



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

Mobile health summit focuses on new technologies used in global health research

By Jeff Gray

Photo courtesy DataDyne.org



Mobile technologies are proving to be valuable tools for research projects conducted in low-resource settings such as this measles survey in Zambia.

Cell phones, personal digital assistants and other hand-held devices are rapidly transforming the way medical information is collected in the developing world and hold enormous potential for monitoring outbreaks, facilitating research and improving health care delivery for millions.

Hundreds of scientists, information technology developers and policymakers gathered recently to discuss these topics at a mobile technologies meeting organized by the Foundation for the National Institutes of Health and sponsored by Microsoft Research. The three-day event, called the mHealth Summit, focused on the use of mobile technologies as tools and platforms for health research and healthcare delivery. The event drew an overflow crowd,

continued on p. 10

Fogarty awards \$13 million in Recovery Act funds



Fogarty International Center has allocated about \$13.3 million of its Recovery Act funds for 65 awards that support research on diverse topics from brain disorders to biodiversity, and provide research training for college students and post-docs. Also, three successful Challenge Grant proposals

submitted to NIH in response to Fogarty's topic areas received an additional \$3 million in total from the agency's central Recovery Act fund. Under ARRA, projects are supported for up to two years.

Fogarty has nearly \$3 million in remaining funds it

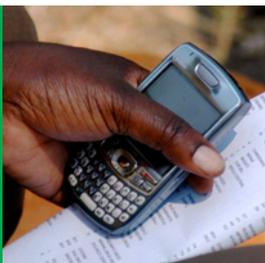
plans to award during the second year of the stimulus program. Several initiatives are being planned and will be announced soon.

"We are grateful for this opportunity to preserve and create jobs in the biomedical research arena, that is so important to our country's economic recovery," said Fogarty Director Dr. Roger I. Glass. "We are especially pleased to nurture the careers of young people interested in working to improve global health."

In addition to three centrally funded Challenge Grants, Fogarty also supported two additional proposals. Topics

continued on p. 13

FOCUS



mHealth Summit

- How are high-tech innovations being used in low-resource settings?
- What apps are coming next?
- What are PEPFAR's plans for mobile technologies?

Complete coverage on pages 8-14

NIH leaders celebrate 30 years of research with China

More than 100 cancer experts from the United States and China gathered in Beijing recently to celebrate the 30th anniversary of a research partnership between the two countries and to discuss new opportunities for future scientific cooperation.

Participants, including Fogarty Director Dr. Roger I. Glass, reviewed the history and scientific accomplishments of joint U.S.-China research and research training efforts over the last three decades, and identified emerging opportunities for future cooperation in areas including molecular epidemiology, genomics, proteomics and nanotechnology.

Chinese meeting co-chair Professor Qimin Zhan, vice president of the Chinese Academy of Medical Sciences, noted, "I look forward to new collaborations. As a result of these discussions at the meeting, we will find new points, some common ground and common interests for future projects. I'm confident of that."

National Cancer Institute Director Dr. John E. Niederhuber, other NCI leaders and scientists, and their Chinese counterparts discussed joint efforts on a range of topics including cancer research, occupational and environmental health, tobacco control, and complementary and alternative medicine.



Fogarty Director Dr. Roger I. Glass (center) celebrated 30 years of US-China research collaborations with Fogarty trainees in Beijing.

"Large numbers of Chinese scientists trained in the United States are returning to leadership positions in China's biomedical research sector," said NCI Deputy Director Dr. Anna Barker, the U.S. co-chair of the meeting. These interactions have helped to further strengthen the countries' relationships, facilitating communication and mutual understanding, she added.

U.S., Russia agree to form research partnerships

U.S. and Russian officials have signed an agreement to collaborate on biomedical research projects and to facilitate academic exchanges between the two countries.



NIH Clinical Center Director Dr. John I. Gallin (left) visited Prof. Elena N. Baibaraina at the V.I. Kulakov Federal Research Center in Moscow to discuss developing a clinical research training program in Russia. Fogarty Director Dr. Roger I. Glass (right) paid tribute to a sculpture of the center's namesake.

Fogarty Director Dr. Roger I. Glass traveled to Moscow recently to formalize the pact with his counterpart at the Russian Academy of Medical Sciences. Other signatories include the U.S. National Academy of Sciences and the Institute of Medicine.

The organizations plan to create a bilateral Health Sciences Forum to bring together U.S. and Russian researchers through regular scientific meetings, develop additional collaborative projects and facilitate academic exchanges. These initiatives will be supported through public-private partnerships. NIH Clinical Center Director Dr. John I. Gallin joined Glass for the visit, which included discussions about developing a clinical research training program in Russia.

Malaria initiative convenes in Kenya

Several thousand researchers, health workers and policy makers gathered recently in Nairobi, Kenya for the fifth Multilateral Initiative on Malaria conference. The initiative, commonly known as MIM, has become the largest collaboration of malaria experts worldwide.

Key issues regarding malaria drug treatments were explored, including the affordability of medicines, poor antimalarial drug quality and improving access to artemisinin combination therapy. Participants also discussed the U.S. President's Malaria Initiative and collaborative approaches to scaling up interventions.

The University of Yaounde in Cameroon will be the next MIM secretariat.

Conference reports are available online: <http://bit.ly/6atigJ>

U.S.-India research collaborations celebrated

U.S.-India research collaborations were celebrated at a number of events this fall, including a state visit by Indian Prime Minister Manmohan Singh and a number of high-level gatherings on the NIH campus.

During their talks, Prime Minister Singh and President Barack Obama reaffirmed their countries' strong commitment to advancing public health and biomedical research and programming collaborations.

