



Scientists urge action on drug-resistant malaria p. 3

FOGARTY INTERNATIONAL CENTER • NATIONAL INSTITUTES OF HEALTH • DEPARTMENT OF HEALTH AND HUMAN SERVICES

Fogarty launches environmental research hubs

Contaminated air, water, soil and food cause untold numbers of illnesses around the world each year. The problem is particularly acute in developing countries, where exposures to indoor air pollution from cooking fires, pesticides, radiation, tainted water and climate change contribute to nearly a quarter of all deaths and illnesses. In addition, workers globally face many occupational risks such as injuries and contact with hazardous conditions.

Many low-resource countries lack the expertise to study the linkages between these risk factors and disease. To rectify this, Fogarty is launching the Global Environmental and Occupational Health (GEOHealth) program, in partnership with the NIH's National Institute of Environmental Health Sciences and the CDC's National Institute for Occupational Safety and Health.

Photo by Greg Allgood/PhotoShare



Fogarty's new program is intended to curb environmental and occupational illnesses in developing countries.

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Fogarty celebrates 25-year-old HIV/AIDS program

Twenty-five years ago, Fogarty embarked on a brave experiment—to see if it was possible to train a generation of developing country scientists capable of leading world-class research efforts in their home countries. Prompted by the devastating HIV/AIDS epidemic, Fogarty's leadership realized the importance of empowering local experts to study how the disease was being transmitted in their cultures and how best to tailor approaches to halt it.

Today, the research landscape is transformed. Fogarty's AIDS International Training and Research Program (AITRP) has played a vital role in preparing as many as 2,000 developing country researchers to contribute to landmark discoveries in the HIV/AIDS field. From proving antiretroviral adherence is possible in low-resource settings, to learning to prevent mother-to-child transmission, to cutting-edge work on microbicides and circumcision, Fogarty's trainees have been at the forefront.

In celebration of these and other successes—as well as to review the challenges that remain—Fogarty held a meeting recently with the program's primary investigators, trainees and program directors.

"The AITRP has had a huge impact," said Fogarty Director Roger I. Glass. "It's really heart-warming. This is a relatively small program, but it has really counted in building the cadre of researchers who have helped bring the scientific discoveries that turned HIV/AIDS from a lethal disease to a chronic, manageable one." He added that the brainchild behind the AITRP, Dr. Ken Bridbord, and its main manager today, Dr. Jeanne McDermott, have "really made it work."

Now the program is entering its next phase, combining with another implementation effort and being recast as Fogarty's HIV Research Training Program. New Fogarty-sponsored

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FOCUS



Transforming Africa's medical education

- Strengthening and expanding curricula
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\$14M awarded for chronic disease research training

To counteract the rapid rise of chronic diseases in developing countries, Fogarty has awarded \$14 million in grants to 15 research institutions. Its Chronic, Non-Communicable Diseases and Disorders Across the Lifespan (NCD-Lifespan) program will fund training in research areas related to non-communicable health problems,

with the ultimate goal of producing locally relevant, evidence-based interventions.

Training will cover a diverse range of subjects, including a trauma and injury project in Uganda, a substance abuse effort in Ukraine, and courses on nutrition and chronic diseases in Ghana, Malawi and Bangladesh. Other projects will focus on improving mental health infrastructure in Southeast

Asia, training in China related to gene-environment interaction and an implementation sciences institute in

Mexico and India. Training in Kenya will concentrate on cancer and tobacco control. Finally, a planning grant will support cardiovascular research training in India with a focus on biostatistics and modeling.

Chronic disease deaths are projected to increase by at least 20 percent in Africa and Southeast Asia by 2020, according to the WHO. In 2008, more than two-thirds of cancer deaths and over 80 percent of deaths from cardiovascular disease and diabetes occurred in low- and middle-income countries.

Fogarty's NIH funding partners for the awards include the National Cancer Institute, National Institute on Aging, National Institute on Alcohol Abuse and Alcoholism, National Institute on Drug Abuse and National Institute of Mental Health.

RESOURCES

Full awards list: <http://1.usa.gov/U9bgZC>

Program website: <http://1.usa.gov/VUYj6k>

Photo by David Snyder for Fogarty/NIH



NIH, Wellcome fund \$38M in African genomic studies

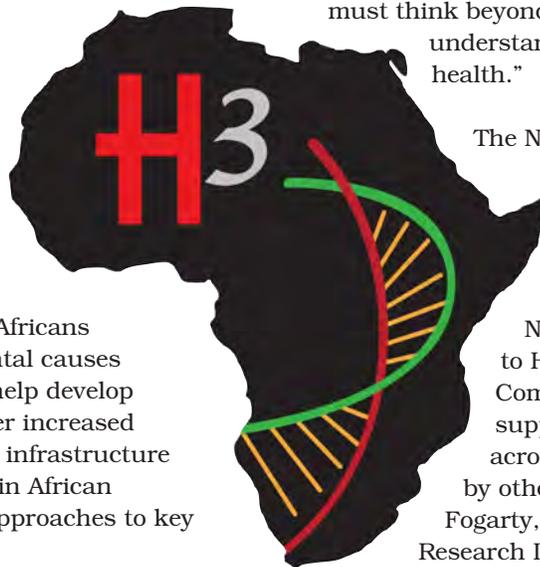
African scientists will conduct genomic research on kidney disease, diabetes, heart disease, obesity, tuberculosis and sleeping sickness through inaugural grants of the Human Heredity and Health in Africa Consortium (H3Africa).

The NIH and Wellcome Trust, funding partners for the project, are awarding up to \$38 million over five years for the genomics research projects as well as to develop an African bioinformatics network and support two pilot biorepositories that can be used for future scientific investigation.

H3Africa aims to improve the health of Africans via studies of genomics and environmental causes of common diseases. The program will help develop expertise among African scientists, foster increased collaboration among them, enhance the infrastructure for genomics research in Africa, and train African researchers in contemporary genomic approaches to key health problems.

"H3Africa aims to transform the way science is conducted in Africa, by creating a sustainable research infrastructure and catalyzing the use of advanced genomic technologies to improve our understanding of a variety of diseases," said

NIH Director Dr. Francis S. Collins. "This is particularly relevant because Africa is the original cradle of all humanity, and in this era of expanded global travel and communication, it is becoming increasingly clear that we must think beyond our borders when it comes to understanding human biology and improving health."



The NIH has committed \$25 million of support over five years, contingent on the availability of funds, and Wellcome Trust has pledged almost \$13 million over five years. More than half of NIH's fiscal year 2013 contribution to H3Africa comes from the NIH Common Fund, a program created to support multi-disciplinary programs across NIH. H3Africa is also supported by other NIH components including Fogarty, the National Human Genome Research Institute, National Institute of Allergy and Infectious Diseases, Eunice Kennedy

Shriver National Institute of Child Health and Human Development, National Institute on Drug Abuse, National Institute of Neurological Disorders and Stroke, and NIH Office of AIDS Research.

