CDC Global Health E-Brief

Urgent Threats, Urgent Realities

First Quarter 2007

WELCOME to CDC's first global health E-Brief, designed to educate and inform readers about key global health activities. The first issue focuses on the need to prepare for and respond to the unforeseen public health challenges from emerging infections – the urgent threats - while maintaining our commitment to the ongoing challenges posed by endemic infectious diseases, chronic disease, and injuries—the urgent realities.✧

Influenza Preparedness: Avian, Pandemic

On January 6, 2007, a 22-year-old female from Lagos, Nigeria, died of what is suspected to be a case of avian influenza. The mother of the 22-year-old died on January 4, 2007, with similar symptoms. Preliminary tests on the samples from the 22-year-old were positive for influenza type A (H5N1).

One of CDC's most important roles is to protect the nation's health from emerging health threats, such as the threat of an influenza pandemic. While a pandemic has not yet occurred, it is important that the United States and the world remain vigilant and be ready to respond.

The circulation of avian influenza type A (H5N1) virus in domestic and wild birds is expected to continue. As a result, people with exposure to sick or dead birds remain at risk of being infected with H5N1 virus. In addition, as long as the virus continues to circulate, there is the possibility that it will undergo genetic changes that allow it to be easily transmitted from person-to-person.

To help prepare for a possible pandemic, CDC is carefully monitoring changes in the virus that might allow it to evolve into a strain that could result in a pandemic. CDC collaborates across the U.S. government under the leadership of the State Department and with global partners such as WHO and national ministries of health. This collaboration has proved to be an effective partnership and is playing an important role in the early identification of suspected cases of avian flu in Nigeria. Some key CDC activities in Africa include these:

- Assisting the investigation of the H5N1 outbreak in poultry, in Nigeria (February 2006)
- Training for influenza surveillance and laboratory testing in Uganda
- Rapid Response Team training in Kenya for English-speaking countries of Africa
- Dispatching an EIS Officer from the Influenza Division to Nigeria in August 2006 to help the country develop a plan for avian influenza and seasonal influenza surveillance
- Dispatching epidemiologists from the Global Disease Detection center in Kenya to investigate the recent human cases in Nigeria

Fortunately, there is no evidence of efficient human-to-human transmission. CDC is also monitoring mutations in the H5N1 virus that could result in resistance to antiviral medications. For example, in January 2007 an Egyptian H5N1 virus indicated a small change in susceptibility to the antiretroviral medication oseltamivir. However, there is no widespread indication of resistance in Egypt or globally.

While monitoring the virus is critical, it is only half the battle. Emergency management and preparedness planning are among CDC's most pressing responsibilities—both domestically and internationally. While CDC continues to improve preparedness within U.S. borders, CDC also assists other countries to develop national pandemic plans that will enhance systems to

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detect and respond to new influenza viruses, and to identify and contain a pandemic at its earliest stage. For optimal response, an emerging influenza pandemic outbreak anywhere in the world must be recognized within 72 hours, investigated, and then confirmed within days. A successful response will require an unprecedented and well-coordinated containment effort involving dozens of trained teams, broadly disseminated public health messages, social-isolation and movement-restriction considerations, and the treatment of patients and potential contacts.

Experts from CDC's Influenza Division and Global Disease Detection (GDD) Centers are strengthening the agency's resources on the ground by improving current surveillance systems, training and equipping rapid-response teams in high-priority countries, supporting the expansion of the WHO Influenza Network, assisting countries with investigation of and response to outbreaks, and facilitating the availability of needed protective equipment and supplies for first responders to a potential pandemic. Much of the capacity that is being developed by CDC and its partners extends beyond the threat posed by avian influenza to help regions and countries to prepare for other emerging threats as well. ✧

Rift Valley Fever

At the request of the Kenya Ministry of Health, the Centers for Disease Control and Prevention (CDC) within the U.S. Department of Health and Human Services (HHS) is working closely with Kenyan health and veterinary officials in response to an outbreak of Rift Valley Fever (RVF) in Northeastern Kenya. As of January 25, 2007, the Kenyan Ministry of Health had reported 404 human cases (112 laboratory confirmed) and 115 deaths related to the outbreak.