In addition to extensive ongoing India-U.S. partnerships in the public health and scientific sector, the White House released a communiqué describing these new developments:

Medical Research: Noting a fifty-year history of bilateral innovation and discovery in the medical research field, President Obama and Prime Minister Singh agreed to enhance collaborative biomedical, public health and translational research focused on infectious and aging-related chronic diseases, maternal and child health, and family planning, while also strengthening health research capacity and the translation of scientific discoveries into life-saving practices of global benefit.

Global Disease Detection Program: The leaders announced India as the seventh regional center in the Global Disease Detection (GDD) network. GDD activities include collaboration on emerging disease detection and response, pandemic influenza preparedness and response, laboratory systems and biosafety, field epidemiology training, health communications, and zoonotic disease investigation and control.

Polio Eradication: India recently developed a bivalent polio vaccine which has potential application in all polio-infected countries.



Indian Prime Minister Singh and U.S. President Obama reaffirmed their commitment to strengthen US-India research collaborations during the recent state visit.

Cooperation on Urban Health: The U.S. Agency for International Development will soon launch its new Health of the Urban Poor Program, which aims to improve reproductive and child health in urban poor populations, especially for those dwelling in slums, by building the local capacity, improving program implementation and increasing resource allocation for urban health through policy analysis. The program will work in close collaboration with urban local bodies and Indian national and state governments.

Health Services and Regulatory Harmonization: The U.S. and India will continue to collaborate on activities that enhance healthcare, including concrete programs for biomedical technical exchanges, fostering regulatory harmonization and sharing best practices in technology transfer. The U.S.-India High-Technology Cooperation Group's Working Group on Biotechnology and Life Sciences anticipates expanded work on these topics and promotion of institutional linkages, including

a workshop on medical technology regulations in India during early 2010 and at the Biotechnology Industry Organization's 2010 international convention.

Status of Health Dialogue: The first meeting of the U.S.-India Health Dialogue is planned for early 2010 in Washington. Secretary of Health and Human Services Sebelius is the U.S. lead and Minister of Health and Family Welfare Azad will lead for India.



India's Secretary of Biotechnology, Dr. M.K. Bhan, met with Indian post-docs doing fellowships at NIH to discuss employment opportunities available to them in India's booming research enterprise. The Indian government is tripling its investment in science and technology. (For more, see page 5)

White House photo by Pete Souza

Photo by Jeff Gray

U.S.-India research collaborations addresses HIV, other sexually transmitted diseases

By David Taylor

U.S. and Indian scientists gathered recently at NIH to review progress on international research collaborations in the area of HIV/AIDS and other sexually transmitted diseases.

Asia, home to 60 percent of the world's population, is second only to sub-Saharan Africa in terms of the number of people living with HIV, according to the latest U.N. statistics. India accounts for roughly half of Asia's HIV prevalence. This session of the US-India Joint Working Group on Prevention of Sexually Transmitted Diseases and HIV/AIDS was the first opportunity for researchers to report on progress made under grants awarded since

Nine NIH Institutes and Centers are participating in the effort, which has three components: to make awards to extramural researchers, to support intramural labs at NIH to expand their collaborations with Indian counterparts, and to support workshops and meetings that encourage collaboration and information sharing.

This collaborative program awarded 16 extramural grant supplements in 2007, six grants for exploratory research in 2008, and supported a total of seven intramural projects in 2007 and 2008, ranging across the behavioral and biological sciences. In just two years the funded researchers have already produced findings on risk behaviors and further opportunities for HIV prevention and treatment.

Dr. V.M. Katoch, Secretary of India's Health Research Department, and the meeting's co-chair, called the program "very productive and very vibrant" and "a unique opportunity from the Indian side."

"This is an exciting meeting," observed Fogarty Director Roger I. Glass, "and comes at a wonderful and propitious time." Global health ranks among the top priorities for NIH Director Francis Collins, Glass noted, and the new U.S. administration has committed itself to India, Glass told the 50 participants and observers.

Besides beginning to yield new research directions, the program has strengthened a corps of researchers working on HIV/AIDS through a number of workshops and meetings, including, for example, a session on prevention, care and treatment of HIV-related co-morbidities.



Fogarty Director Dr. Glass told participants of the US-India Joint Working Group on Prevention of Sexually Transmitted Diseases and HIV/AIDS that the new U.S. administration is committed enhancing research partnerships with India.

the program began in 2006. The initiative is part of the implementation of the U.S.-Indo Joint Statement on Collaboration on Prevention of Sexually Transmitted Diseases and HIV/AIDS signed by the HHS Secretary and the Indian Minister of Health.

The working group was established to develop research collaborations and facilitate the expedited review and clearances of funded bilateral projects. This meeting included working group members, U.S. and Indian representatives of the panel of eminent scientists appointed to review the research proposals, NIH program staff, and scientists whose projects received awards.

"This has been a successful two years with a lot of work on both sides," observed Dr. Jack Whitescarver, director of the NIH Office of AIDS Research (OAR) and the JWG's co-chair, who congratulated the researchers and program personnel. The OAR coordinates AIDS research conducted by every NIH Institute and Center, and established this program to promote collaborations between U.S. and Indian scientists on HIV/AIDS research.



The meeting was the first opportunity for researchers to report on progress made since the joint U.S.-Indian effort began in 2006.

NIH hosts Indo-U.S. science & technology meeting

A high-level meeting focused on increasing interactions between the United States and India in the areas of biomedical research, engineering, and technology recently convened at NIH. The Indo-U.S. Science and Technology Forum, the sponsor of the meeting, was established in 2000 as an autonomous, non-profit society to facilitate increased cooperation between the two countries. The group is comprised of senior government officials, members of academia and representatives of private industry.

“These collaborations go back 20 years,” said Fogarty director Dr. Roger I. Glass, one of the governing members of the organization. “This forum is really about how we can sustain and build on these partnerships.”