Resistance to malaria drugs is a growing concern

Photo by Cameron Taylor/PhotoShare



There are ominous signs that drug-resistant malaria is emerging on the Thai-Cambodian border, scientists report. If this trend continues to spread and intensify, millions of people will have no malaria treatment options left.

This startling prospect prompted Fogarty and the NIH's National Institute of Allergy and Infectious Diseases to convene the world's experts to examine the problem, identify possible approaches, spark collaborations and spur the field to take action.

A meeting report, published recently in the *American Journal of Tropical Medicine and Hygiene*, details the stakeholders' discussions about the causes of drug resistance and suggestions for combating them. The widespread use of monotherapies—malaria drugs in which artemisinin is the only active ingredient—together with the prevalence of poor-quality, including fake, malaria drugs are the main culprits, they agreed. Participants identified several priorities for action, including robust surveillance of resistance, modeling to enable emergency planning if resistance becomes widespread, advocacy to improve drug quality and discourage use of monotherapies, improved mosquito control and ongoing research to produce new antimalarials.

That the *Plasmodium falciparum* parasite, which transmits malaria, would find a way to survive artemisinin treatment, as it has other antimalarials, was feared from the start. The drug delivers a powerful but short-lived punch, so to kill lingering parasites it must be combined with other compounds. In 2006, the WHO recommended that artemisinin monotherapy be eliminated.

“Although some countries have enforced the ban, many pharmaceutical companies continue to produce and distribute a variety of artemisinin monotherapies to malarious countries with few regulatory obstacles,” the scientists wrote in their review.

Stakeholders at the conference discussed several hurdles to keeping artemisinin effective. First, detecting resistance is no easy matter. Tests typically measure how much parasite remains in the blood 72 hours after treatment begins but do not always take into account differences in initial densities, the presence of acquired immunity, the microscopist's skill and contributions from other antimalarial drugs. Although seven-day tests are more accurate, patients have already embarked on standard treatments by then, potentially facilitating the growth of resistant parasites.

Research needed to address artemisinin resistance

1. Discover the mechanisms of artemisinin action and parasite resistance.
2. Conduct *in vivo* parasite clearance studies for monitoring and surveillance.
3. Develop new antimalarial drug response assays.
4. Discover molecular markers for resistance.
5. Create low-cost rapid tests to measure drug quality.
6. Discover treatments that kill artemisinin-resistant parasites and block transmission to mosquitoes.
7. Discover new partner drugs for combination with artemisinins to treat malaria.
8. Build models to estimate impact of artemisinin resistance spread to aid emergency response planning.

Researchers have not established exactly how artemisinin kills *P. falciparum* and how resistance builds. Mounting data suggest that a fraction of the parasites enter a dormant state when exposed to the drug; these survive and eventually replicate. Molecular markers being developed should facilitate large-scale surveillance to pinpoint where resistance is building and also give important insight into the mechanisms of artemisinin drug action and resistance. Genomic studies have identified candidate genes involved and further investigations will likely throw light on the parasite's interactions with artemisinin and other antimalarials.

In another approach, researchers in more than 50 projects are investigating compounds that might work against malaria where other drugs fail. Yet, any promising candidates will need years of testing for safety and efficacy before they can be delivered to clinics, the authors write.

Conference participants urged the use of mathematical modeling to identify where policymakers should require malaria control and elimination actions. They also said it's imperative to tackle the high prevalence of substandard and counterfeit antimalarials, along with stopping the continued illegal sale of monotherapies, both of which undermine artemisinin's effectiveness.

“Advocacy efforts to improve awareness and funding are needed to support the long- and short-term goals of malaria elimination so that this vital enterprise can continue unabated,” the scientists stated.

RESOURCES

Full report: <http://1.usa.gov/SLWQgk>

New, faster TB tests

The time it takes to diagnose a patient with tuberculosis (TB) is a matter of life and death in many parts of the world. Testing methods can take weeks and patients remain untreated and contagious in the meantime. But a new test developed with NIH support promises results in under two hours, so the patient can receive medicine the same day. It also reveals whether the patient harbors drug-resistant bacteria and needs special treatment.

TB is widespread, with a third of the world's population infected. Most people remain well, but those with weakened immune systems, such as HIV/AIDS patients or under-nourished children, can become seriously ill. In 2010, about 1.4 million people died of TB, primarily in developing countries.

Currently, health care workers detect TB by various methods, depending on resources, ranging from physical examinations to chest X-rays to blood or sputum tests. The NIH and the Bill and the Melinda Gates Foundation funded research to find a test that was quick, able to screen for multi-drug resistance and automated to limit human error. Rather than starting from scratch, the scientists adapted a test developed several years ago to detect anthrax sent through the U.S. Postal Service.

"We wanted a highly sensitive molecular test" that would be speedy, simple and detect multidrug-resistant TB, said Dr. Mark Perkins, chief scientific officer at the Foundation for Innovative New Designs (FIND), which is funded by Gates and produced the new TB test. Perkins, a former research

Fogarty launches environmental research hubs

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GEOHealth is intended to create regional hubs for collaborative research, data management, training and policy support regarding environmental and occupational health research in low- and middle-income countries. To support planning for the hubs, \$3.2 million is being awarded in two-year grants for activities in more than 15 countries. Each hub will be managed by a pair of institutions—one from the U.S. and one from the host country—with both receiving direct awards.

The GEOHealth projects cover a wide range of topics that build on existing strengths within the consortia and tackle local priority health needs. The planning grants will allow partners to conduct needs and opportunities assessments, prepare for policy-relevant research and training, and foster partnerships that can be sustained through the program's next phase. The multidisciplinary centers will lead collaborative research and training in fields such as epidemiology, biostatistics, genetics, environmental science, industrial hygiene, systems science, toxicology, behavioral science and implementation science.

Photo by David Snyder for Fogarty/NIH



A fast, new diagnostic test, developed with NIH support, will help prevent TB deaths.

fellow at the National Institute of Allergy and Infectious Diseases, spoke recently at the NIH.

Perkins and his team came up with Xpert MTB/RIF, an automated nucleic acid amplification test that comes in a self-contained, cartridge-based platform. From a sputum sample, it detects *Mycobacterium tuberculosis* and pinpoints if it has drug resistance. Resistance is particularly problematic, because if it is undetected, patients receive inappropriate medicines.

The WHO endorsed the new test, predicting it would triple the diagnoses of resistant-TB and double the diagnoses of TB/HIV cases in high-rate areas. The test was initially priced at \$18, but now has come down to \$10.

The lecture was sponsored by the Trans-NIH Global Health Working Group, formed to highlight opportunities for innovative research that will benefit low-resource countries.

