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UN meeting highlights non-communicable diseases

This fall, worldwide attention is focused on the number one cause of death, accounting for nearly two-thirds of deaths globally—non-communicable diseases. World leaders are gathering at a U.N. High Level Meeting on NCDs in New York City on Sept. 19-20 to address the threat caused by chronic ailments such as heart attacks and strokes, diabetes, cancers and chronic respiratory disease.

The global burden of NCDs is an urgent and increasing public health concern and a strain on global economies, particularly as these diseases have become more of a factor in low- and middle-income countries. This is only the second time in the history of the United Nations that the General Assembly is convening heads of state and government on an emerging health issue with a major socioeconomic impact. Ten years ago, a similar meeting on HIV/AIDS sparked a coordinated international response to the crisis.

HHS Secretary Kathleen Sebelius is leading the U.S. delegation. Participants from NIH include its director, Dr. Francis Collins; National Cancer Institute Director Dr. Harold Varmus; Fogarty Director Dr. Roger Glass and National



Photo by Masaru Goto/World Bank

The U.N. meeting will address the global burden of NCDs—both a health concern and a strain on economic productivity, particularly in developing countries.

Heart, Lung and Blood Institute Program Director, Dr. Arun Chockalingam. In addition to formal plenaries, the U.N. is hosting discussions on NCD's impact, prevention and control strategies, and increased international collaboration.

Fogarty funds new projects to combat lifespan diseases

Fogarty has awarded \$14.4 million to 14 research institutions to reduce the impact of the ongoing global epidemic of non-communicable diseases in developing countries. The five-year NCD-Lifespan grants will help to build the ranks of experienced clinicians and researchers by establishing research training programs in more than a dozen low-and middle-income countries.

“Chronic diseases and disorders are now the leading cause of death worldwide, and are hitting low-resource populations the hardest,” said Fogarty Director Dr. Roger I. Glass. “These grants will go a long way toward building

public health infrastructure and human capacity in countries that are struggling to combat a lack of formally trained personnel who can deal with these conditions.”

A wide range of curricula and training will be developed by the NCD-Lifespan grantees, including a cancer epidemiology certificate program for Moroccan health workers, cardiovascular-related education tracks in both health service and patient-oriented research for students in Ghana, biostatistics and mentoring curricula for Nigerian trainees, interdisciplinary training in substance

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FOCUS



The scourge of non-communicable diseases:

- Confronting the diabetes epidemic in South Asia
- Reducing the cost of heart disease in South Africa
- Addressing household air pollution

Read more on pages 7 - 13

Fogarty supports zoonotic research in Tanzania

By Jeff Gray

Diseases that can jump from animals to humans—called zoonoses—are a global health concern. They are a particular problem in Tanzania, where many people live in close proximity to livestock. To address this, Fogarty and NIH—in partnership with the National Science Foundation—recently awarded Duke University \$1.7 million to support groundbreaking research in the East African country.

Photo by Scott Wallace/World Bank



How diseases jump from animals to humans is the focus of a new grant by Fogarty to Duke University for study in Tanzania, where livestock spread disease.

The four-year grant from the Ecology of Infectious Diseases initiative will help establish an innovative surveillance project in northern Tanzania designed to track three diseases that can be transmitted among a wide range of host species. Dr. John Crump, the principal investigator, will bring together medical, social, veterinary and ecological scientists in order to carry out a large-scale study of the impact of three bacterial zoonoses: leptospirosis, Q fever and brucellosis.

These diseases account for more hospital admissions for fever than malaria, resulting in deaths in some cases. Reproductive problems and loss of milk production caused by the three bacteria also have major effects on livestock production in the region, where many rural households rely on domesticated animals for food security, income and social capital.

Coxiella burnetii, the heat-resistant bacterium that causes Q fever, is particularly virulent and can take an airborne form transmittable to humans. Diagnostic tests for the three diseases are often unavailable in resource-poor areas, increasing the likelihood of misdiagnosis and improper medical treatment of patients.

“In northern Tanzania, malaria was the clinical diagnosis for over 60 percent of inpatients with fever, and Q fever, leptospirosis, and brucellosis were never diagnosed clinically nor specially treated,” said Crump. “Misdiagnosis of these infections as malaria and consequent lack of specific therapy increases the risk of complications and death.”

Crump’s team will focus on three different environments where human, livestock and wildlife interactions occur: pastoral areas where livestock are raised, agropastoral areas where both crops and livestock exist and peri-urban areas that are immediately adjacent to cities or suburbs. A novel combination of research methods and approaches will be used, including human illness surveillance, analysis of hospital records, household surveys, social behavioral studies and linked human-animal epidemiological studies. The resulting data can also be used in potential control strategies such as animal vaccination.

Misdiagnosis of these infections as malaria and consequent lack of specific therapy increases the risk of complications and death.

“This study will help build desperately needed diagnostic capacity in a neglected area of disease research in Tanzania,” said Dr. Christine Jessup, Fogarty’s program officer for the Ecology of Infectious Diseases initiative. “By bringing together such diverse disciplines, the program stands a much greater chance of yielding more effective interventions and agricultural practices.”

The Ecology of Infectious Diseases program, a joint NIH-NSF initiative, supports interdisciplinary efforts to understand the underlying ecological and biological relationships between the emergence and transmission of infectious diseases and manmade environmental change such as habitat alteration, biological invasion, climate change and pollution.

For more information, please visit: <http://bit.ly/pgq7XN>

Solving a math puzzle to stop infectious disease

By Steve Goldstein

Shweta Bansal wants to know where you've been. Also, how long you were there and how often and who you might have come into contact with.

No, she's not with the police, but she is a detective of sorts. And if there is anything she's hoping to "arrest," it's the spread of disease.

Dr. Bansal is a computational mathematician and her research is focused on human ecology and behavior, about how humans interact with social and natural environments and how that impacts and is impacted by infectious disease transmission. She constructs contact network models to create a backbone to show how infectious disease. "It could be by touching a doorknob that has been touched by some with a cold or as well-defined as sexual contact with someone with an STD," said Bansal.