In addition to numerous presentations and discussions, the meeting also featured the release of the organization’s latest progress report, which emphasizes India’s development as a knowledge center. With the recent establishment of several new science and technology institutions, the report says the scope for enhanced engagement between India and the U.S. “holds promising, but nevertheless, challenging potential.” It also identifies the need for new models and frameworks for collaborative efforts in order to seize the emerging opportunities.

“India is poised for a transformational change” said Dr. T. Ramasami, Secretary of India’s Department of Science and Technology. “In recent years, decisions were made to triple the Indian government’s investments into science and technology.”

Several Indo-U.S. advances in the biomedical sciences are showcased, including new low-cost diagnostic and therapeutic technologies, cutting-edge mitochondrial

Additional training was provided through a grantsmanship workshop for new investigators held in New Delhi. Meeting participants discussed other ways that the program could foster a new generation of HIV/AIDS research teams. Officials from both governments agreed that short-term training exchanges can help expand the pool of HIV/AIDS biomedical and behavioral researchers. OAR has piloted the Intramural-to-India (I-to-I) Program to draw on NIH’s broad internal expertise in HIV/AIDS research and widen the network of NIH scientists working with Indian researchers.

“The I-to-I program has demonstrated how much interest



Photo by Jeff Gray

Dr. Norm Neureiter (far left) of the American Association for the Advancement of Science, helps Indian ambassador to the U.S. Meera Shankar unveil the Indo-U.S. Science and Technology Forum’s new annual report. India’s Secretary of Science and Technology Dr. T. Ramasami (far right) and other senior officials look on.

research, holistic approaches to autism and the integration of basic sciences into public health. Three new developments in cancer biology being researched jointly by U.S. and Indian institutions are also highlighted—targeted therapeutics, stem cells and nanotechnology.

India’s ambassador to the U.S. Meera Shankar says the countries share a rich history of scientific collaboration that holds great potential. “Today, the Indian-U.S. relationship has transformed into a strategic partnership,” she said. “Cooperation in science and technology between India and the United States will be a very important instrument for finding solutions to the common challenges that we face.”

The Indo-U.S. Science and Technology Forum report is available at: <http://www.indousstf.org>.

there is in this collaborative program,” said Dr. M.K. Bhan, Secretary of India’s Biotechnology Department.

Both the U.S. and Indian government members of the working group agreed to continue the research partnership and are discussing possible initiatives for the next phase of the collaboration.

The Indian delegation’s visit also included meetings with NIH leadership including Dr. Francis Collins and several Institute Directors, meetings on maternal and child health and vaccine research, and an interactive session with NIH Visiting Fellows.

Iran's health houses provide model for Mississippi Delta

By Ann Puderbaugh

A rocky, remote region of southern Iran may not seem the most likely place to look for a health care delivery model that would work in the U.S. But the remarkable success of Iran's health house concept—in which small primary care centers are located in each community—is providing hope and inspiration to officials in the Mississippi Delta.

After decades of frustration and millions of dollars invested with dismal results, Mississippi health care pioneer Dr. Aaron Shirley knew he needed a fresh approach. In some parts of his state, the infant death rate for nonwhites is on a par with Libya and Thailand. Mississippi's health consistently ranks dead last among states in annual tallies produced by the United Health Foundation. It has the highest rates of obesity, hypertension and teen pregnancy in the country, with about 20 percent of its population lacking health insurance.

"We've been attacking this problem over and over again with just heartbreaking results," said Shirley, chairman of the Jackson Medical Mall Foundation, a one-stop health care facility for Mississippi's underserved. "Instead of bragging about the number of buildings that get put up, I'd like to focus our efforts on improving health outcomes by providing primary care to people right in their communities."

Turning to Iran for advice

Together with James Miller of the Oxford International Development Group, Shirley reached out to Iranian health care experts for advice. He knew WHO and World Bank evaluations indicate positive outcomes from Iran's novel health house concept and thought it might provide the solution for his own population.

He discovered his Iranian counterparts are dealing with many of the same issues he faces: lack of funding and trained personnel. And yet they are having stunning successes, reducing child mortality rates by about 70 percent since 1980 and increasing contraception rates to 90 percent, even in rural areas.

Shirley and Miller began conversations with officials from the Shiraz University of Medical Sciences (SUMS), which manages more than a thousand urban and rural public health facilities in Iran's Fars province, in addition to training health care workers and conducting research



Photo by Dr. Mohammad Shahbazi/Jackson State University

Mississippi health care pioneer Dr. Aaron Shirley visited Iran to learn how he could adapt the successful health house concept of primary care delivery for use in the Mississippi Delta.

projects. Over time, they built a relationship based on mutual respect and a desire to share information.

"There are many significant areas of collaboration open to us, both in areas of research, academic exchanges and healthcare delivery, all of which will increase understanding and friendship between our two nations and its peoples," according to Dr. Hassan Joulaei, health deputy at SUMS.

Health house concept achieves results

Their ongoing dialogue led to an invitation to examine Iran's system in person. During a visit to Shiraz in May 2009, Shirley and his team discovered some fundamental differences between Iran's approach and the one used in the Delta.

In Iran, preventive care is a priority and special attention is paid to high-risk groups such as mothers and children. Health care workers are chosen and trained within each community. Preventive and curative programs are integrated seamlessly. The system is decentralized, which encourages regional facilities to become self-sufficient and empowers local communities.

In contrast, Mississippi has a fragmented ad-hoc system of hospitals, health clinics and individual medical practices, says Miller. “Our public health programs and services aren’t integrated and are anything *but* user friendly. Our health research is often too narrowly focused on specific risk factors and, like the rest of the U.S., we place the emphasis on curing existing conditions rather than preventing them in the first place.”

Introduced in Iran in 1980, health houses are the basic unit of the rural health care structure, with responsibility for family health and wellness, census taking, public education, disease monitoring and control, environmental health, and the collection and reporting of health data. The health house staff—usually local residents who’ve been specially trained—refer patients to the area’s health center or district hospital if they need more sophisticated services.