A hub in Bangladesh will focus on water contamination, indoor air pollution caused by cooking and heating fuels, and urban smog. A consortium in Ethiopia will target not only indoor and outdoor air quality, but also climate change and occupational health with an emphasis on agriculture. Meanwhile, in Uganda, food safety and hygiene, water quality, work-related injuries and health worker exposure to biological contaminants are the subjects of interest.

In the remote and heavily deforested jungle of Peru's Alto Mayo region, a multidisciplinary team will study the quality and safety of traditional medicines prepared from native plants, among other subjects. A collaborative effort in Suriname will examine the effects of environmental contamination on indigenous medicinal plants and the detrimental impact of gold mining on fish and other local food sources.

RESOURCES

Complete list of awards: <http://1.usa.gov/PaFXN9>

Research evidence key to health policy decisions

More effective types of research evidence—or “briefs”—are needed to better inform health policy decisions, according to Dr. John Lavis, a knowledge transfer and public policy expert who spoke recently at the NIH. Lavis described the challenges to using research evidence in policy decisions, including institutional or economic constraints, evidence that isn’t easy to use or relevant, or policymakers not valuing evidence as an information source.

Often, research evidence must compete with other factors in the decision-making process. For example, researchers and clinicians in Uganda face cultural challenges to implementing circumcision programs for HIV prevention. “There have been so many times when a researcher has claimed to have a significant finding without taking into account ethnographic or religious considerations,” said Lavis. “We must find the most effective way forward given the circumstances and the setting.”

Lavis also cited gloomy economies as a factor that can affect evidence’s impact on policy. “Recessions change what’s possible and what’s not,” he said.

However, new approaches being developed to meet these challenges are cause for optimism, said Lavis. They include workbooks, clearinghouses of policy-relevant documents, training for stakeholders and rapid response services

Photo by Jeff Gray/Fogarty



Dr. John Lavis says health policymakers need to incorporate relevant, high-quality scientific evidence in their decision making.

that can deliver research evidence. He recommended regular dialogue among stakeholders, researchers and policymakers, with an evidence brief serving as the starting point for deliberations.

Lavis is a professor at both the Harvard School of Public Health and Canada’s McMaster University. He co-created and oversees Health Systems Evidence, a nonprofit online repository. The database is considered the world’s most comprehensive free-access source for high-quality evidence on how to improve health systems and provide cost-effective programs, services and drugs to populations in need.

The lecture was sponsored by Fogarty’s Center for Global Health Studies in collaboration with the National Cancer Institute’s Center for Global Health and the Pan American Health Organization.

RESOURCES

Health Systems Evidence website: <http://bit.ly/tOSU07>

Coca-Cola funds Russian scientists to study at NIH



The Coca-Cola Company has announced it will sponsor Russian scientists to come to the NIH for postdoctoral training, as part of the Biomedical Sciences Fellowship Program managed by Fogarty and the Foundation for the NIH.

The program was established by the 2009 U.S.-Russia Bilateral Presidential Commission to enhance relationships between the two countries. Funded by the State Department and private sources, the program supports postdoctoral students during quality mentored education, either in Russia or in an NIH laboratory. Fellows and

their U.S. colleagues are encouraged to nurture long-term scientific collaborations.

“We are delighted to welcome Russian scientists to the NIH campus for this wonderful opportunity to stimulate enduring research partnerships between our countries,” said Dr. Roger I. Glass, Fogarty director. “Since our populations share many of the same chronic health problems—heart disease, stroke, cancer and alcohol-related issues—by working together we hope to speed discoveries that will benefit everyone.”

RESOURCES

Press release: <http://bit.ly/S2CHyu>

HIV/AIDS research must focus on a vaccine or cure

In the last quarter century, scientists have discovered many ways to battle HIV/AIDS, but now need to develop a vaccine or a cure to finish the war. With 34 million people currently infected and new cases occurring at nearly 3 million a year, the virus is still a formidable foe.

“There is no doubt a vaccine is required if we are to deal with this epidemic,” Dr. Myron S. Cohen, Fogarty grantee at the University of North Carolina, said recently in an NIH Director’s lecture. “Now is not the time to rest on your laurels. It’s the time to really invest.”

Many approaches have reined in the spread of HIV. Steps to prevent mother-to-child transmission, male circumcision advocacy and safer sex education programs have all brought remarkable success, Cohen suggested. Also encouraging are the landmark treatment-as-prevention studies that proved the benefits of antiretroviral therapies for preventing transmission.

Extending the number of people tested and treated will further reduce the spread of infection, he noted. New products in development include faster assays for clinics and home screening tests. Researchers are working on new antiviral agents, as well, although developing them remains a challenge.

While progress continues on the treatment and prevention fronts, NIH researchers need to push even further to stop HIV/AIDS completely, Cohen urged. Research at the NIH toward a vaccine and cure is not “wishful thinking,” he said, but holds a real possibility of success.

RESOURCES

Videocast: <http://1.usa.gov/QJKIM3>

NIAID’s HIV/AIDS website: <http://1.usa.gov/Rcrhsq>

Fogarty celebrates accomplishments of 25-year-old HIV/AIDS program

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Photo by Jeff Gray/Fogarty



Fogarty grantees and collaborators met to celebrate the 25th anniversary of the Center’s AIDS research training program.

projects will focus on building or strengthening capacity in a particular scientific or critical research infrastructure area of importance to a developing country.

Program directors and trainees at the meeting warmly recounted how AITRP led to so much more than increasing academic knowledge in select trainees. Alumni returned home and passed on what they learned to expanded numbers of additional trainees. Relationships among those involved in the program, including the U.S. partners, have continued. And many former trainees are now policymakers themselves, not only in the HIV/AIDS arena but also in global or public health institutions.

One former AITRP trainee with an impressive track record is Dr. Patty Garcia. A professor and researcher at Cayetano Heredia University in Lima, Peru, she was the first woman to serve as chief of Peru’s National Health Institutes. From a single Fogarty grant, the university has built a diverse research portfolio and competed successfully for about 20 NIH grants and contracts. “AITRP has changed our lives,” Garcia commented. “It has given capital to institutions that will keep building more collaborations as we go forward.”

Although AITRP is widely acclaimed now, when it was launched the concept of developing research capacity in low-resource settings seemed a risky proposition to some. “My initial reaction was, it’s just pie in the sky,” recalled AITRP grantee Dr. Quarraisha Abdool Karim, of Columbia University, the University of KwaZulu-Natal and CAPRISA (Center for the AIDS Programme of Research in South Africa). However, she said, it has transformed the landscape, producing HIV/AIDS research that opened the door to new approaches to treatment and prevention.

She reminded the audience that the battle against HIV/AIDS is far from won and research needs to focus on producing a vaccine, reaching untreated populations and integrating the treatment of HIV and its co-infections.

As attendees at Fogarty’s meeting concurred, AITRP established a worthy blueprint for future funding programs that they hope and believe can help bring to an end the HIV/AIDS epidemic.