The modeling reveals patterns of human or animal interaction that allows researchers to recommend points of intervention. This research may assist policymakers in making the right choices that can prevent the spread of disease and save lives.

Bansal, a slim, soft-spoken, India-born and California-raised 30-year-old, is a postdoctoral research fellow with the Research and Policy for Infectious Disease Dynamics program—RAPIDD. Managed by Fogarty's Division of International Epidemiology and Population Studies and the U.S. Department of Homeland Security, which provides funding, RAPIDD is designed to improve standards in infectious disease modeling to better inform policy decisions.

Bansal's work encompasses both direct and vector-borne disease transmission. Currently, she is modeling data on dengue collected in Iquitos, the largest city in the Peruvian rainforest and home to swarms of *Aedes aegypti*, the mosquito that is a vector for several tropical fevers. "With directly transmitted diseases like influenza and measles, we understand that interactions between individuals have the ability to spread disease and are suited to network modeling," Bansal explained. "With a vector-borne disease there's another player in the game."

The goal is to extend the network models used to understand patterns of direct transmission to vector-borne diseases, so that the movement patterns of individuals can be overlaid with the vector to reveal how dengue is spread within the community. This involves using detailed location data including GPS coordinates.

"This is to understand the data and think about where the greatest risk of transmission is and where we might focus our intervention," said Bansal. With the data collected over 10 years, health authorities can allocate limited spraying resources.

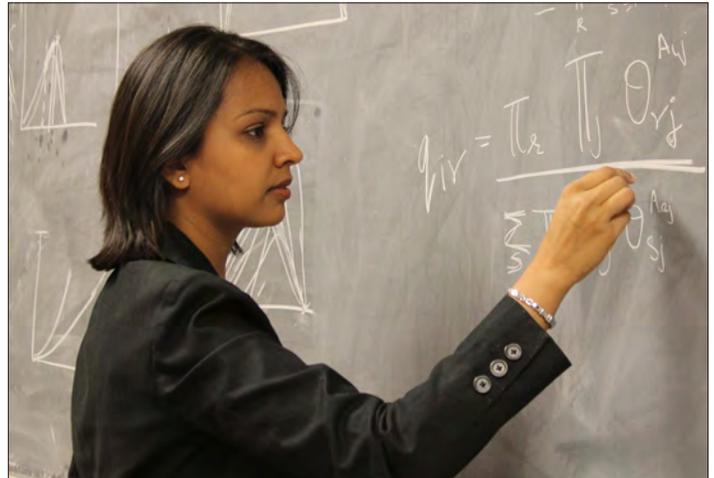


Photo courtesy of Dr. Shweta Bansal

With Fogarty support, Dr. Shweta Bansal uses mathematical models to uncover patterns of human or animal interaction so disease outbreaks can be prevented or contained.

RAPIDD is also concerned with zoonosis, or the spread of disease from non-human animals to humans. Bansal has spent considerable time thinking about livestock diseases, specifically, foot and mouth disease, which are of concern to Homeland Security officials, and how they might jump to other species.

Hollywood has also recently highlighted rapidly transmitted diseases in the thriller "Contagion," which depicts the spread of a deadly airborne flu virus. "Given SARS and H1N1, it's very timely to talk about pandemics spreading through the globe," Bansal said.

In fact, her research was inspired by an anecdote from the SARS outbreak in which two infected individuals traveling from Hong Kong to Toronto and Vancouver ended up inciting 200 cases in the one instance and none in the other—all due to different patterns of human interaction. RAPIDD has been "very much a blessing" for her postdoctoral work, she said. "It focuses on bringing the right expertise together on the mathematical side, the biological side and the public health side and thinking at a fundamental level about infectious disease dynamics," said Bansal.

Next spring, Bansal will be teaching at Georgetown University's Biology Department, but remains a faculty affiliate with RAPIDD. Look for her on CSI:Disease.

Fogarty funds new non-communicable disease programs

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Photo courtesy of WHO/R. Viree



Fogarty's NCD-Lifespan awards will fund a wide range of research, including behavioral health programs in India.

dependence for investigators in Thailand, workshops and summer institutes for Thai dental students, one-to-one mentoring and peer-oriented training exercises for suicide

researchers in China and long-term training in behavioral conditions and the social determinants of illness for mental health trainees in India.

Non-communicable diseases currently exact a huge toll on populations across the globe. According to the World Health Organization, 63 percent of deaths in 2008 were primarily a result of cardiovascular diseases, diabetes, cancers and chronic respiratory diseases. The worldwide rise in deaths from these diseases is projected to continue, with the greatest increase expected in low-and middle-income regions. Fogarty recently launched the NCD-Lifespan program to address these diseases as well as mental illness and depression, neurological disorders, drug and alcohol abuse, developmental disorders and other conditions.

NIH funding partners for the awards include the National Institute on Drug Abuse, the National Institute of Mental Health and the National Institute of Dental and Craniofacial Research.

For more information on the NCD-Lifespan program, please visit: <http://www.fic.nih.gov/Programs/Pages/chronic-lifespan.aspx>

List of NCD-Lifespan Awards

- Strengthening Indian NCD Clinical Research and Training capacity—Florida International University, \$1,182,280
 - Research Training in Cancer Prevention and Control in Morocco
H. Lee Moffitt Cancer Center and Research Institute, Tampa, Florida
\$1,167,470
 - Building Research Capacity to Improve Mental Health in China across the Lifespan—Harvard Medical School, \$1,151,771
 - NYU/UG Cardiovascular Research Training Institute Program (Ghana)—New York University School of Medicine, \$1,177,654
 - Research Training: Socio-Economics of Mental Health Service Delivery in South Eastern Europe (Albania, Bulgaria, Czech Republic, Moldova, Romania, Serbia)—University of California, Berkeley, \$1,134,452
 - Training Program in Nigeria for NCD Research—University of Maryland, Baltimore, \$1,133,898
 - Nutrition-Related NCD Prevention Training in China—University of North Carolina at Chapel, Hill, \$1,142,731
 - SHARE India University Pittsburgh Population and Intervention Research Training—University of Pittsburgh, \$965,385
 - China-Rochester Suicide Research Training Program (CRSRT)—University of Rochester, \$1,123,960
 - Clinical, Public Health & Behavioral Oral Health Research Training for Thailand—University of Washington, \$1,137,106
 - INDO - US Training Program in Behavioral Health Across the Lifespan—Washington University, \$1,144,102
 - Drug Dependence through the Lifespan: US-Thai Training Program—Yale University, \$1,149,113
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- Two-year planning grants were also issued to the Praboromarajchanok Institute in Thailand and Fundacao Faculdade de Medicina in Brazil.