Iran, US partnership forms

While in Shiraz, Shirley and his partners at Oxford International Development Group and Jackson State University signed a formal agreement with their SUMS counterparts to work together to adopt Iran’s model to suit the Delta’s unique needs, in addition to establishing educational exchange programs and joint research projects.

Last fall, in consultation with Fogarty’s Middle East officer, Judy Levin, it was Mississippi’s turn to host its Iranian partners for a conversation on how to reduce health disparities in both the U.S. and Iran. Participants explored the possibility of jointly designing an information system to track health factors among rural populations in the two countries and developing “sister” research projects examining the social determinants of health—or the *causes* of the causes of illness and disease.



Photo by WHO/Majgan Tavassoli

The U.S.-Iranian partnership project is planning joint research projects with counterparts at Shiraz University, using its health houses as research nodes.



Photo by Dr. Mohammad Shahbazi/Jackson State University

Iran’s child mortality rate has dropped by 70% since 1980, when the health house concept was first implemented.

Mississippi develops health house plan

Shirley and his team have developed a pilot community health house plan and are looking for funding to implement it. So far, more than 15 Delta communities have expressed interest in participating. “I believe this will provide a cost-effective way for us to provide quality primary care, engage local communities and empower individuals to take responsibility for improving their health,” he said.

“There are many significant areas of collaboration open to us, both in areas of research, academic exchanges and healthcare delivery, all of which will increase understanding and friendship between our two nations and its peoples.”

— DR. HASSAN JOULAEI, Health Deputy at SUMS

The project sites are intended to become permanent research nodes to generate health disparities data over time and the overall model is designed so that it is scalable and can be widely adapted.

“This is a wonderful example of how science can provide the basis for meaningful exchanges,” according to Fogarty’s Levin. “It also shows that great ideas can come from unexpected places and when we look outside our borders we discover how much we can learn from others.”

Mobile health: a high-tech innovation ideal for low-resource settings

Clinicians, scientists and software developers are increasingly employing a wide range of approaches to mobile health care delivery, electronic medical records management and long-distance research training. Programs vary greatly in terms of technological complexity, scalability and geography. But global health experts agree that innovative mobile communications platforms—particularly those that use cell phones—can effectively address critical shortages of trained health personnel in low-resource settings, both in the U.S. and the developing world.

Photo courtesy of Microsoft Research



A pregnant woman in Australia uses a portable monitor and smartphone to transmit vital data about her fetus, using technology developed by Microsoft and researchers at Edith Cowan University.

Facing communications challenges in his antenatal health care project on the Thai-Burmese border, Amnat Khamsiriwatchara from Thailand's Mahidol University turned to smart phones for the solution. Though his team members were operating in an area with no existing cell phone network and were often unable to transmit data in real time, they could upload malaria surveillance information to a server at a health center after visits to the area. The cell phone pilot was so successful, Khamsiriwatchara says there are plans to expand it to include other research topics and to broaden its reach to the Thai/Cambodian border provinces.

For a directory of open source software and other mHealth resources, please visit www.fic.nih.gov/mhealth

— All mhealth summit coverage by Jeff Gray

Cervical cancer, the most common cause of death among Botswanan women, is being addressed through a novel application of mobile technologies. Rachel Gormley, from the University of Pennsylvania, and her colleagues conduct visual inspections of the cervix using acetic acid or household vinegar and take photos using a Samsung U900 cell phone, which features a five-megapixel camera. The images are then transmitted to a gynecologist at a distant location who can provide diagnosis and treatment advice.

Despite technical constraints such as difficulty lighting the cervix, the image quality is suitable for diagnostic purposes, according to Gormley. "The great thing about this technology is that it combats the shortage of specialists—one gynecologist can be connected to multiple practitioners on the ground," said Gormley. "It utilizes infrastructure already in place and it allows for rapid exchange of information, even in areas that don't have consistent access to computers or the internet."

Cell phones also offer a degree of portability and safety that laptops cannot provide. DataDyne researcher Yusuf Ibrahim operates a project in Kenya that uses cell phones to combat the spread of polio by tracking vaccinations, monitoring outbreaks and redeploying resources to combat them. Working in the dangerous Turkana region of Kenya near the border with Sudan, Ibrahim and his associates could not travel safely with laptop computers, making cell phones a logical choice for DataDyne's Episurveyor program.

Rural Australia was the testing ground for a mobile fetal monitoring project. Dr. Martin Masek, a researcher from Edith Cowan University, tested low-cost Doppler-based fetal monitors that interface with smartphones, a development that has already benefited indigenous women in remote and rural Australia at risk for premature births and fetal deaths. He learned a valuable lesson about implementing technology. "Not every remote community is the same," said Masek. "What works for one, might not work for another."

In Malawi, the nonprofit organization FrontlineSMS helped the government employ cell phones to mobilize an army of volunteers to provide better care to the nation's rural areas and improve HIV and TB drug adherence. Josh

Photo courtesy of DataDyne.org



Cell phones offer a greater degree of portability and safety than laptops, which is key to projects such as this polio monitoring program in the dangerous Kenya/Sudan border region.

Nesbit, executive director of the nonprofit organization, purchased 100 cell phones and a laptop computer and brought in health workers for text message training. Nesbit and his colleagues also focused on creating a platform based on low-cost, readily available tools such as open-source software and \$7 solar phone chargers. Six months later, Nesbit returned to Malawi and found that the health workers had shifted patient follow-up information, HIV/TB data, patient care requests and general logistics to a text message format, saving them thousands of dollars and work hours.

“Whether you’re gathering it, recording it, moving it—almost everything a health care provider does is managing information. If it’s not done electronically, you’re losing efficiency.”

is actually managing information,” said Dr. Bill Tierney, a Fogarty informatics grantee and one of the co-creators of the OpenMRS program, a medical record system used widely in Africa.

