

CDC Global Health *E-Brief*

Strengthening Health Systems Globally

Fourth Quarter 2008

WELCOME to the fourth quarter E-Brief, designed to inform readers about key global health activities at the Centers for Disease Control and Prevention (CDC). Our last issue of the year focuses on the agency's continued efforts to help strengthen health systems around the world. Unprecedented levels of funding for global health, coupled with the strong U.S. Government commitment to global health, demonstrated by major initiatives such as the President's Emergency Plan for AIDS Relief (PEPFAR) and the President's Malaria Initiative (PMI), represent tremendous opportunities to improve health systems and promote the delivery of adequate and equitable health services. CDC is committed to empowering our host country government partners to establish capacity to address their own health priorities. The current issue offers a snapshot of how CDC has shared its core expertise to help strengthen health systems and improve the world's health. ✧

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Centers for Disease Control and Prevention
Coordinating Office for Global Health
www.cdc.gov
www.cdc.gov/cogh



IN THIS ISSUE

- 1 Investment in Human Capacity Strengthens Public Health Expertise in Cote d'Ivoire
- 3 Enhancing Surveillance and Outbreak Response Capacity in Pakistan
- 3 Routine Immunization Services: A Platform to Strengthen Systems
- 5 Building Laboratory Capacity: Accurate, Timely Lab Results Are Essential to Safeguarding the World from Infectious Disease Threats
- 5 WHO Global Salm-Surv Network Strengthens Foodborne Disease Outbreak Detection and Response

Investment in Human Capacity Strengthens Public Health Expertise in Cote d'Ivoire

Since the first public health agreement between the United States and Cote d'Ivoire in 1987, CDC has worked side by side with Ivoirian scientists and the Ministry of Health (MOH) to build top-notch infrastructure and expertise to shape a national response to HIV. In those 20-plus years, the CDC Retrovirus Cote d'Ivoire (CDC Retro-CI) project in Abidjan has answered some of the most important questions about HIV worldwide, while strengthening the country's overall health system and workforce.

Cote d'Ivoire's history of political instability and random violence, coupled with the highest HIV prevalence in West Africa, created a challenging environment for leaders and public health workers. From the beginning of the program, CDC understood that the

country's capacity to sustain HIV prevention and control activities would require a national cadre of Ivoirian public health, laboratory, and medical providers to implement national HIV/AIDS services. To meet the need, CDC established a comprehensive training program and close mentorship of Ivoirian students, medical professionals, and MOH staff in public health, laboratory and behavioral sciences, epidemiology, clinical services, and research.

"Before CDC came to Cote d'Ivoire, our response to HIV was disorder, chaos. We didn't have HIV testing. But CDC Retro-CI helped us organize ourselves (into) a national fight against HIV," according to one Public Health official.

The program began with the recruitment of four Ivoirian doctoral candidates in Europe, who were asked to return to their home country to provide technical leadership in the CDC Retro-CI laboratory. Their leadership helped CDC Retro-CI support routine training of hundreds of laboratory technicians throughout the country and region in HIV, TB, and STD diagnostics; virology; immunology; and biosafety. At the same time, CDC supported the strengthening of the Retro-CI laboratory to become a world-class facility—and the first lab with its level of capacity in sub-Saharan Africa.

CDC Retro-CI soon became a regional Center of Excellence, and laboratory technicians from Mali, Senegal, Ghana, and other countries made regular trips to Abidjan for training. Laboratory staff from CDC Retro-CI also provided expert technical assistance to lab professionals from other countries, conducted regional training, and offered 3- to 4-month details for advanced training. The lab currently also serves as a teaching laboratory for medical students pursuing doctoral-level coursework in microbiology and related sciences.

From its first days, CDC Retro-CI hired lab and research staff and provided on-the-job training to develop Ivoirian professionals who could conduct the expanding CDC-supported research and program activities. As former Retro-CI Director Dr. Stefan Wiktor points out, "very few expatriate staff were resident in-country, so Retro-CI was a product of Ivoirian staff, of their professional evolution from medical students to directors of world-class research trials, which we helped to support." For more than two decades, CDC Retro-CI directors have personally mentored and trained dozens of Ivoirian medical providers and researchers to manage clinical research, collect and analyze data, and produce scientific publications.



Laboratory technicians in Cote d'Ivoire and other countries in the region have been trained at CDC Retro-CI's world-class laboratory facility in Abidjan.

