parasites, contaminated food and diseases that affect the digestive system. Young children are particularly at risk.

Treatment/Prevention: No vaccine; treated through Oral Rehydration Therapy, an inexpensive solution of salts and other substances administered orally. Prevented by sustainable access to safe drinking water and basic sanitation.

25 Years of GenBank

Unique DNA database has helped advance scientific discoveries worldwide

Since its origin 25 years ago, the database of nucleic acid sequences known as GenBank has become one of the key tools that scientists worldwide use to conduct biomedical and biologic research. Established by the National Institutes of Health (NIH) in 1982, GenBank has grown at an exponential rate, doubling in size every 18 months. In celebration of this vital resource and its contribution to science over the last 25 years, the National Center for Biotechnology Information (NCBI), National Library of Medicine (NLM), and NIH held a two-day conference on GenBank in April at the main NIH campus in Bethesda, MD.

“GenBank has been a critical research tool,” says NCBI Director David Lipman, “enabling much of the progress that has been made over the last two decades in understanding biological function and genetics. The value of the database will only expand as it continues to grow.”

The conference attracted a host of genetic research luminaries, included among them:

- Rich Roberts, Ph.D., a Nobel Prize winner for his discoveries of split genes, and currently Chief Scientific Officer at New England BioLabs
- Sydney Brenner, Ph.D., a Nobel Prize winner for his work on genetic regulation of organ development and programmed cell death, and currently a professor at the Salk Institute
- Francis Collins, M.D., Ph.D., who led the Human Genome Project and is Director of NIH’s National Human Genome Research Institute

- Craig Venter, Ph.D., who led the private-sector effort to sequence the human genome and is President of the J. Craig Venter Institute.

What Is GenBank?

Basically, GenBank is the biggest database of DNA in the world. Deoxyribonucleic acid (DNA) is the chemical compound that contains the instructions needed to develop and direct the activities of nearly all living organisms. DNA molecules are made of two twisting, paired strands, often referred to as a double helix.

The data in GenBank is provided by those who conduct the

“GenBank has been a critical research tool.”

sequencing, mostly individual labs and large-scale sequencing projects. GenBank exchanges data daily with its two partners in the International Nucleotide Sequence Database Collaboration (INSDC): the European Bioinformatics Institute (EBI) and the DNA Data Bank of Japan (DDBJ).

“GenBank has provided a foundation on which much of contemporary biology is now based,” says genetics researcher and Nobel Laureate Dr. Rich Roberts. “It is becoming almost impossible to conceive of any serious biological study of a new organism that does not begin with the determination of its DNA sequence, which of course must be stored in GenBank.”

Nobel Laureate Dr. Rich Roberts (left) chats with Dr. J. Craig Venter, who led the private-sector effort to sequence the human genome and is President of the J. Craig Venter Institute.



Nobel Laureate Dr. Sydney Brenner (left) discusses GenBank with Dr. Francis Collins (center), who led the Human Genome Project and is Director of NIH's National Human Genome Research Institute.



Dr. Betsy Nabel, Director of the National Heart, Lung, and Blood Institute (NHLBI), addressed those attending the GenBank anniversary conference.

To Find Out More

A good place to start for more information is the homepage for GenBank at www.ncbi.nlm.nih.gov/Genbank. Video webcasts of the two-day conference can be seen at the following Web sites: www.videocast.nih.gov/summary.asp?live=6670 www.videocast.nih.gov/summary.asp?live=6671



Dr. Donald A.B. Lindberg (center), Director of the National Library of Medicine, discusses GenBank with Dr. David Landsman (left), Chief of NCBI's Computational Branch, and Dr. Michael Gottesman, Deputy Director of Intramural Research at NIH.

Photos: Michael Spencer, NIH

The Place Where Hope Lives

**The Children's Inn
at NIH comforts kids
and their families**



Children need the comfort and security of their families—especially when they are being treated for a life-threatening illness far from home. The Children's Inn is a private, non-profit, family-centered residence at the National Institutes of Health campus in Bethesda, Maryland. The Inn offers a healing, supportive "place like home" for families participating in groundbreaking medical therapies at NIH. Our mission is to care for the heart, soul, and spirit of families during their most trying times.

Families stay at The Inn free of charge. During the past 18 years, nearly 8,600 seriously ill children and their families have made almost 40,000 visits there.


The Children's Inn at NIH

For more information, call (301) 496-5672 or toll free (800) 644-4660 or visit www.childrensinn.org.

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
- **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 Biological 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 niminfo@nih.gov
1-866-615-6464
- **National Institute of Neurological Disorders and Stroke (NINDS)** www.ninds.nih.gov
braininfo@ninds.nih.gov 1-800-352-9424
- **National Institute of Nursing Research (NINR)**
www.ninr.nih.gov (301) 496-0207

Centers & Offices

- **Center for Information Technology (CIT)**
www.cit.nih.gov (301) 594-6248
- **Center for Scientific Review (CSR)**
www.csr.nih.gov (301) 435-1115
- **Fogarty International Center (FIC)**
www.fic.nih.gov
- **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 Research on Women's Health (ORWH)**
http://orwh.od.nih.gov (301) 402-1770

NIH MedlinePlus Advisory Group

Marin P. Allen, Ph.D., Office of Communications and Public Liaison, NIH

Christine Bruske, National Institute of Environmental Health Sciences

Vicky Cahan, National Institute on Aging

Kym Collins-Lee, National Eye Institute

Kate Egan, National Institute of Mental Health

Marian Emr, National Institute of Neurological Disorders and Stroke

Susan Johnson, National Institute of Dental and Craniofacial Research

Mary Beth Kester, National Institute of Biomedical Imaging and Bioengineering

Kathy Kranzfelder, National Institute of Diabetes and Digestive and Kidney Diseases

Carol Krause, National Institute on Drug Abuse

Lonnie Lisle, National Institute on Deafness and Other Communications Disorders

Ann London, National Institute of Allergy and Infectious Diseases

Richard E. Manrow, Ph.D., National Cancer Institute

John McGrath, Ph.D., National Institute of Child Health and Human Development

Gregory Roa, National Institute of Alcohol Abuse and Alcoholism

Dennis Rodrigues, Office of Communications and Public Liaison, NIH

Diane Striar, National Heart, Lung, and Blood Institute

Chris Thomsen, National Center for Complementary and Alternative Medicine

Larry Thompson, National Human Genome Research Institute

Anne Thurn, Ph.D., Office of Dietary Supplements

Marcia Vital, National Institute of Arthritis and Musculoskeletal and Skin Diseases

Down the Block . . . Around the World . . . MedlinePlus.gov

A Free Subscription to NIH MedlinePlus, the Magazine

No matter where you are in the world, www.medlineplus.gov is your best global source for free, accurate, understandable health information. With more than 120 million unique visitors and almost 1 billion page views a year, www.medlineplus.gov already attracts millions of people all over the world for its trusted, up-to-date health information.

A free subscription to *NIH MedlinePlus*, the Magazine, is your guide to the latest medical research and health care information at www.medlineplus.gov.

While online, visit the National Library of Medicine's newest exhibition, "Against the Odds: Making a Difference in Global Health." Learn more at www.nlm.nih.gov.



MedlinePlus.gov



To receive your free subscription, fill out a subscription card from this issue (or write your name and full mailing address on a piece of paper) and mail to Friends of the National Library of Medicine, 2801 M Street, N.W., Washington, DC 20007 or, fax the information to (336) 547-0768 or e-mail to Traci.Marsh@vitality.com or, find a subscription form at www.nlm.nih.gov/join.pdf.