“Whether you’re gathering it, recording it, moving it—almost everything a health care provider does is managing information,” Tierney said. “If it’s not done electronically, you’re losing efficiency.”

Although there are many different mobile technologies being employed in a variety of ways around the globe, information gathering and sharing is at the core of every m-health project. “Health care is an information business—when you think of health care, you’re thinking surgery or drugs people are taking, but health care

Hopkins taps into Uganda’s 3G network

Photo courtesy of Johns Hopkins University



Two limitations that global health researchers frequently face when implementing new distance learning and informatics programs are insufficient communications infrastructure and the lack of timely feedback regarding the effectiveness of the research and training being conducted.

A platform that bridges these gaps is Johns Hopkins University’s Electronic Mobile, Open-source, Comprehensive Health Application, or eMOCHA.

Dr. Robert Bollinger, a Fogarty informatics grantee, and his team have been spearheading efforts to create tools for distance learning programs in low-resource settings in India and sub-Saharan Africa. Though many of the platforms have been based on more traditional technologies such as web, CD-ROM and teleconferencing, eMOCHA relies on the use of mobile phones.

“Wireless access all over Africa is ubiquitous,” said Bollinger. Uganda is no exception, with powerful 3G capacity in 80 percent of the country. 3G, or 3rd generation, refers to high-bandwidth coverage that allows simultaneous use of speech and data services.

The eMOCHA platform is currently being used by PEPFAR, and connects 17 partners throughout Uganda with its nerve center at Mulago hospital in Kampala. Researchers there targeting rural health care workers develop and send out training tools, such as touch-screen data forms. The forms are received on android-supported smart phones and response data is sent back to the server.

The program has proved to be effective because of its speed and accuracy. Data can be linked to global positioning system coordinates and plotted on a map, allowing experts to identify training gaps. If the programs aren’t having an impact, the Mulago team responds by pushing out new training data and starting the cycle again.

“Building on that experience and that loop, we can continue to empower people locally as well as impact the outcomes we’re interested in,” said Bollinger. “We’re building a toolbox for distance learning, including eMOCHA, but our ultimate goal is to hand off that toolbox to people in India, Uganda and other places.”

Cell phone useful in research targeting Peru's sex workers

Sex workers, a stigmatized population, are also at risk for a host of sexually transmitted infections. As the marginalized women are typically reluctant to visit health clinics, mobile data collection devices are particularly useful to researchers and health workers dealing with this population.

In Peru, outreach teams preventively treat the sex workers for infections with the medication metronidazole, in addition to screening them for chlamydia and other conditions. Metronidazole, however, causes headaches, nausea and abdominal pain in some patients.

Since these side effects needed to be carefully monitored, the outreach teams had to track down sex workers in streets, bars, discotheques and even brothels to interview them. Initially, the data-gathering process relied on a paper-based system that proved to be inefficient and prone to privacy issues. Laptops were also tried, but because of their value and the personal information they carried, they put workers at risk for theft and assault.

Peru's mobile phone infrastructure is substantial, and it soon became obvious that cell phones would be the best means of gathering real-time medical data from the women.

"We have close to an 80 percent cell phone penetration rate," said Dr. Walter Curioso, a Fogarty grantee and physician-scientist at Cayetano Heredia University. "The market has been increasing since 1993 from almost 200,000 up to 23 million now."

By implementing the cellphone data collection system at his research sites in both urban and rural areas of



Mobile devices can make it easier for researchers to study populations, such as sex workers, that value privacy.

Peru, Curioso and his team were able to collect about 800 reports in three cities. They worked closely with the mobile technology company Voxiva, which provided the platform for the database server.

Using cell phones, the health workers collected information on side effects and sent the data to the server. If the database detected a severe adverse event, a text message and e-mail were generated and sent to a team leader, who contacted the community health worker in the field handling that patient. The health worker could access all of the data on the patient, including voice messages. Confidentiality and privacy were key concerns, so no names were collected on the database, only code numbers. The system greatly increased the ability of the public health workers at Cayetano to manage clinical STD programs, and gave them a means of real-time surveillance, according to Curioso.

Health worker surveys following the study showed support for the mobile technology and its user-friendly interface. Respondents identified the ease of reporting information as critical, since they often had only minutes to interact with the subjects to gather data. The sex workers also favored the cell phones, citing the confidentiality of the process and sensitive treatment of their personal information.

Mobile communications technology revolutionizes global health programs

...continued from p. 1

with about 500 attending in person and hundreds more via webcast.

"This is a wonderful time to focus on a topic that is clearly providing much opportunity both in research and in medical practice, but which has perhaps not been pulled together into one conference until now," said NIH Director Dr. Francis Collins, who identified mobile health technology as an area of great interest to NIH during his keynote

speech. "I think the attendance of this meeting really indicates the way in which this has tapped into the interest of broad numbers of organizations and individuals in the public and private sectors, both here in this country and, in fact, around the world."

Though some of the discussions dealt with new software and devices, much time was devoted to existing technologies such as smart phones and short message

service, commonly known as SMS or text messaging. While computers are still scarce in many parts of the world, cell phone usage is exploding in low-and middle-income countries. According to a recent U.N. report, mobile phones reached an average penetration rate of nearly 50 percent in developing countries in 2008, up from nearly zero 10 years ago.

“We’ve seen how the developing world is leapfrogging landline phones and going straight to mobile phones, and how this is improving lives in ways that we could never have imagined,” said Ambassador Elizabeth Frawley Bagley, Special Representative for Global Partnerships at the U.S. Department of State.

“The move to global health in the United States is really being driven on the university campuses, and there’s tremendous enthusiasm. The ability to link this enthusiasm with mobile technology is a combination of both the altruism of global health as well as the high-tech that mobile health technology can bring to the developing world.”

