

CDC Global Health *E-Brief*

Using Surveillance and Research Data to
Inform Public Health Policies

Second Quarter 2008

WELCOME to the second quarter global health E-Brief, designed to inform readers about key global health activities at the CDC (Centers for Disease Control and Prevention). Our second issue for 2008 spotlights the use of surveillance and research data to inform policies, and the life-saving power of these policy decisions - when implemented. For example, after a two-day meeting, 14 African countries made policy decisions that will impact over four million children -- with implementation, they will be eligible to receive a life-saving vaccine to prevent them from pneumonia and meningitis; and, CDC and the World Health Organization have developed a groundbreaking surveillance method to help prove the effectiveness of antiretroviral treatment (ART) expansion programs. ✧

Data Convince African Countries to Provide Life-Saving Vaccines that Prevent Meningitis

"Last June I attended a meeting at the World Health Organization (WHO) headquarters for the African Region in Brazzaville, Congo. The journey there from the United States involved two 10-hour flights, an overnight stay in a run-down hotel in Kinshasa, the capital of the Democratic Republic of Congo, and an early morning boat ride the next day across the Congo river into Brazzaville. Representatives from 21 African countries made the same river crossing to discuss introduction of new vaccines in their countries. As director of the Hib Initiative, an international consortium funded by the GAVI Alliance (formerly the Global Alliance for Vaccines and Immunisation), including CDC, WHO, the London School of Hygiene and Tropical Medicine, and the Johns Hopkins Bloomberg School of Public Health, my goal was to increase awareness about Hib vaccine-- a life saving childhood vaccine. Few of the representatives attending the Brazzaville meeting had considered the need for Hib vaccine, mainly because they were not aware of Hib as an important cause

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of meningitis and severe pneumonia in children and because of concerns about vaccine cost. The good news is that the data we presented at this meeting about the burden of meningitis and pneumonia convinced the attendees to make the vaccine part of their countries' standard immunization program. We must continue to share this information with other countries so that we take advantage of every opportunity to prevent deaths from Hib disease among children."



Dr. Rana Hajjeh, CDC scientist and Director of the Hib Initiative

-Dr. Rana Hajjeh, CDC scientist and Director of the Hib Initiative

Haemophilus influenzae type b (Hib) is a bacterial disease that each year causes pneumonia and meningitis in young children, resulting in three million illnesses and

Bacterial Meningitis Surveillance in Uganda

Despite an ongoing 20-year conflict between rebel and government forces, CDC has helped implement a pediatric bacterial meningitis surveillance system in Uganda's Gulu District.

Charles Anywar, who grew up in this region, holds two jobs, one as a nurse in one of the busiest hospitals in northern Uganda, and the other as the PBMS data manager. He works with Dr. Robert Iriso, pediatrician and PBMS coordinator at the hospital, to record information on new cases of suspected meningitis, track patients' lab results, and follow up with patients and their physicians to determine survival rates. After collecting and entering the data into the PBMS database, Charles forwards the information to Dr. Annet Kisakye, the National Surveillance Officer for the Ugandan Expanded Program on Immunizations with the Ministry of Health, to be combined with data from the other hospitals.

Uganda introduced Hib vaccine in June 2002 with funding provided by the GAVI Alliance (formerly the Global Alliance for Vaccines and Immunization). PBMS data demonstrated that the Hib vaccine is highly protective and each year prevents almost 30,000 cases of severe Hib disease (both meningitis and pneumonia) and more than 5,000 deaths among children younger than five. These data convinced the government of Uganda to commit national resources to use the Hib vaccine.



Charles Anywar pilot tests the new data management module for pediatric bacterial meningitis surveillance.

400,000 deaths. Bacterial meningitis alone kills more than 65,000 young children in the developing world each year. The United States has been able to virtually eliminate pediatric bacterial meningitis through several interventions including the introduction of Hib vaccines.

A safe and effective vaccine has existed since the early 1990s. However, Hib vaccines are still not used in many developing countries despite compelling evidence of the tremendous disease burden from Hib around the world, the tremendous potential to prevent this large disease burden, and WHO recommendations for every country to add Hib vaccine to their infant immunization programs.