AMBASSADOR MARK R. DYBUL, M.D.

In his role as US Global AIDS Coordinator from 2006 to 2008, Ambassador Dybul helped create and implement the President's Emergency Plan for AIDS Relief (PEPFAR), the largest international health initiative launched for a single disease. Today, PEPFAR's mandate expands beyond HIV/AIDS. It supports the Medical Education Partnership Initiative (see related article on page 8). Dybul is now co-director of the Global Health Law Program at Georgetown University's O'Neill Institute for National and Global Health Law and a fellow at the George W. Bush Institute. Below are comments he made in a recent NIH address.



How has PEPFAR contributed to progress against HIV/AIDS?

Therapy for HIV/AIDS in 2003 was for 50,000 people; we are now at over 8 million in low- and middle-income countries, over 6 million of those are in sub-Saharan Africa. The reduction in HIV rates has been equally dramatic. There has been a more than 25 percent reduction in HIV rates in 33 countries in 10 years; 22 of those are in sub-Saharan Africa. We've seen dramatic reductions in young people, mostly because of behavior change. But we've also had significant reductions through medical advances, for instance in the reduction of mother-to-child transmission and the rise in male circumcision—which has an onward benefit towards women. We are approaching 25 million lives saved with antiretroviral therapy.

How is the effort expanding?

HIV has shattered the myth that . . . people in Africa couldn't do anything as complicated as [deliver] anti-retroviral treatment. We can now start layering in [treatment for] non-communicable diseases, and other chronic diseases, because the structure is there. That's why we shifted from this individual disease focus to the health of a person. You can spread out from this and other platforms that have been built, to deal with chronic disease management. Non-communicable diseases were responsible for 36 of the 57 million world deaths in 2008; it's about the same now. About 29 percent of the deaths in low- and middle-income countries occur before the age of 60. They're heavily concentrated in Africa, which is disturbing to some degree but also exciting, because we know if we concentrate our efforts in a geographical area, we can have a disproportionate impact across multiple diseases, not just one.

PEPFAR has contributed to reducing cervical cancer, which affects 530,000 women per year and kills 275,000 of them. Eighty-five percent of cases are in developing countries. The reason for that is there isn't a lot of screening, but also because it's very linked to HIV/AIDS. Women who are HIV-positive not only get a more aggressive form of the cancer, they get it at a much younger age. In Africa, we're seeing teenagers die from cervical cancer because they're HIV-

positive . . . The good news is that there are very low cost interventions that would stop the vast majority of those [cervical cancer deaths].

What are some of the barriers?

Those providing technical support to countries for HIV/AIDS include bilaterals, academics, international institutions, academic national and international UN agencies, private partners, private donors, foundations, civil society, technical contractors—local and international. None of them talk to each other. None of them work very well with the countries or even ask the countries what they need. They are not responding to the countries but to what they want to do. And then if you talk to the countries, you get a lot of complaints about this whole system, because it doesn't actually fulfill their needs, it's uncoordinated, it's duplicative, it wastes money, and in the end, it costs lives.

What do you recommend?

The only way we are going to move forward is with country ownership, a results-based approach, good governance—which is not about corruption but using the money you have well, getting the best outcomes for the resources you have available—and having all sectors engaged. This last one is critically important because, in the end, global health and development aren't going to happen government-to-government and they're not going to happen government alone. They're going to happen with government, the private sector, nongovernmental-based organizations [working together]. It's going to be important to have religious leaders and tribal leaders involved. But if you don't engage all sectors, you're not going to make progress.

The current model of just asking taxpayers in the North to fund programs in Africa and Asia is over. It's not going to happen much longer. Unless there's a co-investment, unless we come up with innovative financial schemes, like a health bond and other things. But the opportunity for co-investment is huge and we're already starting to see it, where Africans and other countries are providing half the resources already for HIV/AIDS. So we've come a long, long way.

Africa transforms its medical education

Sweeping changes are taking hold in sub-Saharan Africa to dramatically transform medical education. Universities are broadening the subjects covered, recruiting and retaining well-qualified faculty, employing state-of-the-art teaching tools, developing regional training centers and upgrading technology to enable distance learning and resource sharing among institutions.

Driving this movement is the U.S.-funded Medical Education Partnership Initiative (MEPI), launched two years ago to increase the quality, quantity and retention of health care workers and the faculty needed to train them. The program is investing about \$130 million over five years through direct awards to African institutions in a dozen countries. Funded by the U.S. President's Emergency Plan for AIDS Relief and the NIH, MEPI is co-administered by Fogarty and the Health Resources and Services Administration.

"I've never seen this kind of enthusiasm and excitement," said Dr. Nelson Sewankambo, who manages the MEPI award to his institution, Uganda's Makerere University, and heads the council of his MEPI peers. "The initiative has brought an unprecedented opportunity. It has really gotten people very interested in doing something about medical education with the purpose of improving people's health on the continent."

MEPI stakeholders recently met in Ethiopia to assess progress. Fogarty Director Dr. Roger I. Glass said the awards are proving to be catalytic. "This program really

Medical Education Partnership Initiative (MEPI) grantees and collaborators met recently in Ethiopia to review progress made in the program's first two years.



Photo by Richard Lord for Fogarty/NIH



A dramatic transformation of sub-Saharan medical education is being fueled by funds from the U.S. government, including the NIH. The initiative is raising the quality and quantity of health care workers and devising ways to keep faculty on staff.

is a game-changer, opening a door for universities and hospitals to be creative in how they move ahead in medical education and science. Governments now see medical education as a priority for their countries."

Unlike many programs for lower- and middle-income countries, MEPI directly funds African grantee institutions. This encourages local ownership and allows each country to adapt the program to suit its unique resources and health needs. Grantees are required to collaborate with their national ministries of health, education and finance to ensure goals are aligned with country priorities and to sustain progress over time.

"This has been something wonderful," said Dr. James Gita Hakim, who runs the University of Zimbabwe's MEPI. "African institutions have been empowered not just administratively but financially."

All the sites have ramped up recruitment of faculty and have dramatically increased the number of students in their programs. Under MEPI, grantees partner with high-income country institutions, which offer expertise and advice during the transition.

"I am particularly impressed by the ownership and sense of teamwork the principal investigators are developing," said Dr. Joseph C. Kolars, of the University of Michigan Medical School, a partner in Ghana's MEPI project. "Leadership of the African medical schools is in the driver's seat, directing, shaping and managing medical education. This is a different funding model."

Strengthening medical curricula

MEPI has led to a fundamental change in the way African institutions and government leaders approach medical education, project leaders said. Traditionally, teachers were physicians or nurses who passed along their knowledge

This story is by Cathy Kristiansen

Some of the comments in this article came from a video series "Voices of Change," sponsored by the Network of African Medical Librarians and Deans.