— DR. ROGER I. GLASS, Fogarty Director

Health and Human Services Secretary Kathleen Sebelius also emphasized the powerful potential of mobile health technology. “They’re the most direct, convenient and dependable form of communication we have,” she said. “We very strongly believe at HHS that this is a wave of the future and are very committed to not only experimenting with this technology but really driving it out.”

Many of the presenters at the summit were researchers and physicians who already use mobile technologies to advance health care and clinical research in low-resource settings. They reported a number of benefits, including increased training opportunities for health workers and greater access to health-related information for isolated and rural populations. They also cited better diagnoses of patients and more actionable and current public health information as examples of improvements facilitated by mobile technology.

In contrast, Richard Gakuba, e-Health Coordinator for the Rwandan Ministry of Health, outlined some of the challenges the new technologies bring. “We lack a skilled mass of people who can bridge that gap between health care and IT, and who can understand the business practice of health care,” he said. Some of the obstacles, such as the lack of significant IT skills among users of mobile devices in Rwanda, can be addressed through education, he suggested.



Photo courtesy of DataDyne.org

Computers are still not widely available in some countries but mobile devices are becoming ubiquitous.

Confidentiality and security issues were also highlighted, and questions were raised about how to protect patients’ privacy while using insecure devices like cell phones to transmit sensitive data. “You cannot have data that is both useful and completely anonymous,” said Dr. Mani Srivastava of the University of California, Los Angeles. Concerns about recycled cell phones and computers being used to manage patient information and other medical data were also voiced.

The overall mood of the conference, however, was one of optimism. Fogarty Director Dr. Roger I. Glass commented on the youth and energy of the speakers. “The move to global health in the United States is really being driven on the university campuses, and there’s tremendous enthusiasm,” he said. “The ability to link this enthusiasm with mobile technology is a combination of both the altruism of global health as well as the high-tech that mobile health technology can bring to the developing world.”

To view the webcasts or download the presentations, visit: <http://bit.ly/eTYzH>

Experts predict the future apps of mobile health

Much of the debate in health technology centers on the future of mobile health research and health care delivery. There are many nascent technologies on the horizon, as well as accompanying obstacles that policymakers, corporations, health workers and other stakeholders are confronting.

A number of cutting-edge devices, computer programs and creative strategies were recently unveiled at the mobile health summit, many of them based on the idea of expanding the capabilities of existing phones. A new technology that offered a possible glimpse of the future was a Microsoft program designed to make standard cell phones, or “dumb” phones, smarter.

Meanwhile, social networking software added to a cell phone based distance learning program encourages collaboration among research fellows in remote parts of India, said Dr. Mary Lee from Tufts University.

Other experts promoted the idea of moving away from standard cell phones to completely new, smaller devices. Clint McClellan, from the wireless technology corporation Qualcomm, emphasized the importance of small, low-cost or disposable devices in mobile health. Showcasing the world’s smallest phone on a chip and a disposable biometric patch meant to be worn, he described the devices as mere gateways to medical data.

The importance of establishing metrics to measure impact was identified as a necessity for moving forward. “Some may be related to process, some may be related to outcomes,” said Dr. Barbara Mittleman, director of the NIH’s public-private partnerships office. “But we especially need to understand the impact of our programs.”

Questions about the sustainability and scalability of the mobile platforms must be addressed, along with concerns about compatibility among various operating systems. Though many of the programs showcased were innovative, some were regarded as potentially lacking interoperability with other platforms. One of the many compatibility issues discussed was the tendency of cell phone and PDA manufacturers to require specialized chargers for their devices.

Some pilot programs were seen as technically innovative, but not well-suited for large-scale implementation, because of cost, logistical concerns or copyright issues. Some projects involved the use of both open-source and copyrighted software, making them less attractive options for some countries. Dr. Scott Ratzan, a former global health technical adviser at the U.S. Agency for International

Development and now vice president of Johnson & Johnson’s global health division, offered a simple solution, “If you don’t have a good business plan, don’t do the pilot.”

Security, privacy and other ethics-related issues are also emerging as mobile health platforms become more commonplace. Market forces and secure management of data often work against one another, and cell phones, despite their amazing potential for health data transmission and management, remain insecure platforms. Dr. Eric Rasmussen of Innovative Support to Emergencies, Diseases and Disasters pointed out that with millions of cell phones recycled annually and many villages sharing phones, underserved populations are especially at risk for the theft or misuse of medical data. Despite the security risks, however, most experts agree patients in low-and middle-income countries would most likely prefer the benefits of mobile health over secure data.



Photo courtesy of DataDyne.org

Developing synergy between nongovernmental organizations, corporations and ministries of health and finance in low-resource countries will be key to the long-term sustainability of mobile health programs such as this one in Ghana.

Greater synergy between nongovernmental organizations, corporations and the ministries of health and finance in target countries is perhaps the most vital requirement for the success of mhealth programs. Without that, sustainability is impossible, said Dr. Julia Royall of the NIH’s National Library of Medicine. “There are too many projects that come into Africa, where I work for example, where people come in with good intentions, tools get shared and some good things happen, and then they leave.”

“I would hope that you get the ministries of health of developing countries involved, as well as the ministries of finance, who make those financial decisions,” she advised. “That way the wonderful stuff you’re doing can be really integrated into how that country does its health business.”

Army employs text messages to treat soldiers

One application of mobile communication devices that is less well known is their use in the treatment of U.S. soldiers wounded in combat. In many cases, the returning service members live great distances from major military medical facilities and from their case managers.

A new army program using secure text messaging to communicate regularly with soldiers wounded in combat is helping to make this transition an easier process. Called mCare, the outreach effort works with the service member's personal cell phone, and strives to create continuous connectivity between the patient, their platoon sergeants and case workers, and informal caregivers such as family members and spouses.

Teams overseeing the treatment of the soldiers create personalized messages on a Web site. The messages are sent to a soldier's cell phone, he or she responds to the messages, and the care team views the responses and creates online reports based on them.