Lessons learned from history's influenza pandemics

Past influenza pandemics have much to teach today's scientists about future outbreaks. An examination of historical influenza pandemics is the subject of a supplement to the journal *Vaccine*, which is guest edited by Fogarty scientists Drs. Mark A. Miller and Cecile Viboud, Vikash Parekh and Dr. Gerardo Chowell of Arizona State University.

Articles range from examinations of the regional impacts of the 1918 influenza pandemic around the world, to analyses of the effects of the 2009 H1N1 flu outbreak, to the downside of using annual all-cause mortality data to estimate the pandemic influenza burden.

In the lead article, the guest editors discuss the need for interdisciplinary studies of historic pandemics. "The 2009 H1N1 pandemic sharpened our focus on past pandemics: How can we use lessons learned from historic pandemics to better understand the epidemiology of the 2009 pandemic virus and guide the public health response to recurrent waves?" the authors ask. "Historic pandemics have repeatedly demonstrated that emerging viruses follow a pattern of returning in several recrudescing waves, in some cases with the heaviest mortality burden occurring several years after the virus first emerged."

Although the WHO has declared the 2009 pandemic over, the authors caution that it's "not yet time to let down our



Photo by Yuri Kozlyev/World Bank

*Health officials should remain vigilant in the wake of the 2009 flu pandemic, according to an analysis of historical data published as a special supplement of *Vaccine*, edited by Fogarty scientists.*

guard." They conclude that mortality impact will occur over several years. "It is therefore critical to maintain surveillance efforts and international data sharing in the post-pandemic period so that prevention and control programs can be tailored to the changing epidemiology of post-pandemic influenza," the authors write.

The genesis for the publication was an international gathering of biomedical and social scientists that convened in May 2010 in Copenhagen to discuss research methodologies and findings from data associated with historic influenza pandemics.

Publication: <http://bit.ly/oGdkdk>

Syrian Tobacco Center rated most productive in research

Photo by the Syrian Center for Tobacco Studies



A Fogarty supported collaboration between U.S. and Syrian scientists has been recognized for its research productivity. Research partners at the University of Memphis (UM), Virginia Commonwealth

University (VCU) and the Syrian Center for Tobacco Studies (SCTS) in Aleppo were highly rated by a new study from the University of Damascus and University of Michigan Health System. The study named the SCTS as the top institution in Syria in terms of productivity of high-quality biomedical research-outpacing much larger institutions with greater resources.

"The formula for this success is simple; the SCTS is made of professionals who understand what is needed to create a productive research environment, has some autonomy and was successful in competing for

international research funding," said Dr. Wasim Maziak, who has since left Memphis and is now professor of epidemiology at Florida International University, as well as director of SCTS.

According to the study, Damascus University and its affiliated hospitals generated 156 papers indexed by PubMed since 1980, or 56 percent of the clinical and biomedical research, followed by the SCTS (15 percent) and the Ministry of Health and its affiliated hospitals (9 percent). But when the age of the institution is considered, the SCTS, established in 2002 is the leading institution in research with an annual average of five publications per year.

Initial funding for the University and Memphis and the SCTS came from a five-year Fogarty International Tobacco and Health Research and Capacity Building Program grant, which has since been renewed. Maziak attributes this success to his partners on this project, Drs. Thomas Eissenberg (VCU) and Kenneth Ward (UM), as well as his Syrian team.



Q & A: Dr. Susan Shurin

Dr. Susan B. Shurin is Acting Director of the National Heart, Lung, and Blood Institute (NHLBI) at NIH, where she oversees an extensive research portfolio with an annual budget of approximately \$3 billion. The NHLBI conducts and supports research to prevent, diagnose, and treat heart, lung, and blood diseases; fosters training of emerging investigators; and communicates research advances to the public.

What is the significance of the U.N. committing to hold this High Level Meeting on NCDs?

This is only the second high-level meeting on a health-related topic the U.N. has ever held—the first one was on HIV/AIDS—so the U.N. recognizes NCDs as a very significant global problem. The important thing is defining the impact of this problem beyond the health sector on economic development, quality of life and on peace and prosperity. Chronic diseases—heart and lung disease, diabetes and cancer—have been the major causes of morbidity and mortality in the developed world. Now these diseases are having an increasing impact on low- and middle-income countries. These are diseases that strike people in the prime of life when they should be productive citizens, and are largely preventable. Nutrition and physical activity are major contributors to cardiovascular disease, cancer and diabetes. Indoor and outdoor air pollution are contributors to cardiovascular and pulmonary diseases and cancer.

How is the NIH providing leadership on this critical research area?

The NIH is working to keep research on the agenda of the Summit on NCDs. A major focus has been on recommendations for interventions. We know what needs to be done, but often we don't know how to effectively implement change. The NIH focus is on the generation of evidence of the effectiveness of an intervention, and its applicability on a population-wide scale. We've probably been most effective in vaccinations and in maternal and child health. There are crucial basic science questions that will help us get a better handle on the mechanisms of disease causation and design more targeted and effective interventions adapted to local demographics, culture and environments. We need more research to guide the economic and public policy changes that need to be made.

What is the Global Alliance for Chronic Diseases and what are its priorities?

The GACD is a group of public funders of biomedical research in both developed and developing nations who have identified common issues and plan to conduct implementation research to guide the investments that will come out of the U.N. meeting. Our initial research focus is on hypertension. Out of these research projects we hope to provide guidance that will enable policymakers and industry to make wise decisions to benefit the public health. Given the limited funds available, public and private entities need to know that their investments are based upon evidence of efficacy.

How do you view the importance of prevention versus treatment in combating NCDs?