Courtesy of the MEPI Coordinating Center

FOCUS ON MEDICAL EDUCATION PARTNERSHIP INITIATIVE

without further specialized training and with little consultation outside their departments. Students received didactic instruction via lectures but often lacked hands-on experience in skills labs and access to up-to-date online information and learning tools.

Through MEPI, grantees are pursuing entirely new educational approaches. “Now, we see medical education as a whole profession by itself. I think by the end of the program, we are going to have a really strong faculty, much stronger than any of us had imagined,” said Zimbabwe’s Hakim.

Institutions are changing curricula content and format, plugging education gaps and expanding the breadth and depth of subject matter—mostly in medicine, but also in nursing and dentistry in some countries. Participants are incorporating more multimedia resources, including grand rounds lectures by experts, procedure demonstration videos and current online journal articles. By using technology to network medical schools together, teaching tools can be shared, ensuring all students receive high-quality instruction, including those in training at rural sites.

“This program really is a game-changer, opening a door for universities and hospitals to be creative in how they move ahead in medical education and science.”

— DR. ROGER I. GLASS, Fogarty director

The University of Nairobi, for example, is expanding hands-on learning with MEPI resources. It has equipped a new multidisciplinary skills lab so students can practice procedures—including episiotomy repair, lumbar puncture, blood pressure measurement and catheterization—on dummies before attempting them

Students in Ghana learn emergency medicine using skills laboratory models. MEPI funds are contributing to new lab equipment, curricula, multimedia resources, research projects and other education-enhancing changes.



Courtesy of Komfo Anokye Teaching Hospital, Ghana



Courtesy of Photoshare/Lisa Bosallo

Africa suffers a quarter of the world’s disease burden but has only 3 percent of its physicians. MEPI-funded institutions are building capacity for medical education, both in cities and in rural areas where most of the population lives.

on humans. For the first time, the university is integrating distance learning as an option. It estimates 20,000 nurses can earn advanced degrees at their work stations rather than by traveling to Nairobi to attend classes.

In Durban, South Africa, the epicenter of the HIV/AIDS epidemic, the University of Kwa-Zulu Natal (UKZN) is expanding its approach to the disease. For instance, it’s introduced basic science courses in HIV virology, diagnosis, immunology and pathogenesis.

To prepare final year students to confidently treat HIV/AIDS patients, bridging the gap between theory and application, the university designed an HIV enrichment workshop that includes case studies, clinical guidelines and government policies. Reaching out to health workers, UKZN packaged a series of workshops to enhance sensitivity about HIV/AIDS. Called “Me and HIV,” the workshops examine the myths, realities, attitudes and perceptions of HIV/AIDS, prevention strategies and how to help people learn to live with their condition.

Broadening to include chronic health problems

Because of its high burden of infectious diseases, sub-Saharan Africa has focused its medical training on that area. However, MEPI seeks to develop much-needed expertise in other health fields—such as emergency medicine, surgery and maternal and child health—and also tackle the rising tide of chronic problems, including cancer, heart disease and mental health disorders.

For instance, Zambia suffers from high rates of maternal and neonatal deaths, which UNICEF estimates at 590 mothers and 3,400 newborns per 100,000 births. The University of Zambia is taking steps to lower these deaths,

not only by improving medical training in general but also by developing clinical care guidelines for neonatology, certifying more trainers in emergency obstetrics and newborn care, and setting up monitoring and evaluation systems to identify problems that need the most urgent action.

The university arranged monthly inter-departmental meetings, which have already brought results. Faculty took up the issue of hypothermia in neonates transported from the delivery room to the intensive care unit. This led to better swaddling of the babies and fewer deaths. A study of maternal care prompted closer monitoring of blood bank stocks, reducing deaths from postpartum hemorrhaging.

In Uganda, Makerere and Mbarara universities are tackling cardiovascular disease. They've introduced specialized faculty training, new courses with related research components and more facilities, such as a cardiac catheterization laboratory. So far, nearly 300 students have taken these targeted courses and several have launched research projects, for instance, on the pathogenesis and progression of heart disease and air pollution's effect on lung function.

HIV-associated malignancies, which are severely under-diagnosed, are a MEPI focus at the University of Malawi. Aside from training scientists in surveillance, the university is preparing more histopathologists—experts in the study of organ tissue. It's also instructing pharmacy technicians and nurses on how to handle chemotherapy drugs and is training physicians to do biopsies of Kaposi's sarcomas.

“Universities must not act in isolation as if we know it all, but work with relevant government departments so that the plans of those ministries can be brought to bear.”

— DR. NELSON SEWANKAMBO, Uganda MEPI project leader

“MEPI seems to have a snowballing effect,” said Malawi project leader Dr. Johnstone Kumwenda. His institution sent two trainees to learn pathology at UKZN. “We can see people are now hungry to get into pathology training. If you provide the opportunities, people will grab them.”

A neglected medical field in many African countries is mental health. With only one psychiatrist on faculty, the University of Zimbabwe devoted some MEPI funds to develop additional mental health expertise, in collaboration with institutions in the U.S., U.K. and South Africa. The university now has three psychiatrists, including one specializing in children, and student enrollment in mental health courses has risen significantly.

Photo by Richard Lord for Fogarty/NIH



By conducting medical research, faculty can enhance their work satisfaction and career achievements, so are less likely to leave their jobs. Research findings also contribute to locally relevant health knowledge.

Ghana's MEPI project focuses on emergency medicine, the first such program in West Africa. In a multi-pronged approach, Kwame Nkrumah University is working with five other training centers to develop medical and nursing curricula and training in handling injury and acute medical illness. Participants are learning emergency medicine research methodology, administration and management.

Focusing on faculty

All MEPI institutions are moving to counter the brain drain of faculty and medical personnel that has plagued African health sectors. A key approach is to build a quality research infrastructure at medical schools and allow faculty protected research time. This can keep staff engaged, nurture professional growth and help tether them to their positions.

MEPI partners also recognize the synergy between research, education and patient care, with robust activity in each aspect improving the quality of the whole. By encouraging research, medical schools not only provide career paths for investigators, but also generate discoveries about local health problems that inform health authorities in the country and across the region. “This is a critical aspect of the effort,” said Dr. Myat Htoo Razak, who oversees Fogarty's engagement in MEPI. “Locally relevant research is essential for evidence-based health services and policy decisions.”

With MEPI funds, the University of Nairobi developed three research-oriented programs, including a year-long, mentored fellowship in implementation science, a career development award in clinical research and a dozen small faculty research grants. It also offers grant proposal writing

classes to help broaden dissemination of research findings. “We want to increase the number of these that people write that get published in peer-reviewed journals,” said Dr. James Kiarie, project leader at Kenya’s University of Nairobi. “Currently it is less than 1 percent. We want to increase that to 50 to 60 percent. We initially felt not so many people would be interested, but the response has been overwhelming.”