Frequent contact with the patients is crucial, as wounded



Photo courtesy of U.S. Army

soldiers can become isolated or forgetful of routines. "A lot of these of these soldiers may be suffering from traumatic brain injury or post-traumatic stress disorder," according to Col. Poropatich, M.D., from the Army's Telemedicine and Advanced Technology Research Center at Fort Detrick, Md.

Sometimes the texts are helpful tips, reminders of appointments or even news items or jokes, but Poropatich says they all play an important role in the soldiers' treatment.

Fogarty Awards \$13 million in Recovery Act Funds

...continued from p. 1

range from conducting research on childhood illnesses using hand-held electronic communication devices, developing distance-based learning initiatives, studying the effect of climate change on cholera, measuring cultural perceptions related to diet, and describing the link between heart disease and diabetes.

Through Fogarty's Brain Disorders program, five ARRA-supported grants are investigating neuro-infectious diseases including HIV/AIDS-related dementias, Batten's Disease, and the neurological consequences of cerebrovascular disease.

Possible new candidates for drugs that will combat cancer, HIV/AIDS and central nervous system disorders are being explored with a stimulus grant awarded by the International Cooperative Biodiversity Groups program.

Research to improve scientists' ability to forecast potential sites for river blindness outbreaks in remote areas of West Africa using satellite data and other information is being supported by an Ecology of Infectious Disease program award.

ARRA funds disbursed through the Frameworks for Global Health program are helping develop new curricula,

establish multidisciplinary networks, and create global health degree programs on 16 U.S. campuses, including four that are new to the program.

To keep pace with advances in information technology, ARRA funds are being invested through 23 awards that train personnel to use IT in their research projects, develop innovative methodologies to tackle research challenges and facilitate distance learning.

To encourage scientists to pursue a career track in global health, Fogarty is using stimulus funds for supplements to existing grants to support U.S. post doctoral researchers, creating or preserving 13 jobs. Topics under investigation include highly pathogenic avian influenza, HIV/AIDS, and others. In addition, stimulus funds are supporting four post-docs through International Research Scientist Development Awards. An award to Vanderbilt University will finance more than 20 one-year mentored research fellowships at foreign sites through the Fogarty International Clinical Research Fellows and Scholars program. Finally, several undergraduates were funded through NIH's central stimulus fund to assist in research.

For more about Fogarty's ARRA projects, visit www.fic.nih.gov/recovery/main.htm

PEPFAR is committed to mobile health solutions

The next phase of PEPFAR presents new challenges— how do we build on the successes of our first phase, shifting from emergency mode to a long-term solution? We will look to increasingly empower and build the capacity of local governments; train 140,000 new health care workers to strengthen the most vital part of a health system—its people on the front lines; and leverage our HIV/AIDS investments to strengthen overall health systems.

Shifting towards a long-term solution means taking advantage of the resources that are already in place, and the perfect illustration of this would be in mHealth. With over 2 million mobile phones sold in the developing world every day and substantial network coverage in Africa, there has been a paradigm shift in the communications infrastructure that we are just beginning to take advantage of.

So much of what we must do is communicate—whether it's reminding a patient to take their anti-retroviral drugs, educating the public about the facts and myths of HIV infection, or simply bringing patients back for a follow-up appointment. Utilizing the mobile phone technology backbone of the continent is crucial. PEPFAR has piloted projects that use mobile technologies track births and deaths in remote villages, monitor patients receiving home-based care and improve distribution of medicines, bed nets and contraceptives.

PEPFAR is a partner in an existing mHealth PPP—Phones for Health with Accenture Development Partners, GSM Association, Motorola, MTN, and Voxiva. Phones for Health was initiated in 2007 and is currently operational in Kenya, Tanzania, and Rwanda, leveraging over \$3 million in public and private resources annually to support HIV monitoring, Infectious Disease Surveillance and Response, blood transfusion services, and other services.

I'm thrilled that PEPFAR has signed an MOU to join the mHealth Alliance. By aligning ourselves with the UN, Vodafone and Rockefeller Foundations and others, we hope to: First, assist in the growth of the Alliance, and thus enable scalable and sustainable mobile technology innovation and impact through leadership, global advocacy

and coordination, and implementation activities; and secondly, strengthen country ownership and address PEPFAR priorities using mobile technology-enhanced solutions in emerging markets.



Dr. Eric Goosby

My office and the Alliance will work in close consultation with the PEPFAR country teams, implementing partners, host country counterparts—including Ministry of Health and Ministry of Telecommunications officials, mHealth Alliance donors, partners and affiliates in four concrete ways: One, we will share reference materials like landscape analyses, training curricula, regulatory standards, and local partnering agreement templates so that others may benefit from our existing investments.

Two, we will laser focus on Implementation and Capacity Building. We will work with the Alliance to provide PEPFAR country teams a platform and collaborative means to engage with the Alliance's stakeholder base with an eye toward strengthening our projects and services. Three, we will align our current Phones for Health PPP with the mHealth Alliance. After extracting lessons learned, we will encourage building upon the Phones for Health PPP implementation activities, where appropriate, to address PEPFAR programmatic challenges.

Finally, we will create an open technology platform for mHealth programs, communications, and partnerships. With cell phones in use in even the most difficult environments, mobile technology allows us to be more nimble, reach targeted groups more effectively, and better meet the needs of underserved or "hard to reach" populations with mobile tools and services that can truly transform healthcare—anywhere in the world.

Dr. Eric Goosby is Ambassador at Large and Global AIDS Coordinator, overseeing implementation of the U.S. President's Emergency Plan for AIDS Relief (PEPFAR), as well as U.S. government engagement in the Global Fund to Fight AIDS, Tuberculosis and Malaria.