As part of a long-term strategy, CDC Retro-CI partnered with the Ivoirian MOH to regularly sponsor Ivoirian medical doctors for 2-year, on-the-job trainings in epidemiology and public health. The program has also worked with the U.S. National Institutes of Health's Fogarty International Center to support one or two Ivoirian MOH professionals each year in their pursuit of advanced degrees in public health, epidemiology, and biostatistics at University of California Berkeley and (with Belgian assistance) at the Antwerp Institute of Tropical Medicine.

Many former trainees and employees of CDC Retro-CI credit the project's investment in Cote d'Ivoire's workforce and establishment of a public health approach in the country with having transformed their personal careers. "I felt very fortunate to be among the few that received graduate training abroad," said one graduate. "We don't have these opportunities in my country. It opened doors."

Developing a competent and skilled public health workforce is the keystone of CDC Retro-CI-supported HIV/AIDS activities in the country. CDC Retro-CI's commitment and comprehensive approach to developing health workforce capacity has resulted in a large cadre of public health professionals in Cote d'Ivoire and the surrounding region. These professionals apply the training and expertise they received to their work at the MOH, multilateral organizations, and civil society. The close network formed among the participants of CDC Retro-CI is a visible legacy. ✧

Enhancing Surveillance and Outbreak Response Capacity in Pakistan

In December 2007, a suspected cluster of human avian influenza cases was identified in a family living in the northwest region of Pakistan. Laboratory testing later confirmed four of the family members had influenza type A H5N1 avian influenza; additional evidence indicated another family member was a probable case. An investigation of the outbreak found transmission of the virus among close household contacts of the family member with confirmed avian influenza.

Events like this spurred the Government of Pakistan, with the help of CDC, to improve the country's outbreak detection and response system. Trainees in the first class of Pakistan's Field Epidemiology and Laboratory Training Program (FELTP), a two year in-service program developed by the Ministry of Health with support from CDC, investigated the outbreak. FELTPs, which are modeled after the CDC's highly respected Epidemic Intelligence Service (EIS), help developing countries strengthen their public health capacity, primarily by training of epidemiologists and laboratory scientists.

Since it began in September 2006, the Pakistan FELTP has become a well-known and valuable asset to the country's Ministry of Health (MOH). The Federal Secretary of Health, Khushnood Lashari, stated "the work that has been initiated will serve Pakistan for a very long time." The Government of Pakistan has requested more training in surveillance and outbreak response and has assigned FELTP graduates to leadership roles in the MOH. For example,



Pakistan FELTP trainee conducting a survey to estimate the prevalence of diarrhea in children younger than 5 years in the town of Murree.

two graduates have been appointed to head Epidemic Intelligence Cells, surveillance and response units located within the MOH at the national and provincial levels. Besides assisting with outbreak investigations, FELTP fellows have also conducted studies to determine the burden of diarrhea and typhoid fever, and evaluated polio vaccination rates, all priorities for provincial and district-level Departments of Health.

The two year training program is just one component of a broader CDC effort to strengthen Pakistan's disease surveillance and response capacity. The FELTP is also helping to implement the Pakistan National Plan of Action for Surveillance, focusing on the country's self-identified priority diseases such as influenza, hepatitis, and polio.

Initially, the FELTP is helping revise the legal framework for surveillance, demonstrating best practices in surveillance methodologies, developing an electronic information management system, and establishing quality laboratory testing for hepatitis and influenza. These systems and the lessons learned will then be expanded to address other priority diseases.

In the future, the Government of Pakistan envisions the health care community using standard definitions and reporting mechanisms (including electronic) to immediately alert the public health system of any disease outbreak in the country. Graduates of the FELTP will respond, investigate, and make timely evidence-based recommendations that will influence overall public health programs and policy. The FELTP is ultimately training the future public health leaders in Pakistan and strengthening the surveillance and response systems in which they will work. ✧

Routine Immunization Services: A Platform to Strengthen Systems

Few can argue that, on many indicators, the health of people in the developing world remains unacceptably poor. The primary reason is that existing health systems cannot ensure that health services are widely available and accessible across society. An exception has been routine immunizations for children.

Public health professionals in immunization programs have long recognized that investing in health systems infrastructure is vital to achieve and sustain high immunization coverage, which protects populations from vaccine-preventable diseases. By building on the platform of immunizations to increase coverage of other essential health

services, there is a tremendous opportunity to improve health systems overall.

Because immunization services are a proven entry point into the health system, other health interventions, with sufficient additional human and logistical resources, can be integrated with immunization service delivery. This leveraging of health interventions includes the following benefits:

- 1) health services match communities' needs and expectations,
- 2) the number of people receiving services increases, maximizing the impact of resources invested,
- 3) services reach those most in need, and
- 4) people's health improves because multiple needs are addressed.