The reluctance of many countries to use the Hib vaccine is because of lack of local data on the disease burden. Many of these countries have no or poor surveillance systems for bacterial diseases. The Hib Initiative and CDC are helping to fill this gap in Africa by strengthening systems such as the WHO-supported Pediatric Bacterial Meningitis Surveillance System (PBMS), run by the World Health Organization in Africa. PBMS is a 22-country surveillance network that helps to accurately diagnose and record data on meningitis infections in

young children who are seen at regional and national reference hospitals. The individual parts of the network then share the surveillance data with decision-makers at the country level.

At the meeting attended by Dr. Hajjeh, country, regional and global level surveillance data gathered with the PBMS network for bacterial meningitis and pneumonia were presented. Convinced by the data, every country who had not yet introduced the Hib vaccine committed to adding it to their country's national immunization program. With the implementation of this new policy decision, more than four million children are now eligible for this life-saving vaccine.

CDC Research Leads to New Tools to Fight Malaria and Anemia in Pregnant Women

Dr. Meghna Desai, one of CDC's lead malaria researchers, was treating a Kenyan child for anemia, when she noticed the child's mother was very pale and looked pregnant. Dr. Desai knew if the mother was pregnant and had anemia (a common consequence of malaria), her pregnancy could be threatened. The experience sparked her interest in studying the effects of malaria during pregnancy, in the hopes of making health system changes that would help mothers like this one – and ultimately ensure that their babies were born healthy.

Each year approximately 50 million women living in regions with high rates of malaria – 25 million of whom are in Africa – become pregnant and are at risk from malaria and its particularly harmful effects during pregnancy. During pregnancy, women lose some of the immunity to malaria they have acquired from living in high-risk areas. If they acquire malaria and develop anemia, their children

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are more likely to be born small – and are more likely to be sick or die. In Africa, low birth weight associated with malaria in pregnancy is estimated to contribute to 100,000 infant deaths each year.

CDC malaria research plays a critical role in ensuring that the tools we have to combat malaria in all those affected by the disease can be implemented with greatest impact both by researching the most effective way to implement an intervention, and by monitoring and evaluating its impact. Findings from studies conducted by CDC experts like Dr. Desai are the foundation for the way malaria in pregnant women is treated and prevented today and are reflected in the World Health Organization’s guidelines and recommendations for preventing and controlling malaria in pregnant women, especially in countries in sub-Saharan Africa with high malaria transmission.

Key CDC research findings that are preventing illness and saving lives are these:

- intermittent preventive treatment of malaria during pregnancy (IPTp)—delivery of the right dose of effective antimalarial drugs as part of routine pre-natal care—reduced the risk that malaria-infected pregnant women would have babies with low birth weight and the associated high risks for infant death;
- insecticide-treated nets (ITNs) help reduce malaria infections and associated ill effects in pregnancy. When pregnant women in a study area in Kenya slept under ITNs, severe malarial anemia was reduced by 47% and the delivery of low-birth-weight infants decreased by 28%; and
- To benefit from treatment, pregnant women who are HIV-positive need more doses of IPTp with the drug sulfadoxine-pyrimethamine (SP) or, in some cases, a different drug.

CDC’s research on the usefulness of insecticide-treated nets and IPTp strongly influenced the strategies being implemented in the President’s Malaria Initiative (PMI), a \$1.2 billion 5-year plan to reduce deaths due to malaria by 50 percent in 15 African countries). PMI provides IPTp, to pregnant women and their babies. To date, PMI has procured SP for IPTp for more than 1.3 million women. Additionally more than 5,000 health care workers have been trained to administer IPTp. In addition to IPTp, African countries are adopting policies on the use of insecticide-treated bed nets and the effective treatment of malaria illness with antimalarial drugs to mitigate malaria’s ill effects in pregnant women.

CDC, with Dr. Desai as principal investigator, is currently helping to plan a study in Kenya on another drug, mefloquine, for use in IPTp among HIV-infected pregnant

women. The study is important for two reasons: 1) SP cannot be given to women who are taking cotrimoxazole, the drug HIV-positive pregnant women receive to prevent complications from their HIV; and 2) the rates of HIV and malaria in many sub-Saharan African countries are very high and the two infections overlap considerably. This project and other CDC research will provide additional information about how to prevent malaria in HIV-positive pregnant women.