A viral disease, RVF causes sudden fever and, more rarely, serious complications including hemorrhagic fever, encephalitis, and blindness. While RVF primarily affects livestock, such as sheep and cattle, humans who are bitten by infected mosquitoes or other insects are also susceptible. Rift Valley Fever is generally found in regions of eastern and southern Africa. The United States has never experienced an outbreak of Rift Valley Fever, but the virus—like the West Nile virus—could reach the U.S., posing a threat to both human and animal health.

The Centers for Disease Control and Prevention (CDC) within the U.S. Department of Health and Human Services (HHS) is leading the U.S. Government's response to the outbreak. Other members of the USG team are the U.S. Army Medical Research Unit-Kenya, the Animal and Plant Health Inspection Service within the U.S. Department of Agriculture, and Naval Medical Research Unit-3. The World Health Organization (WHO) and its partners from the Global Outbreak Alert and Response Network (GOARN) are also actively engaged in the investigation and efforts to contain the outbreak.

CDC is helping Kenya's Ministry of Health to enhance its surveillance and response strategies, to revise standard case definitions to help accurately identify cases of suspected infections, to identify risk factors for disease transmission, and to craft health communications and media messages. CDC is also assisting the Ministry of Livestock and Fisheries Development with training and capacity building of veterinary labs, including the transfer of technology, and working with the Department of Veterinary Services within the Ministry of Livestock to improve their data management systems. Similar assistance has been provided in Tanzania.

In recent weeks, 18 experts from CDC's Global Disease Detection (GDD) Center in Kenya and from the CDC's offices in Atlanta, Georgia, and Ft. Collins, Colorado have helped investigate the outbreak in Nairobi and affected provinces. Also collaborating on the investigation are the current trainees and graduates of the Kenya CDC Field Epidemiology and Laboratory Training Program (FELTP) and representatives from the CDC-supported Kenya Medical Research Institute (KEMRI). KEMRI and the Kenya GDD Center have also provided laboratory support to confirm diagnosed cases. The improved detection of new cases and knowledge of how the virus is being spread will enable a swifter and more targeted response.

CDC continues to play a strong role in identifying the source and patterns of transmission of Rift Valley in order to effectively control the current outbreak of RFV. This information will play an important role in the development of prevention and intervention strategies for Rift Valley

The CDC Global Health E-Brief is produced quarterly by the Centers for Disease Control and Prevention's (CDC) Coordinating Office for Global Health (COGH). To find out more about CDC and COGH, go to www.cdc.gov and www.cdc.gov/cogh.

Fever in endemic countries to limit the public health threat posed by RVF. For more information on the Rift Valley fever outbreak, please visit www.cdc.gov/mmwr/preview/mmwrhtml/mm5604a3.htm?s_cid=mm5604a3_e . ✧

XDR TB: Old Foe Poses New Threat

CDC is actively engaged in addressing the emerging global concern stemming from reports of extensively drug-resistant tuberculosis (XDR TB), first described in the March 24, 2006 issue of the *Morbidity and Mortality Weekly Report* (*MMWR*). XDR TB is defined as *M. tuberculosis* strains which meet the definition for multidrug-resistant TB (MDR TB) with additional resistance to fluoroquinolones and at least one of the second-line injectable drugs (amikacin, kanamycin, or capreomycin). The loss of these additional drugs leaves most patients virtually untreatable with currently available drugs.

Based on a joint CDC-WHO survey of 14 supranational reference labs, this *MMWR* provided an alert that XDR TB has emerged worldwide as a threat to public health and TB control.

The report documented the occurrence of XDR TB in 47 countries on six continents, including the United States. U.S. patients with XDR TB are 64% more likely to die during treatment than patients with multidrug-resistant (MDR) TB. Additionally, reports from a province in South Africa describe a recent outbreak of XDR TB in an HIV-infected population, characterized by alarmingly high death rates. Of 536 patients with TB, 221 (41.2%) had multi-drug resistant (MDR) TB and, of these, 53 had extensive drug-resistant (XDR) TB. Nearly all (98%) of the individuals with XDR TB died—1/2 of them within 16 days and 70% within one month. Forty-four of these persons were tested for HIV; all were positive and had been receiving antiretroviral drugs. These data likely represent the "tip of the iceberg" of highly drug-resistant TB predominantly affecting HIV-infected individuals in that country and other regions of the world. The harrowing implication of these highly resistant strains of TB spreading among clients accessing HIV care and treatment services, such as those spearheaded by the President's Emergency Plan for AIDS Relief (PEPFAR), has necessitated concerted and swift responses.