When it is possible to do so, it's both easier and more cost effective to treat than prevent disease. Prevention and treatment of hypertension, high blood cholesterol and smoking have a huge impact on the morbidity of cardiovascular disease in the developed world. We see these as complementary processes. In much of the world, prevention depends on having healthy options for food consumption, for example. These are not things that can be solved within the health care system.

What are the priorities in terms of research questions to address NCDs?

We don't have good data about the prevalence of risk factors for disease, although we have some data on the prevalence of disease. Both are necessary if countries are to make informed decisions on the priorities for their investments. Building sustainable health care systems is exceedingly important. With these, we can target specific interventions in countries. At the basic science level, we need better understanding of population-based differences in genetic susceptibility if we are to develop interventions to prevent and treat disease around the world.

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NCDs: A silent scourge threatening global health

By Steve Goldstein

Non-communicable diseases are the quiet killers, attracting less attention than infectious diseases and, due to their steady, relentless nature, accepted by many as matters of fate. This is ironic, since behavior can influence the risk factors for these diseases. In 2008, according to WHO, 63 percent of global deaths were attributable to NCDs, mainly due to cardiovascular disease, diabetes, cancer and chronic respiratory disease.

Once thought to be the afflictions of developed nations, NCDs are projected to increase everywhere, but more so in low- and middle-income regions. Nearly 80 percent of NCD deaths occur in low- and middle-income countries and NCDs are the most frequent causes of death in most countries, except in Africa, where infectious diseases end lives before NCDs take hold.

Morbidity and mortality data from WHO reveal that the disproportionate impact on lower resource settings is growing. Over 80 percent of cardiovascular and diabetes deaths, and almost 90 percent of deaths from chronic obstructive pulmonary disease, occur in low- and middle-income countries. More than two-thirds of all cancer deaths occur in low- and middle-income countries.

The rapidly growing burden of NCDs in low- and middle-income countries is accelerated by the negative effects of globalization, rapid unplanned urbanization and increasingly sedentary lives.

In 2008, Fogarty chose to address NCDs as one of its five strategic goals and funds a number of programs designed to build NCD research capacity in developing countries. Fogarty recently launched an initiative called NCD Lifespan, combining and building on previous programs devoted to increasing expertise in NCDs, operations research, genetics and population studies in low-resource settings. In addition, for more than a decade Fogarty has supported research regarding tobacco consumption and ailments triggered by occupational and environmental issues that include asthma, lung disease and some cancers.

Another program—Fogarty International Research Collaboration Awards—supports studies on a wide variety of topics, among them breast cancer in Egypt and Chile, kidney disease in Nicaragua and cardiovascular



Photo by Mukunda Bogati/PhotoShare

Fogarty has developed a number of programs designed to build capacity in non-communicable disease research in developing countries, where nearly 80 percent of NCD deaths occur.

risk factors in the Philippines. Finally, a component of the Medical Education Partnership Initiative is strengthening training in cardiovascular research in Uganda and Zimbabwe, and HIV-related cancers in Malawi.

Although the UN meeting on NCDs will not include mental health, Fogarty has a long-established program that supports studies of brain disorders in the developing world.

The rapidly growing burden of NCDs in low- and middle income countries is accelerated by the negative effects of globalization, rapid unplanned urbanization and increasingly sedentary lives.

The costs to health-care systems from NCDs are high and projected to increase. Significant costs to individuals, families, businesses, governments and health systems add up to major economic impacts.

NCDs are quiet killers with an explosive impact. But as the stories on the following pages demonstrate, both awareness of the epidemic and efforts to curtail it are growing.

Confronting South Asia's diabetes epidemic

By Steve Goldstein

The line stretching forever outside a local Sri Lankan health ministry office was filled with anxious mothers and sick babies. These infectious disease cases garnered attention from health officials, despite the piles of death certificates atop their desks attesting to a growing toll from non-communicable diseases such as diabetes, cancer and heart disease.

This scene greeted Fogarty grantee Dr. Dale Williams, who visited the region as part of a WHO delegation in the 1980s to assess awareness of non-communicable diseases. “We couldn’t get any traction at the time to get people to think about NCDs,” Williams recalled. “Now, the heartwarming thing about our program in India is their awareness and the aggressive way, for a developing country, they are tackling the issue.”

Over the past decade, supported by an International Clinical, Operational and Health Services Research and Training Award from Fogarty, Williams, while working at the University of Alabama-Birmingham (UAB), helped lead a research training program in India to develop a cadre of researchers in clinical, operational, health services and prevention science research focused on NCDs. Most significantly, the program has given “credibility to the study of NCDs as a career track,” said Williams. “I think that is one of those immeasurable things that may be our biggest impact.”

There are over 50 million diabetics in India alone, making it the country with the highest burden of diabetes worldwide. “This is very serious from a population impact standpoint,” said Williams, “because people with diabetes have an enhanced risk of other NCDs, including cardiovascular disease. You can prevent a lot of disease and reduce the burden of disease with the right programs, whether its diet or exercise or helping people make the right lifestyle choices.”

Collaborating with the Madras Diabetes Research Foundation (MDRF) in Chennai, the program has included short-term training in the United States, a national seminar involving trainees from throughout India, intensive training workshops for selected trainees and workshops, video conferences and special courses for MDRF faculty and staff. In addition to research methodology, trainees are taught data management, sample handling systems and basic science research skills. Together, they’ve created the

Indian NCD Network as a formal entity to provide clinical research training that can support research and prevention programs to combat the diabetes epidemic.

MDRF has evolved into one of the leading diabetes and clinical care institutions in India and the entire South Asia region. The foundation produced over 200 research publications in the past five years, including 49 publications from trainees last year alone. Diverse areas of study include low-cost diagnostics, methods to increase physical activity through community empowerment, parental history of diabetes as a risk factor for adolescents and the risk factors for damaged eyesight due to the disease, among others.



There are over 50 million diabetics in India alone, making it the country with the highest burden of diabetes worldwide. Government awareness of the problem has increased, thanks in part to a Fogarty-funded research training program.