Innovative Threshold Survey Helps Preserve ART’s Life-saving Effects

Right now, over 33.2 million people are living with HIV/AIDS – an epidemic that has long been one of global proportions. Ninety-five percent of people living with HIV/AIDS reside in developing countries. Fortunately, these countries are benefiting from significant expansion of antiretroviral treatment (ART), the main treatment for HIV/AIDS. While not a cure, it can prevent progression and symptoms of the disease in an individual for many years.

ART is dramatically improving the health and extending the lives of people who have HIV/AIDS – further contributing to the economic and

social well-being of resource-poor countries. However, ART can lead to HIV ART drug resistance (HIVDR) if delivery programs are poorly designed and not enough drugs are available. The Centers for Disease Control and Prevention (CDC), as part of the President’s Emergency Plan for AIDS Relief (PEPFAR), is leading efforts to provide HIVDR surveillance in resource-limited settings, thereby preserving ART’s life-saving effects. These critical surveillance data help guide public health policies to reduce occurrences of HIVDR and inform the selection of future drug regimens that will be effective for specific populations, without draining resources from other activities, such as higher-priority treatment, prevention and laboratory expansion.

In partnership with the World Health Organization (WHO), CDC has developed a groundbreaking threshold survey that provides Ministries of Health with a relatively simple, rapid, and inexpensive method to estimate levels of HIVDR in areas where ART is being delivered. The method builds on well-established surveillance systems and uses blood specimens that are already being gathered as part of a country’s routine antenatal clinic (ANC) surveillance.

The scientists test a few dozen randomly selected specimens from eligible HIV-infected persons for viral genetic mutations that reduce the virus’ susceptibility to ART. “Then we basically provided a cheat sheet,” explains



CDC’s Dr. Meghna Desai Working in Kenya

Keith Sabin, a CDC expert in global HIV/AIDS surveillance, “requiring only check marks to simply and easily classify levels of resistance into one of three categories: low, medium, or high.”

The “cheat sheet” is simple, but provides vital information to guide programs. Those localities testing “low” should repeat the survey in two years; those areas testing “high” should expand the number of HIVDR testing sites, analyze program monitoring data, strengthen program implementation, and consider changes in standard ART regimens.

The method has multiple advantages:

- the process for specimen collection already exists, minimizing implementation costs;
- only a small number of specimens are required;
- the results determine whether or not regimens are appropriate; and
- the results provide critical information on prevention failures.

“[This method] helps countries use their resources wisely, only spending additional resources on more intensive program monitoring if it’s needed. Then they can focus the funding on treating people, training workforce, ensuring adequate drug supply, and other essential program activities,” Sabin explains.

To date, CDC has helped nine countries conduct the threshold surveys (Tanzania, Vietnam, Malawi, Kenya, Ethiopia, China, Thailand, Botswana and Namibia). Five new countries are scheduled to conduct HIVDR surveillance within the year. So far, no significant drug resistance has been found. According to Sabin, “this simple and efficient method is showing the world that our remarkable ART expansion programs are working – and it is allowing us to ensure that they keep working.”

The Plague – Fighting Pestilence with Persistence

Does the plague still exist? While it is an ancient disease, it is certainly not gone. The plague still persists with approximately 1,000 to 3,000 cases worldwide each year, including five to 15 cases each year in the western United States, according to the World Health Organization. There is no vaccine for this persistent disease. However, today’s antibiotics can treat the disease and prevent death, which occurs in 50% to 90% of untreated victims.

Yersinia pestis – the plague bacteria – causes swollen, tender lymph glands called buboes in bubonic plague, and fever, weakness, and pneumonia in pneumonic plague. People get the bubonic plague from flea bites. Fleas become infected when they feed on rodents with the bacteria. People are infected with pneumonic plague through airborne transmission, that is, by inhaling *Yersinia pestis* particles.

Most Americans today don’t worry about the plague, but health care and emergency preparedness professionals do. They worry because aerosolized *Yersinia pestis* could be used in a bioterrorist aerosol attack

spreading the pneumonic form of plague. Once people have the disease, the bacteria can spread to others who have close contact with them. Because people don’t get sick right after exposure to the bacteria, they could travel over long distances and potentially infect many others. Controlling the disease at this later stage is much more challenging. For all of these reasons, public health and preparedness experts recognize the need for continued plague research and preparedness, and control activities. The more we understand about plague and how it spreads, the greater our ability to control it —whether it strikes naturally or is released intentionally.