For example, routine immunization sessions for young children present opportunities to provide advice on growth monitoring and nutrition, deliver Vitamin A supplements and mosquito nets to prevent malaria and other vector-borne diseases, and to assess and treat other medical conditions from which children may be suffering. Mothers who bring their children to immunization sessions can also receive reproductive and sexual health care and counseling.

To improve on synergies realized to date, CDC is working with global partners to evaluate and identify the best ways in which additional health services can be effectively integrated with routine immunizations. The information will provide evidence to determine the optimal types of services to integrate, and at what point combining too many services fails to produce the desired health benefits.

In Malawi, CDC supported a pilot study to determine the feasibility of distributing insecticide-treated mosquito nets through routine immunization services. Bed nets typically cost up to \$5 in this country, which has an estimated average annual income of \$160. In two districts, free nets were given to children when they had completed their routine vaccinations by 12 months of age. For comparison, another district offered the immunizations without the nets. In the two districts receiving the integrated services, the percentage of children aged 12-23 months who were both fully vaccinated by 12 months and who had slept under a net the night before their mothers were interviewed was four times higher (increasing from 10-14% to 40-44%).

Now, the Malawian Ministry of Health has begun to distribute free nets at ante-natal clinics and under-5 clinics nationwide.



A mother receives an insecticide treated mosquito net after her child was fully vaccinated in Malawi.

CDC supported similar research on the integration of vaccine services with bed net distribution in Indonesia. A mother who received a net there said, "I am very happy that they gave me a free net. I would still have gotten my child vaccinated, but with the net I can protect my baby from malaria." A vaccination worker in Indonesia observed, "More children are coming to [the vaccination session] because the mothers know that if they complete their immunizations, they will get a net, so they come more regularly."

Other studies in the works include evaluating the integration of routine immunizations with safe water solution and hygiene products, as well as with family planning services. A comprehensive multi-country study will explore community and health-worker preferences about integrated services and estimate the timeframes and personnel required.

Findings from all of these studies will provide insight and evidence on how integrated services can best be implemented in a variety of settings around the world. As countries strive to reduce unnecessary morbidity and mortality, the synergy created by integrating other health services with routine immunization programs can help to strengthen health system capacity, optimize use of local resources, maximize the efficiency of public health services—and ultimately save lives. ✧

Building Laboratory Capacity: Accurate, Timely Lab Results Are Essential to Safeguarding the World from Infectious Disease Threats

Misidentification of a virus can lead to deadly delays in detecting and containing an epidemic, as was the case when severe acute respiratory syndrome (SARS) threatened the world's health in 2003. Initial delays in identifying what was later determined to be a new coronavirus significantly increased the spread of SARS and had a devastating economic impact on the affected countries.

Then and today, Chinese laboratories are part of a global network dedicated to quickly identifying existing or new pathogens before they spread globally.

Even before SARS, China CDC—China's lead public health agency and a counterpart to U.S. CDC—had committed substantial resources to strengthening its network of public health laboratories. Beginning in 2005, U.S. CDC collaborated with China to integrate elements of U.S. CDC's training in quality management systems (QMS) into the Chinese network of public health laboratories. The goal has been to improve China's laboratory system and overall laboratory services.

In recent train-the-trainer QMS workshops led by U.S. CDC, participants focused on reducing laboratory errors and producing consistent, timely, reliable test results that can be replicated in multiple laboratories. Graduates of the workshops serve as the quality assurance leaders for China's public health laboratories and as faculty who conduct QMS training at the local level.



Representatives of clinical and public health laboratories in China participate in an evaluation to assess their capacity to support infectious disease surveillance and preparedness and to serve as reference laboratories for clinical diagnosis.

“Reliable, timely laboratory results are essential to a rapid response during a public health emergency, and they are a cornerstone of the revised International Health Regulations (IHR),” explains U.S. CDC Health Scientist Dr. Xin Liu. The regulations provide guidance to help World Health Organization member countries prevent and respond to serious threats to public health, including SARS, new flu pandemics, and other emerging infections.

According to Dr. Liu, strengthening the laboratory network with QMS tools ensures that laboratory bench work is integrated with all of the processes required to detect and respond effectively to emerging infectious diseases. Epidemiologists must have accurate laboratory data to identify and contain outbreaks that pose threats to the public's health.