In Mozambique, the Universidade Eduardo Mondlane is using MEPI funds and advice from partners at the University of California, San Diego to establish an infrastructure for research. It’s building laboratories and offering courses in methodology, grant proposal and paper writing. “If physicians are able to write research grants and get funded, they will feel professionally happy and will be able to improve conditions in the work place. They get incentives to improve their salaries and increase their knowledge,” said project leader Dr. Emilia Noormahomed.

In Nigeria, the University of Ibadan is making some funding available to postgraduate students, resident doctors and junior faculty as a way to spark interest in research careers. Funded projects include local health studies on the hepatitis E virus in pigs and humans, and HIV’s impact on infant hearing.



Dr. Nelson Sewankambo (on right), who runs Uganda’s MEPI project and leads a council of his peers, teaches up-to-date curricula to a growing number of Ugandan medical students.

Establishing rural training sites

Most of Africa’s population lives in rural areas, yet health care workers are located overwhelmingly in urban centers. Persuading staff to move far from the cities, to live and work in relative isolation, has long been a challenge. To fix this, universities are building rural residency requirements into medical curricula, collaborating with government officials to improve rural staffing levels, technology and living conditions, and are developing remote training centers for local students, who’re more likely to remain in their home communities once qualified.

Faculty in South Africa are collaborating with the national health department to develop training sites in five villages as part of a rural teaching network. The sites will incorporate e-learning materials, video conference links, Internet access and other distance learning aids. Medical students training in urban centers must perform community service by identifying a disadvantaged population, such as orphans or the homeless, and choosing an activity to improve their condition.

Some populations are so remote that the students and faculty need to reach them by small plane to bring them medical attention. “It is an innovative way to use modern technology to take the medical schools to the rural areas and to make these areas attractive to trainees,” said Dr. Umesh Laloo, project leader at UKZN.

Uganda made a bold move to embrace far-flung areas in its training plans, priming 95 new rural sites to offer standardized curricula. Meanwhile, Kenya is networking nine district hospitals to offer quality instruction in their communities.

In some countries, community health services are being built from a basic level. In Zambia, grantees bought a bus and will subsidize fuel to allow students and faculty to travel to some hard-to-reach areas.



Africa’s remote areas have limited medical service. MEPI funds are contributing to new rural training programs to attract local students, who would be more likely to remain in the area once qualified.

Another tack to encourage retention is to allow faculty time off to update their training, holding their jobs open and even offering promotions on their return.

In an uncommon approach, the University of Zambia paired 18 faculty members with others in similar or complementary areas of academic focus, so they can learn from and support each other in their work and become more anchored in their positions.

Boosting connectivity and e-learning

Broader use of electronic resources is essential to curriculum reform and quality training, especially in rural settings. The Internet provides extensive e-learning resources and keeps students up-to-date. Some countries are using MEPI funds to improve power supplies and wiring for Internet connections. Other places are upgrading hard- and software and building e-libraries.

At the University of Nairobi, the medical school solicits curriculum ideas from its students, who are often adept at assessing new technology and electronic resources. The institution supports student-led seminars, focus groups, journal clubs and workshops.

With MEPI resources, the university's medical library now has 50 new computers offering electronic teaching tools, guidelines on care and treatment, and access to scientific journals. To keep students and faculty in rural areas abreast of the latest information, MEPI funds were used to purchase 50 new smartphones, which have been loaded with guidelines on topics such as diarrhea treatments for children and nutritional needs of HIV-positive children. Health care workers who can immediately consult guidelines have been shown to follow them more closely.

Sharing best practices

While MEPI directly supports some 30 individual institutions, project leaders are sharing the fruits of the program with their rural training outposts, other medical schools in the network and beyond, to build synergies and together lift the region's health sector. "We need to ensure that the rest of Africa benefits from our experiences," said Dr. Peter Donkor, project leader at Ghana's Kwame Nkrumah University.

Examples of MEPI-driven exchanges between countries abound. During a recent visit, Ugandans observed how the University of Malawi centralizes the administration of its research grants, rather than supporting several grant-

Electronic resources are integral to modern medical training. MEPI funds are enhancing power supplies, wiring and equipment to improve Internet access.



Courtesy of the MEPI Coordinating Center



MEPI project leaders share their curricula templates, best practices, research findings and ideas to maximize efficiency. As the network expands, it will benefit medical education throughout the region.

specific administrators. Now Uganda's medical schools are setting up similar systems, to curb costs, improve grant tracking and keep a current tally of the university's total grant funding.

Medical institutions in Africa can avoid duplicating specialized curricula if students are able to attend existing courses in other countries. For example, Ghanaian grantees arranged with UKZN for emergency medicine physicians to receive hands-on training in South Africa.

Networking among program participants is producing ties that promise to deepen over time. "Without MEPI, I wouldn't have met many of my colleagues doing great work in other countries," said Dr. David Olufemi Olaleye, project leader at Nigeria's University of Ibadan. "Each of us was working in a different corner of the world. Now we communicate in our common goal of enhancing medical education and planning, and thinking of the next generation of academicians in the region."

Ensuring sustainability

As the ripple effect of MEPI continues, participants are already working to ensure the benefits are sustainable. Encouraging country ownership is key to this effort. In applying for a MEPI award, organizations needed to demonstrate buy-in from national governments—the primary funders of medical education and health services in Africa. This requirement has spurred much more communication between medical schools and ministries, MEPI project leaders reported.

"Universities must not act in isolation as if we know it all, but work with relevant government departments so that the plans of those ministries can be brought to bear," Uganda's Sewankambo said. "The degree of collaboration between the Ministry of Health and our training institutions has never been this good. And one is hearing this not only from Uganda but from others under the MEPI initiative."

Photo by Richard Lord for Fogarty/NIH

In Kenya, University of Nairobi grantees invite officials from the ministries of health and education to monthly department head meetings. “Government policymakers approach things with a lot of skepticism, so you really need to convince them that this is important and a desired change,” Kenya’s Kiarie said. At the same time, he added, the government is not expected to engage in the day-to-day decisions made by what is already a large team of officials from the schools of medicine, dental sciences, pharmacology, nursing and public health.

Since MEPI began in Zambia, medical educators and government officials are communicating in unprecedented ways. For example, the University of Zambia includes a senior health official as an advisor for its MEPI project and consults the ministry before disseminating clinical guidelines to provincial hospitals.

The Zambian government is extending monetary support as well, said Dr. Yakub Mulla, MEPI project leader. “The government has doubled the funding for the training of health professionals,” he said. It’s also building the new Copperbelt University that will help expand medical education capacity.

MEPI project leaders say they hope their successes will inspire additional funding from developed country organizations and philanthropic groups to a topic—medical education—that traditionally has not excited much funder attention.