CDC is conducting research in Uganda where approximately 2,000 cases of plague have been reported since 1999. Efforts by the Ministry of Health to control the disease have had limited success because laboratory capacity, case follow-up, and data on the animal carriers of plague are essentially non-existent. Without these resources and information, public health professionals have been unable to develop policies and interventions to control plague and reduce associated illness and death.

To help build regional capacity, CDC established a field laboratory in the Arua province of northwestern Uganda (near the border with Democratic Republic of the Congo). Staffed by CDC and local experts in laboratory, epidemiology, and clinical medicine, the program is helping to understand risk factors for plague, evaluate interventions targeting rodents, develop methods for improved diagnostics, and understand obstacles to treatment. Already the laboratory has identified key ways in which plague is transmitted, confirmed a human plague case for the first time locally, and evaluated an intervention based on a novel method of flea and rodent control to ensure its efficacy in controlling plague.

These efforts represent the first steps in a long-term collaboration that will greatly contribute to the understanding of plague and the development of policies and interventions to reduce its impact in Uganda. Additionally, research in Uganda provides an opportunity to increase CDC’s global emergency preparedness capabilities.



Thailand Commits to Seasonal Flu Shots for Seniors

Asian cultures are generally known for commitment to their older adult population. An example of this commitment is Thailand’s bold step in February 2008

to fund flu shots for seniors with chronic disease. This evidence-based policy decision is notable because it required Thailand—a middle income nation—to make a large government investment. The government moved forward because of the significant health impact this decision will have. More than five million people living in Thailand are over the age of 65 and many have serious conditions such as bronchitis, emphysema, asthma, heart disease, renal disease, diabetes, and hypertension. Without seasonal flu shots, they would be at risk for severe complications due to influenza infection.

The government's decision was influenced by high-quality data collected through collaboration with the Centers for Disease Control and Prevention (CDC) and the Thailand Ministry of Public Health (MOPH). "What's great about this recent announcement is the opportunity to see our scientific work translated into public health policy," says Mark Simmerman, Ph.D., chief of CDC's Influenza Section in Thailand. In collaboration with Thai health officials, the CDC team has conducted active surveillance since 2003 and has presented data on the incidence, cost, risk factors, and seasonality of influenza since 2003.

Thailand is no stranger to initiating policy decisions based on scientific evidence to protect the public's health. The country organized a major vaccine campaign against Japanese encephalitis in 1998 and has given influenza vaccine to some health care workers and government

veterinary workers for several years.

"We have to look for the groups that will benefit most," says Dr. Piyanit Tharmapornpilas, who manages the Expanded Program on Immunization for the MOPH. Research from other countries provides guidance about which groups those might be, but clear information

specific to Thailand is available only from the population-based studies conducted by the MOPH-CDC collaboration, according to Dr. Piyanit.

The studies used to support the policy decision demonstrated that the disease and cost burden of influenza in Thailand were substantially greater than had previously been believed. They identified young and advanced age, and underlying chronic disease—especially those with cardiopulmonary disease and previous hospitalization within the last year—as risk factors for severe complications from influenza infection.

In 2008 alone, the number of government-provided flu shots will nearly double to around 600,000. Those shots are expected to cover about 50% of the Thais who are 65 or older and have chronic disease. According to Thai MOPH plans, a new government plant to manufacture flu shots locally will be operational by 2011, and will eventually have the capacity to produce more than 10 million doses annually. This is one of several steps that Thailand is taking to prepare for an influenza pandemic, and represents how Thailand, with assistance from CDC, has been able to turn surveillance data into sound public health policy with the promise of prolonging the lives of its seniors.



Thai government officials look on as Minister of Commerce Mingkwan Saengsuwan helps kick off a campaign to promote flu shots among senior citizens.

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The US CDC is assisting the Chinese Center for Disease Control and Prevention (China CDC), with support from private technology companies and the CDC Foundation, to strengthen China CDC's health informatics capacities. This timely partnership will be used for rapid public health assessments in Sichuan province's post-earthquake environment. CDC experts in informatics, mobile computing, and natural disaster epidemiologic surveillance were deployed to

Beijing to help design and develop a platform of data collection and management which is based on PDA and mobile technology systems and tools. As efforts in the affected areas shift from emergency response to recovery, the health and well-being of the approximately 5 million displaced persons and the re-building of health systems are chief concerns. "With the new system and equipment, China CDC will collect public health data in earthquake-affected areas where communications capacity

has been destroyed and send it to headquarters for analysis. This allows China CDC to rapidly get the right resources to the right places to save lives by preventing or reducing disease and injury," said Dr. Leslie A. Lenert, Director of CDC's National Center for Public Health Informatics. US CDC informatics experts will continue to provide guidance to China CDC in coming weeks on how to use the donated technology in a systematic and sustainable way to best manage disease control and

prevention while the Sichuan public health system is rebuilt.