A recent article in the journal *Nature* on the critical problem of diabetes in India cited 13 references—six of them were from collaborators at MDRF and 10 of the authors had been trainees in the UAB program. MDRF is also researching the genetic component of diabetes. Although obesity is a risk factor for Indians and westerners, the disease appears at a lower threshold of obesity in India, and diabetic Indians are much more likely to suffer coronary artery disease at a relatively young age. Fogarty grantee Dr. Viswanathan Mohan, the MDRF director, said “the training provided by Fogarty has helped identify promising young investigators for leadership roles.”

Photo by Curt Cernemark/World Bank

Photo courtesy of Dr. V. Mohan



After a study showed that nearly a quarter of residents of a community in Chennai, India had diabetes or were pre-diabetic, researchers at the Fogarty-supported Madras Diabetes Research Foundation advised residents to increase their physical activity. With no suitable place to exercise, the residents raised funds to build a walking park. A follow-up study showed a decrease in diabetes.

Although the primary focus for capacity building is at MDRF, Williams noted that “we’re also working with three other institutions that have had workshops and we’re developing faculty that will work all over India.” He estimated that more than 750 researchers have attended training sessions overall. Two of the faculty attendees were the directors general of the India Council of Medical Research, as well as their deputies.

“So part of our strategy is to make sure they understand the impact of NCDs in India and develop methods to address them,” said Williams, now teaching at Florida International University. As evidence of the Indian government’s more serious approach, Mohan cited an ongoing national study that focuses on diabetes prevalence and risk factors in both urban and rural areas of India. Mohan also noted a relatively new National Program for Prevention and Control of Cancer, Diabetes, Cardiovascular Disease and Stroke launched by the government of India.

Awareness of diabetes and NCDs in India has come a long way since the 1980s. One of the major accomplishments Williams likes to cite is the impact on community medical students—who are preoccupied by infectious diseases at home—attending the national seminars that often include prominent faculty and Indian government officials.

Changing the color of the rice bowl to beat diabetes

A cultural hurdle had to be overcome before a study could demonstrate how a change in a dietary staple could reduce the incidence of diabetes.

Dr. Frank B. Hu of the Harvard School of Public Health wanted to test the efficacy of substituting brown rice, a whole grain, for white rice on biomarkers of diabetes risk in India, which has the largest number of diabetics in the world. There is evidence that consumption of whole grains can decrease diabetes through simple dietary changes.

With the assistance of co-investigator Dr. V. Mohan of the Madras Diabetes Research Foundation and a Fogarty International Research Collaboration Award, Hu discovered during a focus group session that participants believed brown rice to be inferior to their customary white rice. After explaining the nutritional and health values of brown rice during a tasting, “attitudes changed substantially among participants,” Hu reported.

Some 200 participants have been randomized into two groups who will consume brown or white rice for breakfast and lunch for four months. Biomarkers related to glucose control will be measured. The goal is to provide data for use in designing a global dietary intervention study aimed at reducing diabetes risk through simple, feasible and sustainable dietary changes.

“I think brown rice can be a very inexpensive and very effective way of improving dietary risk factors at the population level,” Hu said.



Photo courtesy of Dr. V. Mohan

A Fogarty-supported research project studied the most effective way of introducing healthy brown rice into a culture used to consuming white rice. Researchers are studying various ways of combating India’s diabetes epidemic, including healthier food choices.

Reducing the cost of rating heart disease

By Steve Goldstein

An overweight, 55-year-old South African man was feeling so poorly he skipped work to see a doctor at a clinic near Cape Town. A smoker, he was diagnosed with hypertension by Fogarty grantee Dr. Thomas Gaziano. But it was the end of the month and the pharmacy had run out of blood pressure medicine. The man went home without the drugs and skipped his next appointment. Gaziano was at the clinic for a year and never saw the patient again.

“It was a missed opportunity,” Gaziano said of the lack of drugs, recalling the incident in his office at Boston’s Brigham and Women’s Hospital. But, he added, an inexpensive way to assess the patient’s overall risk of heart disease could have resulted in successful treatment much earlier.

Gaziano’s goal was to devise just such a low-cost tool to determine each patient’s risk of disease. Eliminating costly lab work from risk assessment tests could prove a watershed in treating CVD in developing countries. Cardiovascular disease is the number one killer worldwide at 30 percent of all deaths, and accounts for 60 percent of all non-communicable diseases. In low- and middle-income countries, CVD is responsible for about 28 percent of all deaths and is growing rapidly. In South Africa, 25 percent of health care spending is already devoted to treating heart disease.

Since 2004, Gaziano has been working in South Africa and India to develop an inexpensive method of assessing risk of cardiovascular disease, funded by a Fogarty International Research Scientist Development Award (IRSDA), with additional support from the National Heart, Lung and Blood Institute.

Given the limited resources in developing countries, Gaziano set out to find a cost-effective risk assessment tool that modified the established Framingham Heart Study factors by substituting body mass index for blood cholesterol, along with blood pressure, diabetes, smoking age and sex. “With a blood test for cholesterol there was a cost, it was not available in many places, people frequently had to travel long distances for testing—losing time and work—so they might not be willing to do so,” Gaziano explained.

The question was whether removing the cholesterol



Photo courtesy of Dr. Thomas Gaziano

In South Africa, 25 percent of health care spending is already devoted to treating heart disease. A Fogarty-funded program is studying an inexpensive method of assessing risk of heart problems.

test would significantly alter the predictive effectiveness of the risk assessment.

What was needed was data from a span of years to see what disease developed—information that was not available in South Africa. In a study published in *The Lancet* in 2008, Gaziano and his fellow researchers used data from 15,000 U.S. patients in 1971 and substituted BMI for cholesterol and then applied follow-up data on the same patients from 1992.

“We found no difference in ability to assess total risk if we substituted BMI for cholesterol,” said Gaziano. He also found that the U.S. data from 1971 looked like South Africa in 2010—high smoking rates, elevated cholesterol levels and low treatment rates. “So the U.S. looked like a developing country at that time in many ways,” he said. Gaziano’s results were later validated by a follow-up study in South Africa that compares scores with and without blood testing. “We found 92 to 99 percent agreement in the scores for assessing risk,” he said.