“This training is expected to have long-lasting impact because the participants will be the leaders for quality assurance in China's public health laboratories,” adds Dr. Wu Guizhen, Director of China CDC's Laboratory Management Division. “QMS and its systematic approach have given participants a broader knowledge of quality management and its impact on public health.”

Now that training is complete, implementation of QMS is moving forward. U.S. CDC is collaborating with China on a pilot survey in the Guangdong province to assess the laboratory network's capacity to support infectious disease surveillance and preparedness and to serve as reference laboratories for clinical diagnosis. The newly acquired QMS tools will be directly applied to the surveillance activities of the International Emerging Infections Program in China. ✧

WHO Global Salm-Surv Network Strengthens Foodborne Disease Outbreak Detection and Response

Frustrated by a lack of adequate laboratory supplies and dated laboratory facilities, Dr. Raufu Ibrahim, a highly trained *Salmonella* researcher in Maiduguri, Nigeria, was unable to confirm his suspicion about a new strain of *Salmonella*. Undeterred, Dr. Ibrahim contacted several international reference laboratories for assistance and received a response from Rene Hendriksen, a steering committee member of WHO Global Salm-Surv. WHO Global Salm-Surv is an international network of institutions and individuals committed to enhancing the capacity of national ministries of health and agriculture and national reference laboratories to detect, respond and prevent foodborne and other infectious, enteric diseases.

WHO, CDC, and the Danish Institute for Food and Veterinary Research founded WHO Global Salm-Surv in January 2000 in response to the heavy burden and public health importance of foodborne disease, particularly

Salmonella, and the need to enhance capacity for laboratory-based surveillance in many countries. Today, the program has close to 1,100 members from 153 WHO Member States and provides training for other pathogens in addition to *Salmonella* such as Shigella, Vibrio cholerae, E. coli O157, and Campylobacter. CDC is a Steering Committee Partner and contributor of scientific expertise.

WHO Global Salm-Surv promotes the integration of foodborne disease surveillance with appropriate laboratory diagnostic practices and fosters a multidisciplinary approach among human health, veterinary, and food-related disciplines. The network supports international training courses, the global *Salmonella* country databank with data from more than 380 institutions worldwide, the external quality assurance system, the electronic discussion group to facilitate communication among members, and reference testing services. Since its inception, WHO Global Salm-Surv has brought together



Dr. Raufu Ibrahim, a highly trained *Salmonella* researcher in Nigeria

microbiologists and epidemiologists from more than 130 countries at 57 training courses at 15 regional sites.

With support from WHO Global Salm-Surv, Dr. Ibrahim was able to identify in his laboratory a new type of *Salmonella*—*Salmonella* serotype Hiddudify. Further investigation showed that *Salmonella* Hiddudify is prevalent in Nigerian chickens and in the local environment. Because of the threat to the health of Nigerians and possible negative effects on the national economy, Dr. Ibrahim is keen to learn more so that Nigeria can be better prepared in the event of an outbreak.

Dr. Fred Angulo, a CDC expert in enteric disease epidemiology, is enthusiastic about the mutually beneficial aspects of the program. “WHO Global Salm-Surv helps nations better detect and respond to foodborne disease and work together; it has [also] facilitated several new partnerships that allow CDC to better perform our public health mission.” ✧

News Bytes...News Bytes...News Bytes...News Bytes...News Bytes...News Bytes...News Bytes...News Bytes...

KEMRI/CDC Participates in the First Late-Stage Clinical Evaluation of a Candidate Malaria Vaccine

In collaboration with the Kenya Medical Research Institute (KEMRI), CDC will be participating in the world's first late-stage clinical evaluation of a candidate malaria vaccine at the KEMRI/CDC Field Station in western Kenya. Based on successful earlier phase 2 trials in Africa, GlaxoSmithKline and the Malaria Vaccine Initiative (MVI) are sponsoring this large phase 3 trial in infants and young children in 7 African countries, including Kenya.

Reductions in Measles Deaths

On December 4, 2008, CDC Director Dr. Julie Gerberding joined leaders from CDC Measles Initiative partners; the American Red Cross, the United Nations Foundation, United Nations Children's Fund (UNICEF), and the World Health Organization (WHO) to announce the remarkable

74% reduction in global measles deaths since 2000 and specific accomplishments in measles reductions in the WHO regions. Partners also discussed the future goals and challenges for reducing measles deaths globally as much work remains.