When Ghana’s MEPI institution launched its project to train emergency medicine physicians and nurses, it included all stakeholders in the planning, including those within various departments in the university, teaching hospital, health ministry, ambulance service and Ghana College of Physicians and Surgeons. “It was not very straightforward getting everyone onboard,” Donkor said. “But now there is great acceptance because everybody really is beginning to see the difference that emergency medicine is making in the care of patients.”

Government backing can have dramatic results. Zimbabwe’s education ministry recently provided co-funding to the country’s MEPI program. Other MEPI sites have similar government pledges in the works.

Amb. Eric Goosby (on right), U.S. Global AIDS Coordinator, and other MEPI meeting participants discuss the many changes facilitated by the program.



Courtesy of the MEPI Coordinating Center

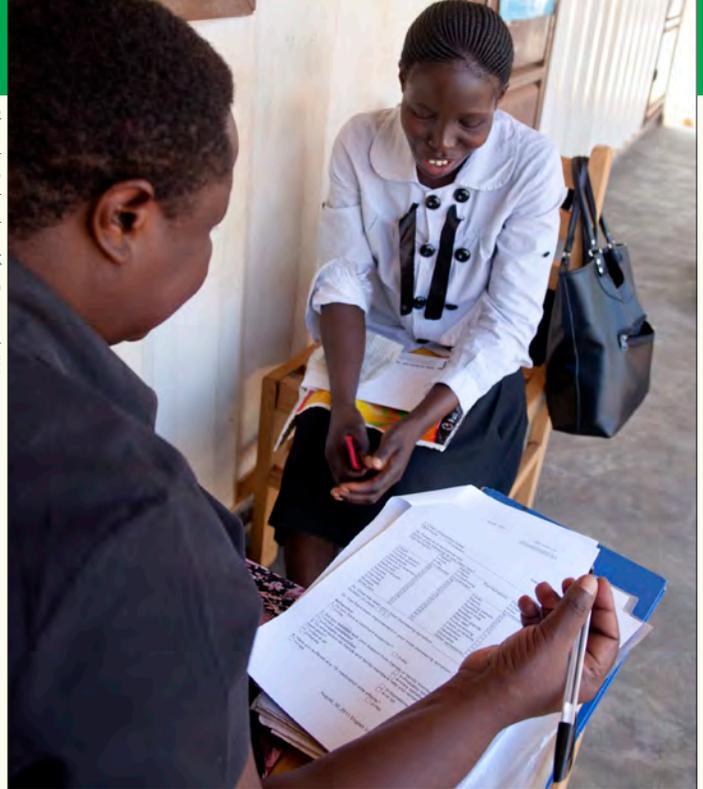


Photo by Richard Lord for Fogarty/NIH

MEPI project leaders are working on ways to sustain the enormous gains they make in medical education, including by winning research funding for their institutions.

Project leaders say they hope their successes will inspire additional funding from developed country organizations and philanthropic groups to a topic—medical education—that traditionally has not excited much funder attention.

“The environment is clearly different now from what it has ever been in terms of supporting medical education,” Sewankambo said. “I think, based on what funders are now seeing, they are beginning to say, yes, we would like to contribute toward medical and health education.”

One organization with a continent-wide reach is the African Medical Schools Association, dormant for several years. MEPI has breathed new life into the organization and given it a focus for action. The association convened its members at the recent MEPI gathering, to facilitate networking especially for its non-MEPI members. The African Development Bank is another organization that could play a role in MEPI’s future, to ensure its benefits are widespread and long-lasting.

“MEPI is creating a huge impact. It would help to scale up the program to all countries of the region, also those not part of MEPI,” said Dr. Francis Omaswa, who directs the African Center for Global Health and Social Transformation, a network and think tank. “Most of the African economies are growing and there is a lot of hope. MEPI presents Africa with an opportunity to capture this movement of hope.”

RESOURCES

MEPI grants: <http://bit.ly/wpkeUU>

Voices of Change website: <http://bit.ly/SKrmDm>

OPINION

By Dr. Roger I. Glass, Director, Fogarty International Center

Building a health care workforce in Africa

It's a shocking pair of WHO statistics: that Africa shoulders a quarter of the world's disease burden yet claims only 3 percent of the global health care workforce. We're working to change that. By linking Africa's medical schools and transforming health science instruction, we're improving the quality and quantity of doctors and health care workers available across the region.

It's uplifting to witness the incredible progress made in the two short years since we launched our Medical Education Partnership Initiative (MEPI), which we co-administer with the Health Resources and Services Administration. Our funding partners—the President's Emergency Plan for AIDS Relief and more than a dozen NIH Institutes and Centers—gathered with MEPI grantees recently in Ethiopia to review the extraordinary advances made so far. (See related article on page 8.)

By awarding these substantial grants directly to African institutions in 12 countries, we're empowering them to take ownership and responsibility to develop lasting resources that will improve the region's health care for decades to come. We're encouraging MEPI partners to link together medical schools, remote health training sites and other related organizations, to leverage resources and expand capacity so quality care can reach more of their people, especially in the rural areas, where it's needed most.

These awards are already proving to be catalytic, igniting enthusiasm among national governments that has sparked the creation of new medical schools, rural training sites and, most significantly, pledges of financial support that will ensure these efforts are sustainable. Through unprecedented engagement with ministries of health, education and finance, MEPI grantees are aligning program goals with country health needs and priorities.

Through MEPI, medical schools are developing plans to train multidisciplinary teams equipped to solve their country's most pressing health problems, whether they're HIV/AIDS, other infectious diseases, or areas that need special attention such as maternal and child health, surgery and cardiac care. Well-qualified physicians, surgeons, engineers and other specialists all play



Photo: MEPI Coordinating Center

Fogarty Director Dr. Roger I. Glass addressed a recent MEPI gathering in Ethiopia.

a vital role in health care and biomedical research. Chronic diseases are now the leading cause of death and disability in the developing world and it is vital Africa is prepared for the challenge.

Some schools are using MEPI support to expand instruction in the emerging field of implementation science—the study of how to move discoveries into practice. I'm particularly delighted at this, since Fogarty has championed this critical aspect of research, sometimes referred to as a way to reduce the “know-do” gap.

It's exciting, also, to witness the sea change underway in the use of technology in medical education. Whether they're improving Internet access, adding online journals to their digital libraries, or implementing videoconferencing and other e-learning technologies, MEPI grantees are weaving technology into every aspect of their programs. Now it's possible for a nursing student at a remote rural outpost to virtually attend a Grand Rounds lecture by the world's foremost authority on a topic of great relevance to the community she serves. The opportunities for knowledge sharing are truly astonishing.

These developments will make it possible for students and professors to stay abreast of the latest discoveries and techniques. That's one way MEPI grantees hope to recruit and retain well-qualified faculty. Medical schools are also establishing research career tracks so that faculty can have protected time and resources to conduct studies. This not only helps tether them to their positions but also produces a body of local research to inform health policy decisions. Research, training and service have a symbiotic relationship—each improves the quality of the whole.