CDC, in collaboration with WHO and the South Africa Medical Research Council (MRC), convened an Expert Consultation on Drug Resistant TB in the African Region in Johannesburg in September 2006. CDC demonstrated expertise in rapid response, surveillance, building laboratory capacity and infection control helped inform discussion at this meeting.

On-going activities supported by PEPFAR have also been accelerated in the context of overall TB program strengthening as the critical element to prevent drug-resistance. Staff from CDC work with their PEPFAR-implementing colleagues in other U.S. Government Agencies and those in WHO, MRC, and other international partners to provide technical assistance and mobilize financial and technical resources to respond to XDR TB.

The U.S. Government has convened a U.S. Federal TB Task Force to discuss a domestic and international response plan for U.S. Government agencies on XDR-TB. The White House is also planning to convene an interagency meeting in the next few weeks to ensure a unified strategic approach. The U.S. Government also participates in the WHO Global XDR-TB Task Force which is finalizing a global plan to respond to XDR-TB. ✧

Mystery Illness in Panama Solved

On October 2, 2006, the Gorgas Memorial Institute of Health Research (GMIHR) in Panama City asked the Centers for Disease Control and Prevention (CDC) to join the Ministry of Health and Pan American Health Organization (PAHO) for assistance in tracking down an unknown killer. A mysterious illness, producing acute renal failure and weakness in adults, had appeared in 21 seriously ill patients in the Latin American nation, leading to death in more than half of them.

A team with expertise in epidemiology, medical toxicology, neurology and infectious disease was assembled by CDC Atlanta as well as staff from CDC's regional office in Guatemala. The team hit the ground running in Panama, quickly distributing supplies and equipment to gather medical data and diagnostic samples from patients—as well as gathering samples from suspected sources of the possible poisoning—and returning them to Atlanta's laboratories. The rapid delivery of supplies to Panama and return transportation of diagnostic samples for testing by CDC and FDA was facilitated through use of CDC's leased airplane.

CDC and United States Food and Drug Administration (FDA) laboratories conducted several comprehensive and exhaustive analyses for a wide variety of both chemical and infectious agents in biologic specimens as well as reviewed kidney and nerve tissue specimens for evidence of infectious diseases. CDC and FDA laboratories also collaborated to assess the purity of various medications associated with case-patients and conducted targeted testing for specific agents in these medications suspected of causing this illness. In just nine days, CDC scientists working with numerous international partners were able to identify the cause of this disease.

Diethylene glycol (DEG) somehow was introduced into several locally produced medications including a sugarless cough syrup. DEG is a water-soluble, clear liquid commonly found in brake fluids, antifreeze, and fuel additives that can cause potent kidney and nervous system damage when ingested by humans.

Once the contaminant was identified, Panamanian health authorities quickly withdrew the contaminated medications from clinics, and began a national public health prevention and risk communication program.

They notified people through the media as well as through door-to-door visits to not use these products. Thanks to this remarkable scientific detective work, it is likely that many lives were saved. CDC will translate lessons learned during this experience to prevent further poisonings. ✧

Measles Initiative Surpasses Goal

Measles deaths have fallen by 60% worldwide, from an estimated 873,000 deaths in 1999 to 345,000 in 2005—a major public health success. This exceeds the United Nation's goal to halve measles deaths by 2005, and is largely due to an unprecedented decline in measles deaths in the African region.

In Africa, measles deaths fell by 75%, from an estimated 506,000 to 126,000. This announcement was made on January 18, 2007, by partners in the Measles Initiative: the American Red Cross, CDC, the United Nations Foundation, UNICEF, and the World Health Organization. The data was published in the January 20 edition of the *Lancet*. The 75% reduction in measles deaths in Africa is due to the firm commitment and resources of national governments and support from the Measles Initiative.