Another part of Gaziano’s work is what he calls a “decision analytic model,” which calculates the different risk factors and attempts to find the most cost effective way of treating a patient. In other words, what would be

the cost of lowering blood pressure at so much per person and what impact would that have on preventing heart attacks and strokes. The goal is to decide which screening method is most cost effective.

For example, in India cholesterol testing costs from \$4 to \$30 per patient, but the annual per capita health expenditure by the government is only \$30, so using cholesterol testing as a risk assessment tool is not sustainable. “So now we’ve given them another option of how to screen for overall risk,” said Gaziano, “and the WHO, as a result of our work, has promulgated new guidelines that do not require cholesterol testing.”

Gaziano hopes to test these conclusions in a new trial, funded by NHLBI, with a projected 5,000 to 10,000 participants in South Africa, to gauge the efficacy of the new screening method.

Gaziano describes his work as one study begetting another as he has tried to refine risk assessment and screening tools for treatment of CVD. As the new study gets underway in South Africa, nurses in the Western Cape are using the revised risk tool.

One of the next steps he envisions is to train community health workers to use this risk tool at fairs or church days



Photo courtesy of Dr. Thomas Gaziano

Dr. Gaziano envisions training South African community health workers to use risk assessment and screening tools for treatment of heart disease at fairs or church days, where people routinely gather.

where people are gathered together. “This would reduce the burden on health centers and make it more likely the right patients get treatment,” he said.

Publication: <http://1.usa.gov/n1LqUV>

Inexpensive polypills may add years for heart patients



Photo courtesy of Imperial College London

For just pennies a dose, combination drugs known as “polypills” may add two years to the life expectancy of people at risk of heart disease in developing countries. A polypill is a combination drug containing multiple active ingredients, usually four or more.

Fogarty grantee Dr. Thomas A. Gaziano and his colleagues studied the cost-effectiveness of two different polypills in six low- and middle-income regions.

For primary prevention, they modeled the impact of a combination of aspirin, a calcium-channel blocker, an angiotensin-converting-enzyme inhibitor and a statin. For secondary prevention, they assessed the same combination of drugs but with a beta blocker instead of the calcium-channel blocker.

They calculated these approaches could result in a two-year gain in life expectancy. In addition, regimens of aspirin, two blood-pressure drugs and a statin could halve the risk of death from cardiovascular disease in high-risk patients.

The results are extremely significant for developing countries, which bear 80 percent of the cardiovascular disease burden. Gaziano concluded that this approach is cost-effective—according to WHO recommendations—and that developing countries should encourage the use of inexpensive polypills for both primary and secondary prevention.

The broad concept of such a therapy for cardiovascular disease has existed for decades. A 2003 article in the *British Medical Journal* coined the term polypill and proposed the concept of combining six medications that have long been used to treat CVD.

Publication: <http://1.usa.gov/nUXTD5>

The chronic challenge of household air pollution

By Steve Goldstein

Cooking the family meal is a universal activity but one with deadly consequences in much of the developing world. Unventilated, smoky stoves used for food preparation—together with many home heating sources—pose a significant threat.

From studies stretching over three decades, Fogarty grantee Dr. Kirk R. Smith has linked household air pollution (HAP) to chronic obstructive pulmonary disease, cataracts, pneumonia, TB and heart disease. Almost 90 percent of deaths from COPD occur in low- and middle-income countries, many in nonsmoking populations.

Photo by Curt Connermark/World Bank



From studies stretching over three decades, Fogarty grantee Dr. Kirk R. Smith has linked household air pollution to chronic obstructive pulmonary disease, cataracts, pneumonia, TB and heart disease.

Low birth weight may also result from household air pollution, Smith's studies have shown, which can have consequences over an entire lifetime, including increased risk of diabetes and other chronic diseases.

Household air pollution from combustion of solid fuels—such as wood, crop residues, animal dung, grasses and coal—used for cooking and space heating is one of the ten most important risk factors in the global burden of disease. In poor countries, indoor smoke from solid fuels accounts for an estimated 3.7 percent of the total disease burden. In India, approximately 70 percent of the population uses biomass fuel for cooking.

“There's only one environmental risk factor that operates 100 percent among the poorest and that's household air pollution,” said Smith, a researcher and faculty member at the University of California, Berkeley.

He says his biggest success is at Sri Ramachandra University in Chennai, India. Last year it launched the first master's program in environmental and occupational health in South Asia, thanks to six faculty trained at UC Berkeley with support from Fogarty's International Research and Training Program in Environmental and

Occupational Health. Dr. Sambandam Sankar—who earned his Ph.D. through this collaboration—is now recognized as one of India's leading experts on household air pollution research.

Almost 90 percent of deaths from COPD occur in low- and middle-income countries, many in nonsmoking populations.

“Until this collaboration took place, studies and databases on household air pollution were limited, in spite of having recognized HAP as a major risk factor for many of health impacts,” Sankar said in an interview. “This led to a large-scale HAP assessment study that created a baseline exposure database for particulate matter associated with combustion of household solid fuel combustion in rural areas of southern India.”

The specialized training in exposure assessment and advanced epidemiologic methods they received at UC Berkeley, prepared the Indian scientists to develop standard operating procedures used throughout the country.

Sankar said the Fogarty grants not only provided the opportunity to interact with Berkeley counterparts, but also led to broader exposure to the research community. “The support allowed us to present our findings at international conferences, thereby increasing the publishing potentials in international journals,” he said.

Grant writing instruction offered as part of the training generated five proposals from institutions in Nepal and India, four of which were funded through Fogarty. Two of the studies, including one linking tuberculosis and indoor biomass and kerosene use in Nepal, have been published. Other research questions have focused on the amount of particulate matter produced by HAP and effects on pulmonary function.

Smith and his colleagues have also been testing the effectiveness of the numerous models of cookstoves that have been developed to make indoor cooking safer. Their latest effort is a Fogarty-supported feasibility study of a program to provide advanced cookstoves to pregnant women as part of their prenatal care benefit package in India. If the pilot study shows women will actually use the stoves, they will work to scale up the effort in a much larger trial.

Publications: <http://ehs.sph.berkeley.edu/krsmith/>

Building the capacity to battle cancer

By Steve Goldstein

Mammograms are commonly used to screen for breast cancer in the United States, but are not widely practiced in many countries.