Dr. Goosby delivered an expanded version of these remarks at the recent m-health summit. The full version is available at: <http://bit.ly/2QutEN>

PEOPLE

Global
HEALTH Briefs**Primack retires from Fogarty**

Dr. Aron Primack, program officer responsible for creating five major initiatives at Fogarty, is retiring from NIH and the United States Public Health Service at the end of the year.

One of his best-known achievements is Fogarty's International Clinical Research Scholars and Fellows Program, which offers graduate level students a year of mentoring at research sites in developing countries. Primack initiated and led the program, which has had nearly 400 participants since its inception in 2003. Several former fellows and scholars now receive funding through other Fogarty programs.

Primack was also responsible for launching the groundbreaking Trauma and Injury Research Training Program, which has helped bring about policy changes regarding traffic safety in several countries. In addition, Primack also helped develop the Global Research Initiative Program for New Foreign Investigators, known as GRIP, as well as research training programs in chronic diseases and tobacco.

"The impact of Aron Primack's work and leadership at Fogarty and NIH is immeasurable," said Dr. Ken Bridbord, director of international training and research. "The trainees from his programs have gone on to teach other scientists, and make advances and discoveries that save lives."

Primack plans to travel, spend more time with his children and grandchildren, and continue volunteering with an organization that provides health care to the uninsured.

USAID chief named

The Obama administration has named Dr. Rajiv Shah, a former executive with the Bill and Melinda Gates Foundation, to run USAID, America's top foreign assistance program. Shah, 36, whose family immigrated to the U.S. from India, had been serving as a senior official at the Agriculture department, dealing with food security.

US science envoys announced

Secretary of State Hillary Clinton has announced the creation of a U.S. Science Envoy Program, which will send America's most prominent scientists to travel the world to engage their counterparts, deepen and develop partnerships in all areas of science and technology, and to "foster scientific and technical collaboration."

Three initial emissaries were named including former NIH Director, Dr. Elias Zerhouni; UCSF professor and former *Science* magazine editor, Dr. Bruce Alberts; and Nobel laureate and California Institute of Technology professor, Dr. Ahmed Zewail.



Dr. Elias Zerhouni



Dr. Bruce Alberts



Dr. Ahmed Zewail

Chronic disease alliance sets priorities

The recently-formed Global Alliance for Chronic Disease—whose members collectively manage about 80 percent of the world's public health funding—has announced its first targets in the fight against chronic diseases. The group pledged to focus efforts on lowering high blood pressure, reducing tobacco use and addressing indoor pollution caused by cooking stoves. Fogarty and the National Heart, Lung and Blood Institute are founding members of the group and were recently joined by the National Institute of Mental Health. More info at: <http://www.ga-cd.org/>

Climate change effort launched

NIH teamed up recently with *The Lancet* and leading international organizations to address the public health impacts of climate change by promoting new strategies to reduce greenhouse gas emissions and improve health. Fogarty Director Dr. Roger I. Glass joined NIH partners in participating in the international launch via satellite from the National Press Club in Washington. More info: <http://bit.ly/60bBFX>

PEPFAR unveils new strategic plan

The U.S. President's Emergency Plan for AIDS Relief (PEPFAR) has unveiled its new five-year strategy detailing plans for "expanding its current partnerships with implementers, researchers, and academic organizations to improve the science that guides this work." PEPFAR also says it will improve contributions to the evidence base around HIV interventions, as well as broader health systems strengthening and integration. Full report: <http://www.pepfar.gov/strategy/>

HIV outbreak peaked in 1996

The number of people infected with HIV world-wide has remained unchanged at 33 million for the last two years, according to a report by the UN and WHO. Officials say the epidemic probably peaked in 1996 and is stable in most regions except for Africa, which last year accounted for 72 percent of the world's 2.7 million new cases. More info: <http://bit.ly/64u2II>

Funding Opportunities

Programs	Contacts	Deadlines
Fogarty International Research Collaboration— Basic Biomedical Research Award (FIRCA-BB) www.fic.nih.gov/firca	Kathleen Michels michelsk@mail.nih.gov	01/28/2010 05/28/2010
Brain Disorders in the Developing World: Research Across the Lifespan (BRAIN) – <i>AIDS and Non-AIDS</i> www.fic.nih.gov/brain-r01 www.fic.nih.gov/brain-r21	Kathleen Michels michelsk@mail.nih.gov	05/14/2010 08/23/2010

Global Health Matters

November/December 2009

Volume 8, No. 6 ISSN: 1938-5935

Fogarty International Center
National Institutes of Health
Department of Health Human Services
Publication No. 07-5369

Managing editor: Ann Puderbaugh
puderba@mail.nih.gov

Writers: Jeff Gray and David Taylor

Web manager: Anna Pruett Ellis

Designer: Carla Conway

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

Photo at bottom of page 1 courtesy of DataDyne.org

We need your help

We are planning to completely redesign the Fogarty Web site over the next year. Please take our **BRIEF ONLINE SURVEY** to let us know how we can serve you better: www.fic.nih.gov/survey

UPCOMING EVENTS

Interested in learning more about global health?

Sign up for a new course at NIH: *Introduction to Global Health*. Registration is open to all. Classes begin Jan. 26.

For more information, visit: <http://bit.ly/6VgOJF>

Register now for these meetings:

The Third Annual NIH Conference on the Science of Dissemination and Implementation

March 15-16, 2010
Hyatt Regency Bethesda

There is no registration fee. Please note the proceedings will NOT be webcast. For more information, visit: <http://bit.ly/4mNOw7>

Implementation Science and Global Health

March 17, 2010
Stone House, NIH campus

Fogarty will host a satellite meeting to the larger conference for its grantees and trainees. For more information: <http://bit.ly/599LJ5>

Oceania Influenza Research Workshop

March 15-19, 2010
Melbourne, Australia

Please submit abstracts by Jan. 15, 2010.
For more information: <http://bit.ly/6P17d6>