A four-component strategy has been the key to ensuring the massive global decrease in measles deaths. The strategy calls for

- The provision of one dose of measles vaccine for all infants, via routine health services
- A second opportunity for measles immunization for all children, generally through mass vaccination campaigns
- Effective surveillance for measles
- Enhanced care, including provision of supplemental Vitamin A

As a result of this strategy, between 1999 and 2005, global measles immunization coverage with the first routine dose increased from 71% to 77%, and more than 360 million children aged 9 months to 15 years received measles vaccine through immunization campaigns.

In addition, measles vaccination campaigns are contributing to the reduction of child deaths from other causes. They have become a channel for the delivery of other life-saving interventions, such as

- Bed nets to protect against malaria
- De-worming medicine
- Vitamin A supplements

In 2006 alone, an estimated 18 million bed nets were provided to families in nine African countries during Measles Initiative-supported campaigns. Combining measles immunization with other health interventions is a contribution to the achievement of the Millennium Development Goal to reach a two thirds reduction in child deaths between 1999 and 2015. There is still some way to go in the fight against one of the world's most contagious diseases. Of the estimated 345,000 measles deaths in 2005, 90% were among children under the age of 5—many dying as a result of complications related to severe diarrhea, pneumonia, and encephalitis.

CDC's Global Immunization Division (GID) contributes funds and technical assistance to partner activities in priority countries around the world. GID's technical assistance supports the implementation of high-quality measles campaigns to strengthen field and laboratory surveillance for measles virus detection and for efforts to strengthen national routine immunization systems in priority countries.

Since 2001, CDC has contributed more than $50 million for the purchase of bundled measles vaccine (more than 280 million doses) to the UN Foundation. This contribution has generated matching funds of more than $16 million in support of measles surveillance and routine immunizations helping to sustain the gains made through this innovative partnership on reducing measles mortality and morbidity in priority countries supported by the partnership. CDC's response to measles highlights the

agency's ability to respond to public health threats, and its ability to expand the focus of a public health intervention strategically to prevent other emergent public health threats. ✧

President's Malaria Initiative: A Call for Action

The global toll of malaria is high: an estimated one million people die each year, most of them young children in Africa. Malaria's impact extends beyond the infected individual. It also weakens economies by leaving adults too sick to work for days each year and requiring large expenditures by ministries of health and families. Malaria-related illness and mortality are estimated to cost Africa's economy $12 billion per year.

In June 2005 President Bush announced the $1.2 billion President's Malaria Initiative (PMI) with the goal to cut malaria deaths in half in targeted African countries. PMI assists national governments in delivering a comprehensive package of proven, effective interventions to a majority (85%) of people at greatest risk—pregnant women and children less than 5 years old.

From PMI's inception, CDC has worked closely with USAID to design the initiative. CDC has helped conceive and lead implementation of the plan for evaluating PMI's impact in achieving its goal. In support of PMI activities, CDC provides assistance with implementation of scale up activities and leadership in formulating strategies and conducting activities to monitor and evaluate program outcomes and impacts. USAID and CDC work with host Ministries of Health, other U.S. agencies (National Institutes of Health, U.S. Department of State); the Global Fund to Fight AIDS, TB, and Malaria; the World Bank; Roll Back Malaria; U.N. Children's Foundation (UNICEF); and other organizations to achieve the President's goal.

Within 6 months of the President's announcement, work was under way in the first 3 (fiscal year 2006) countries targeted: Angola, Tanzania, and Uganda. In November 2006, PMI began work in the next 4 (fiscal year 2007) targeted countries—Malawi, Mozambique, Rwanda, and Senegal.

The final 8 countries targeted for the initiative were named at the White House Summit on Malaria, December 14, 2006–Benin, Ethiopia, Ghana, Kenya, Liberia, Madagascar, Mali, and Zambia. Activities in these countries are scheduled to begin in fiscal year 2008. To date, PMI has provided life-saving interventions to more than 6 million people. ✧