Most Latin American women don't take advantage of the screenings, even when they're offered for free. Dr. Beti Thompson of the Fred Hutchinson Cancer Research Center in Seattle wanted to find out why. She's using a Fogarty International Research Collaboration Award to study how health care workers in Chile can increase the number of women who have mammograms. Since breast cancer is the most common cancer among Chilean women and has a high mortality rate, it's not a trivial issue.

Thompson and her team used a randomized trial of 500 women to test three interventions. All women received screening information verbally from their general practitioners, some received follow up information by mail and some received the mailed information with an additional telephone call or home visit.

After six months, it was clear screening behavior increased dramatically with enhanced contact, Thompson reported. In the group that only received verbal information, merely 6 percent of women had a mammogram. But about half the women who received a follow up mailing were screened and 70 percent who received both the mailing and a phone call or home visit underwent mammograms.

Screenings are just one of the cost-effective interventions available across the four broad approaches to cancer prevention and control: primary prevention, early detection, treatment and palliative care. For years Fogarty has worked to attack cancer through its tobacco initiative and more recently through its NCD Lifespan and Medical Education

Partnership Initiative programs.

According to the WHO, even if current global cancer rates remain unchanged, the estimated incidence of 12.7 million new cancer cases in 2008 will rise to 21.4 million by 2030, with nearly two thirds of all cancer diagnoses occurring in low- and middle-income countries.

In Brazil, Fogarty grantee Dr. Eduardo M. Tarazona-Santos of the Universidade Federal de Minas Gerais is working to determine Latin America's genetic susceptibility to gastric cancer, the second highest cause of cancer deaths in the region. Gastric adenocarcinoma is associated with the high prevalence of infection with the type 1 carcinogen *Helicobacter pylori*, often found in developing countries.

Supported by Fogarty and the National Cancer Institute, Tarazona-Santos is studying the genetic history of gastric cancer patients and controls in Lima, Peru and Rio de Janeiro, Brazil. Preliminary results have been published.

Inflammatory Breast Cancer (IBC) is of clinical importance because it is found disproportionately in young women and has a high incidence in Egypt. Supported by a Fogarty International Research Collaboration Award, Dr. Bonnie F. Sloane of the Wayne State University School of Medicine in Detroit is helping to build a high caliber cancer biology research program in Cairo, focused on IBC.

Few students are trained in state-of-the-art research techniques in Egypt, so a major component of the partnership is training postgraduate Egyptian students both onsite and in the lab and research cores at Wayne State and the Karmanos Cancer Institute in Detroit. One trainee, Eslam El-Ghonaimy, spent five weeks this summer working at Karmanos learning several specialized culture and live-cell imaging techniques, a new area of research in Egypt.

Preliminary results suggest that the immune system may contribute to the unique phenotype of IBC patients. The collaborators hope to identify druggable pathways that can be targeted for new therapies. Findings have been presented at conferences in Cairo and Saudi Arabia. Sloane said that Fogarty "provided us with key financial support and served as evidence that our collaborations were recognized internationally."

Publications: <http://bit.ly/nSigBl>
<http://1.usa.gov/mWwtDs>



Photo by Dr. D.P. Singh/PhotoShare

At current rates, the incidence of cancer will rise to 21.4 million cases worldwide by 2030. Fogarty research training programs seek to build capacity in developing countries to improve the diagnosis and treatment of the disease.

Shining a spotlight on NCDs

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



The human and economic costs of non-communicable diseases are staggering. Two out of every three deaths are attributable to NCDs, principally cardiovascular disease, diabetes, cancer and chronic respiratory disease. Lost productivity and health care costs may amount to trillions of dollars over the next few decades.

What's more, 80 percent of these deaths—and the vast majority of such deaths in people under the age of 60—occur in countries with developing economies or economies in transition. That represents untold pain, suffering, disability and hardship for millions of people.

The toll on the global economy is alarming. For each 10 percent rise in mortality from non-communicable diseases, annual economic growth is reduced by 0.5 percent. Unless action is taken to slow or reverse current trends, a World Bank study has estimated that the economic burden of the major non-communicable diseases will cost the global economy some \$35 trillion from 2005 to 2030. For these reasons, the World Economic Forum has ranked these diseases as one of the top threats to global economic security.

We at Fogarty anticipated the growth of interest in NCDs. Awareness was stimulated five years ago by the Disease Control Priorities Project, which was designed to use cost effectiveness to improve health outcomes in developing countries. At that time, NCDs were identified as providing at least half of the “best buys” in health care, and we included it as a priority issue in Fogarty’s strategic plan.

September’s U.N. High-Level Meeting on Non-Communicable Diseases provides an exceptional opportunity to focus attention on the worldwide surge in NCDs. But given the previous focus on infectious disease and HIV/AIDS, most developing countries don’t have expertise in NCDs. This is where Fogarty plays an important role. Our training programs are beginning to build capacity to cope with these diseases in low-resource settings.

Fogarty is training diabetes researchers in India and raising awareness of the disease in a country that has the greatest number of diabetics in the world. In South Africa, we’re leading research in cost-effective ways to screen for heart disease. Ongoing research in South Asia on the effects of household air pollution may lead to a reduction in chronic respiratory disease. Another collaborative effort brings together Egyptian and American investigators to find new drug pathways to treat inflammatory breast cancer.

Collaboration is vital and NIH is rising to meet the challenge. Our colleagues at the National Heart, Lung and Blood Institute have established Centers of Excellence in developing countries to combat NCDs, the National Cancer Institute and National Human Genome Research Institute have established a global cancer genome atlas and the NIH Director recently launched an effort to study the genetic basis for diseases across Africa, a project called H3Africa.

Many sectors of society will need to pull together to address this formidable foe, including health care organizations, agriculture, the food industry, educational institutions, governments and nonprofit organizations. And, to ensure the most effective and efficient use of very limited resources, it is imperative that these efforts are supported by a firm foundation of scientific data generated by well-designed research studies.