I was pleasantly surprised and encouraged by the degree to which MEPI grantees have already begun to gel as a group. By sharing successes and challenges, they can better leverage resources and increase their impact. In time, I hope that Africa will have a self-sustaining health sector that is fully able to handle the continent's immense health needs. MEPI will be part of this future.



Collins to receive Galien Foundation award

NIH Director Dr. Francis S. Collins has been named the 2012 recipient of the Pro Bono Humanum Award by the Galien Foundation, in recognition of his exemplary and innovative efforts in improving the human condition. Collins was honored for his contribution to the ethical implications of scientific research.



Freire to become president of NIH foundation

Dr. Maria C. Freire has been named president of the Foundation for the NIH and will assume her new role in November. She is currently president of the Albert and Mary Lasker Foundation and previously held key positions at the Global Alliance for TB Drug Development and the NIH Office of Technology Transfer. She has also served on Fogarty's advisory board.



Austin named director of NIH center

Dr. Christopher P. Austin has been promoted to director of the National Center for Advancing Translational Sciences from his position leading the center's division of preclinical innovation. Austin, a developmental neurogeneticist by training, came to the NIH in 2002 from Merck.



Clayton to lead NIH women's health office

Dr. Janine A. Clayton was named director of the NIH Office of Research on Women's Health, after serving as acting director for a year. Before joining the office, Clayton was deputy clinical director of the National Eye Institute.



Longtime Fogarty collaborator is mourned

Renowned epidemiologist Dr. R. Palmer Beasley has died of pancreatic cancer at age 76. Beasley, a longtime Fogarty and NIH grantee, linked the hepatitis B virus to liver cancer. He was dean at The University of Texas School of Public Health. Before that, he worked at the University of Washington and the American University Medical Center in Taipei, Taiwan.



Ecuador honors Fogarty grantee Silberberg

The government of Ecuador has selected Dr. Donald Silberberg for its highest scientific honor, the Vicente Rocafuerte medal. Silberberg, a Fogarty grantee at the University of Pennsylvania and the first American to receive the award, was recognized for his work on neurological and psychiatric conditions in Ecuador.



Petroze recognized for Rwandan work

Former Fogarty scholar Dr. Robin T. Petroze has received an American College of Surgeons/Pfizer Surgical Volunteerism Award for significantly contributing to surgical care. Petroze, who attends the University of Virginia, has studied the burden of diseases requiring surgery in Rwanda.

Child index shows uneven progress

Under-nutrition is worsening, according to a new report on children's well-being across all world regions. However, Save the Children's "2012 Child Development Index" shows youth are doing 30 percent better overall than in the mid-1990s, based on gains in health and education.

Full report: <http://bit.ly/P6PfmI>

UNAIDS: more science needed in programs

Scientific breakthroughs and other developments should be better applied to HIV/AIDS programs to bring an end to the epidemic. A new publication, "UNAIDS report: Together we will end AIDS," details strategies.

Full report: <http://bit.ly/SfazgI>

Forecast predicts huge tobacco death toll

One billion people could die prematurely from tobacco use during this century, according to a recent study published in *The Lancet*. About half of men and 11 percent of women in developing countries use tobacco, the article reports.

Full study: <http://bit.ly/Um9066>

WHO releases new dengue strategy

The WHO is calling for aggressive action to address dengue, with the goal of halving mortality by 2020 and reducing incidences by a quarter. Dengue is endemic in more than 100 countries, causing up to 100 million new infections each year that claim 20,000 lives.

Full report: <http://bit.ly/Sfbs91>

New global health journal launched

A new quarterly publication established by USAID will produce articles on best practices and lessons learned about global health program implementation. The journal, *Global Health: Science and Practice*, will be peer-reviewed, open-access and available online.

Website: www.ghsjournal.org

Helping LMIC scientists publish findings

To encourage low- and middle-income country scientists to publish their work, PLOS has created the Global Participation Initiative. Its first effort will address the cost barrier by publishing articles by developing country scientists for free or at a low cost.

Website: <http://bit.ly/SIWtPA>

NIH scientists recognized for brain program

A team of NIH program officers who collaborate on managing Fogarty's global brain disorders program has received the 2012 NIH Director's Award. The program develops research and capacity building projects in developing countries on a broad range of brain and nervous system disorders.

Website: <http://bit.ly/rEn7km>

Funding Opportunities

Funding Opportunity Announcement	Details	Deadline
NIH-NSF Ecology and Evolution of Infectious Diseases Program	http://1.usa.gov/U4cMvV	December 5, 2012
Limited Competition: Framework Programs for Global Health Innovation (D43)	http://1.usa.gov/JYqonE	December 14, 2012
Limited Competition: Brain Disorders in the Developing World: (R01) - Non-AIDS (R21) - Non-AIDS	http://1.usa.gov/L6UUfk http://1.usa.gov/JjpxKs	February 14, 2013
Limited Competition: Brain Disorders in the Developing World: (R01) - AIDS (R21) - AIDS	http://1.usa.gov/L6UUfk http://1.usa.gov/JjpxKs	April 11, 2013
Chronic, Non-Communicable Diseases and Disorders Across the Lifespan: Training Award (D43) Planning Award (D71)	http://1.usa.gov/Hj3YfL http://1.usa.gov/GW4LyT	April 17, 2013
Global Infectious Disease Research Training Program: Training Award (D43) Planning Award (D71)	http://1.usa.gov/H0U3Gq http://1.usa.gov/GZ22uc	May 21, 2013

For more information, visit www.fic.nih.gov/funding

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Bollywood, like Hollywood, raises risk of teen smoking

Photo courtesy of PhotoShare/Saurabh Mittal



By showing tobacco use on-screen, India's movie industry, or Bollywood, is igniting an interest in smoking among adolescents, according to a recent study funded by Fogarty's International Tobacco and Health Research and Capacity Building program.

Nearly 4,000 students in New Delhi, ranging from ages 12 to 16 years, participated in the study, answering questions about smoking experience and identifying which popular Bollywood movies they had watched during the preceding two years.

In the 59 popular movies they named, the researchers identified 412 instances of tobacco use. Children who had seen more smoking portrayals were more likely to have tried smoking themselves than those who had seen fewer. Overall, 5.3 percent of children surveyed said they had used tobacco products at least once. Other factors also influenced whether children had tried tobacco, such as gender, age, academic performance, exposure to tobacco promotions, socioeconomic background, strictness of parents and whether family members or peers smoked.

Past studies have linked portrayals of smoking in Hollywood and European movies to a higher risk of smoking among adolescent viewers.

The Indian study was co-led by Dr. Monika Arora, of both Health Related Information Dissemination Amongst Youth and the Public Health Foundation of India.