CDC Responds to Cholera Outbreak in Zimbabwe

Since late October, CDC has been assisting in the response to a large cholera outbreak in Zimbabwe. As of January 4, 2009, there have been 33,579 including 1,671 deaths as reported by WHO Zimbabwe. Cholera cases in refugees from Zimbabwe have been reported in South Africa and Botswana, and are likely to appear in Zambia and Mozambique, as well. CDC is working with WHO, who is leading the response, providing technical assistance in an epidemiologic investigation

of the outbreak and making recommendations how to control the outbreak.

CDC Investigates Suspected Diethylene Glycol Poisoning (DEG) in Nigeria

CDC staff in Nigeria reported clusters of deaths as a result of acute renal failure among children reported at three main health facilities. The Nigerian Field Epidemiology and Laboratory Training Program (FELTP), a program started and managed by CDC, is investigating. The suspected agent is an acetaminophen (paracetamol)-based teething syrup for children that has been contaminated with DEG. The first case was reported on November 24, 2008, and as of December 10, 2008, a total of 65 cases have been reported with 59 deaths (i.e., 91% of all cases reported have died). Reported cases are aged 3 – 36 months.

CDC Participates in China -US Workshop on Food Safety

A China – US Workshop on food safety was held in Beijing, China, in November 2008. CDC participated, as part of a Health and Human Services (HHS) team led by Secretary Mike Leavitt, with Chinese counterparts about research and policy related to general food safety, including melamine-contaminated milk products, a major source of food safety concern in China after two well publicized contamination incidents in baby formula and pet food. The discussions resulted in an increased understanding of the melamine situation, and other food safety issues, and an increased cooperation and coordination on the work needed to address the issue of melamine in the food supply.

CDC Assists with Unknown Chronic Liver Disease Outbreak in Ethiopia

In August 2007, the Ethiopian Ministry of Health (MOH) requested CDC assistance in investigating an outbreak of chronic, fatal, liver disease of unknown cause occurring in the Tigray region of Ethiopia, and CDC immediately responded. The initial CDC investigation helped public health officials learn more about the disease, but its cause remains unknown. Ethiopian officials now believe that the numbers of affected people and geographic areas have increased. CDC investigators returned to Ethiopia on December 3, 2008, and with the Ethiopian MOH increased disease surveillance in the region; looked for new cases; and interviewed people in one of the most affected villages. The investigation included

testing human and environmental samples for contaminants or other agents that may be causing the disease. CDC Director Dr. Julie Gerberding also traveled to Ethiopia during December to reaffirm CDC's commitment to helping the Ethiopian government resolve the outbreak.

President's Emergency Plan for AIDS Relief (PEPFAR) Results Released

December 1, 2008, was the 20th anniversary of World AIDS Day-- a day in the past that was often spent in remembrance of lives lost to the epidemic. While we continue to remember the lives lost, CDC was able to embrace the World AIDS Day theme "Celebrate Life!" as President George W. Bush announced that the President's Emergency Plan for AIDS Relief (PEPFAR) **had fulfilled ahead of schedule its commitment to support treatment for two million people.** As of September 30, 2008, through PEPFAR, CDC has supported:

- Life-saving antiretroviral treatment for more than 2.1 million men, women and children living with HIV/AIDS around the world.
- Nearly 9.7 million people affected by HIV/AIDS in PEPFAR's 15 focus countries had received compassionate care, including nearly 4 million orphans and vulnerable children.
- Prevention of Mother-to-Child HIV Transmission programs that resulted in nearly 240,000 babies being born free of HIV.

Through its unique capabilities (health systems strengthening, treatment, prevention, laboratory capacity building, surveillance, and human capacity development), CDC looks forward to helping the U.S. Government meet the new PEPFAR 10-year goals: treatment for at least 3 million people, the prevention of 12 million new infections, and care for 12 million people, including 5 million orphans and vulnerable children.

CDC Support for Global Blood Safety Highlighted in CDC Morbidity and Mortality Weekly Report

Through PEPFAR, CDC works in partnership with countries to strengthen laboratory capacity, epidemiology, surveillance, public health evaluation, workforce capacity, and prevention initiatives—essential components for strong sustainable public health systems. A key part of CDC's health systems strengthening activities has been five years of support to improve national blood transfusion services in 14 countries in Africa and the Caribbean. In recognition of World AIDS Day, the progress made by these CDC-supported nations toward delivering an adequate supply of safe blood is highlighted in the November 28th, 2008 CDC *Morbidity and Mortality Weekly Report*. To view this issue of the CDC *Morbidity and Mortality Weekly Report* go to: <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5747a2.htm>