Innovation in medical research today is not the sole province of the developed world. Yes, advances made by U.S. researchers will help to reduce the worldwide burden of non-communicable diseases. But our nation’s health also stands to benefit from the creative, cost-effective ideas of researchers in developing nations. International partnerships are crucial to fighting this massive epidemic. The Global Alliance for Chronic Diseases, which includes NIH and the world’s major medical research agencies, recently launched an initiative to support research on hypertension in low- and middle-income nations.

All nations are feeling the devastating impact of cancer, heart disease and other non-communicable diseases and, consequently, must be part of the solution. This convergence of interests presents exceptional opportunities—and enormous responsibilities—to those of us in the medical research community.



Colglazier new S&T advisor at State

Dr. E. William (Bill) Colglazier, recently retired executive officer of the National Academy of Sciences and the National Research Council, is the new Science and Technology Adviser to Secretary of State Hillary Clinton. The office is charged with providing scientific and technical advice in support of U.S. foreign policy.



Pablos-Méndez joins USAID

Former Fogarty Advisory Board member Dr. Ariel Pablos-Méndez has been sworn in as the new Assistant Administrator for the Global Health Bureau at USAID. An experienced public health physician, he was recently Managing Director at the Rockefeller Foundation.



Former NIH Director Healy dies

Former NIH Director Bernadine P. Healy, the first woman to lead the organization, died in August. Dr. Healy, who served as director from 1991 to 1993, launched the Women's Health Initiative, the most far-reaching trial of women's health ever undertaken in the United States.



Pinn retires from NIH women's health office

Global health advocate Dr. Vivian Pinn has retired as Director of the Office of Research on Women's Health at NIH after 20 years of service, having fostered advances in the health of, and medical career opportunities for, women and minorities. Deputy Director Dr. Janine A. Clayton is serving as acting director.



Rao to head new stem cell center

Dr. Mahendra S. Rao, internationally renowned for his research on human embryonic stem cells, has been appointed as director for the new NIH Intramural Center for Regenerative Medicine. The NIH-CRM is an initiative to create a world-class center of excellence in stem cell technology at NIH.



South Africa honors Quarraisha Abdool Karim

Dr. Quarraisha Abdool Karim, associate scientific director of the Centre for the AIDS Programme of Research in South Africa (CAPRISA), is the recipient of the Distinguished Women in Science award of the government of South Africa. Her work on the CAPRISA 004 Tenofovir gel trial was cited.



UCSF names Sepúlveda head of global health

The University of California, San Francisco has named Dr. Jaime Sepúlveda as executive director of UCSF Global Health Sciences. Previously, he was senior fellow at the Bill & Melinda Gates Foundation and, from 2003 to 2006, led Mexico's NIH. He's a former Fogarty Board member.

Nutrition library launches

WHO has unveiled an electronic Library of Evidence for Nutrition Actions—an online reference of current scientific evidence and nutrition recommendations. It will help researchers design, implement and evaluate interventions for maternal and child health.

Website: www.who.int/elena

New site for dengue initiative

The Dengue Vaccine Initiative has a new website. The consortium of organizations is seeking to introduce a vaccine in over 100 countries where dengue is now endemic.

Website: <http://www.denguevaccines.org>

Lancet's global health portal debuts

The Lancet has launched a new Global Health Portal, which offers free and unlimited access in one location to all content from the journal's various platforms and sections.

Website: <http://www.thelancet.com/global-health>

Best practices for mixed method research

NIH has released recommendations for best practices in combining qualitative and quantitative research. Prior to this report, there were limited guidelines for scientists seeking funding for research with mixed method designs.

Report: <http://bit.ly/qvX4pL>

Ovarian cancer analysis in Genome Atlas

An analysis of genomic changes in ovarian cancer provides the most comprehensive and integrated view of cancer genes for any cancer type to date. The study was done by The Cancer Genome Atlas Research Network, an NIH consortium.

Report: <http://bit.ly/17tdHc>

New report on Fogarty mission

Fogarty's mission and achievements are detailed in a new article in *Infectious Disease Clinics of North America*, written by Drs. Joel G. Breman, Kenneth Bridbord, Linda E. Kupfer and Roger I. Glass, the Fogarty director.

Article: <http://www.id.theclinics.com/current>

Funding Opportunities

Program	Contact	Receipt Date	Eligibility
Administrative Supplements for the Initiative on Research and Innovation Management (iRIM)	Leticia B. Robinson, Ph.D. FICMEPI@mail.nih.gov	Oct. 14, 2011	Currently funded IEARDA and MEPI institutions.
Limited Competition: Global Health Program for Fellows and Scholars (Global Health Fellows) (R25)	Myat Htoo Razak, Ph.D. MyatHtoo.Razak@nih.gov	Oct. 14, 2011	Fellows: Post-doctorates (in either post-residency clinical fellowships or in other health-related post-doctoral programs from the U.S. and LMICs). Scholars: Doctoral level U.S. students in the health professions.
Ecology of Infectious Diseases (EID) Announcement on National Science Foundation website (NSF 10-616)	Christine Jessup, Ph.D. Christine.Jessup@nih.gov	Dec. 14, 2011	Proposals for research on disease systems of public health concern to developing countries are strongly encouraged, as are disease systems of agricultural concern.

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

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African genetics, nursing opportunities released



The NIH has released several funding opportunity announcements for its Human Heredity and Health in Africa (H3Africa) project, intended to enhance the ability of African scientists to use cutting-edge research approaches to the study of diseases of importance in Africa and around the world. H3Africa is a partnership with The Wellcome Trust, a global charity based in London, and the African Society of Human Genetics.

Fogarty is participating in the trans-NIH initiative that is expected to award about \$53 million over the next five years—\$37.25 million from the NIH Common Fund and \$15.75 million from individual institutes and centers. The Wellcome Trust is contributing \$12 million to the effort over a similar time period.

Full announcement: www.genome.gov/27545142

Also, applications are now being accepted for the Global HIV/AIDS Nursing Capacity Building Program, supported by the President's Emergency Plan for AIDS Relief. Up to \$9.5 million over five years will support nursing and midwifery education in at least 12 PEPFAR countries. The Health Resources and Services Administration is coordinating the initiative.

Full announcement: <http://bit.ly/peJtIN>

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