The press release is available on the US Embassy Beijing website at: <http://beijing.usembassy-china.org.cn/070208p.html>



Fredrick Miruka a Clinical Officer at KEMRI-CDC speaks to a patient during the medical camp.

Update to 2008 first quarter e-brief: CDC is continuing to monitor yellow fever outbreak in South America in three countries: Brazil, Argentina, and Paraguay. As of June 26, 78 cases and 34 deaths have been confirmed.

Since February 2008, CDC has been involved in the detection, verification, and investigation of a monkeypox outbreak in the Democratic Republic of Congo. CDC supported deployment of a 9-person team to the affected area. The team engaged in epidemiologic investigations, health care worker education, ecologic survey activities and patient care. The CDC team helped train health care workers from across the affected area in monkeypox recognition, specimen collection, reporting, patient care and proper infection control practices. Surveillance data were reviewed to determine the extent and duration of the suspected epidemic, and information about interactions between people and wildlife was gathered to learn more about how the virus is transmitted from animals to people. As a result of

the assistance, CDC and the Ministry of Health have strengthened their collaborations on orthopoxvirus research and disease detection and control.

The presidential elections in Kenya conducted on December 27, 2007, were contested, and shortly after violence erupted in multiple locations throughout the country. More than 1,000 people were killed and 350,000 people displaced. There were disruptions in availability of food and fuel, and there was displacement of some CDC staff, including an authorized departure from Kisumu to Nairobi for USG employees.

On February 28, a widely accepted power-sharing agreement between the Kenya Government and the opposition was signed, and threats of political demonstrations and violence have dropped dramatically. As a result, the US Embassy cancelled the authorized departure for Kisumu and surrounding areas, and CDC staff and their families have been allowed to return. Although the power-sharing agreement has eased tension and reduced unrest, the conflict affected CDC-Kenya's programmatic, research, and administrative activities.

Throughout the weeks of unrest, CDC-Kenya staff proved themselves to be resourceful, caring, competent and hard working. Through long hours, strategic planning, and regular communications, staff at CDC-Kenya, including employees of the KEMRI-CDC collaboration in Kisumu, ensured the continuity and quality of public health activities, including these:

- * HIV programs that provide prevention services, care, and antiretroviral treatment to tens of thousands of people with HIV;
- * more than 40 public health studies, and

* intensive community-based disease surveillance. Although the violence has subsided, the impacts on public health in Kenya may extend for years to come. These may include increases in mental illness, substance abuse, and unemployment and disruptions in food supply, immunizations, medications, and health services. Besides resuming their normal public health operations, the CDC-KEMRI collaboration is evaluating the public health impact of the post-election violence to identify and respond to any lasting public health problems in Kenya. These activities are described in a [Letter to the editor](#) to the American Journal of Tropical Medicine and Hygiene (May 2008).

The WHO cites delays in tuberculosis diagnosis as the leading risk factor for tuberculosis (TB) transmission within health care facilities. A recent study conducted by CDC-Thailand and the Thailand Ministry of Public Health found that almost 75% of patients hospitalized with clinical pneumonia were not adequately evaluated for TB. High rates of TB in Thailand and frequent diagnostic delays coupled with these data suggest that interventions should be implemented to ensure that hospital clinicians in Thailand consider performing a TB laboratory evaluation for all adults hospitalized with clinical pneumonia. Early screening interventions have the potential to prevent infection and devastating hospital outbreaks of TB, including drug-resistant TB. The full study can be found in the July issue of Infection Control and Hospital Epidemiology.

<http://www.journals.uchicago.edu/doi/full/10.1086/588684>

COGH is pleased to bring you this podcast of the recent visit to CDC by United Nations Secretary General Ban Ki-Moon: <http://www2a.cdc.gov/podcasts/player.asp?f=9305>. The link also includes a transcript.