

TESTIMONY**TESTIMONY OF
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DIRECTOR
CENTERS FOR DISEASE CONTROL AND PREVENTION
DEPARTMENT OF HEALTH AND HUMAN SERVICES****BEFORE THE
COMMITTEE ON HEALTH, EDUCATION, LABOR, AND PENSIONS
AND THE
COMMITTEE ON GOVERNMENTAL AFFAIRS
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RESTRUCTURING AND THE DISTRICT OF COLUMBIA****U.S. SENATE****September 24, 2002**

Good morning, Mr. Chairmen and Members of the Committees. I am Dr. Julie Louise Gerberding, Director, Centers for Disease Control and Prevention. During my tenure as CDC Director, I am committed to achieving our vision of healthy people in a healthy world through prevention by a commitment to excellence in science, services, systems, and strategies. Thank you for your continued support and recognition of the critical need for a strong, flexible, well resourced public health system to deal with emerging threats, including bioterrorism and naturally occurring diseases such as West Nile virus (WNV). I am pleased to be here to update you on CDC's public health response to WNV-related illnesses in the United States. I will also discuss the status of our WNV prevention programs.

Mosquito-borne illnesses in the United States were largely eliminated as a health risk in the middle of the last century, although mosquitoes that can transmit malaria, dengue, and yellow fever remain. Although Americans have not regarded mosquito-borne diseases as a major domestic threat for some time, the introduction and rapid spread of WNV has changed this. CDC has played an important leadership role in rebuilding the nation's capacity to monitor and diagnose mosquito-borne viral diseases through state and local public health partners around the country, but this year's events show that more work remains to be done. The more we strengthen our nation's front-line workers, whether in the field or in the laboratory, the better prepared we are to respond to new and emerging infections, such as WNV.

Emerging Infectious Disease Threats

The past decade has seen a significant number of emerging infectious disease problems in the United States. Some, such as *E. coli* O157:H7 and *Cyclospora*, are foodborne. Others, like hantavirus pulmonary syndrome, are transmitted from animals to people. Still others, like Lyme disease and ehrlichiosis, are vector-borne, while others, like vancomycin-resistant enterococci, result from the development of antimicrobial resistance in response to the misuse of antibiotics. Some emerging infectious diseases appear to be caused by new pathogens; others, in retrospect, have been here all along but were just not recognized. Some are clearly domestic in origin and others just as clearly have been introduced from abroad, illustrating the futility of thinking of infectious diseases in purely domestic or international terms. Infectious diseases know no borders. We must learn from the experiences of other countries in dealing with diseases such as bovine spongiform encephalopathy (BSE), variant Creutzfeldt-Jakob disease (vCJD), and foot and mouth epidemics in Europe, Ebola hemorrhagic fever in Africa, and avian

influenza in Hong Kong .

CDC launched a major effort in 1994 to rebuild the component of the U.S. public health infrastructure that protects U.S. citizens against infectious diseases. In 1998, CDC issued *Preventing Emerging Infectious Diseases: A Strategy for the 21st Century*, which describes CDC's plan for combating today's emerging diseases and preventing those of tomorrow. It focuses on four goals, each of which has direct relevance to the detection of and response to WNV: 1) disease surveillance and outbreak response; 2) applied research to develop diagnostic tests, drugs, vaccines, and surveillance and prevention tools; 3) public health infrastructure and training; and 4) disease prevention and control. The plan emphasizes the need to be prepared for the unexpected – whether it be the next naturally occurring influenza pandemic or the deliberate release of anthrax organisms by a terrorist. This CDC plan is available on CDC's website at www.cdc.gov/ncidod/emergplan/index.htm, and copies have been provided previously to the Committee.

Despite the diversity of emerging infectious diseases, public health workers, in partnership with health care providers in the United States, must detect them and respond. This is particularly true at the state and local levels of the system. CDC and other Department of Health and Human Services agencies have worked to strengthen the infectious disease public health infrastructure through cooperative agreements with states to build epidemiologic and laboratory capacity and through the development of emerging infections programs which are now in place in nine locations around the country. In many instances, these programs have significantly improved our ability to respond to infectious disease emergencies. Resources for bioterrorism preparedness and response have also bolstered capacity at the state and local level. But as highlighted by the Public Health Security and Bioterrorism Preparedness and Response Act, which originated in the Health, Education, Labor, and Pensions Committee and as illustrated by the challenges posed by the emergence of WNV, we still have gaps and needs to be addressed.

West Nile Virus

WNV is a mosquito-borne virus first recognized in the West Nile district of Uganda in 1937. Since then, it has been seen in Europe , the Middle East , Africa , and as far east as India . The virus lives in a natural cycle involving birds and mosquitoes, and only incidentally is transmitted to humans and other mammals, often in outbreak situations. A closely related virus, St. Louis encephalitis (SLE) virus, acts similarly in North America . Most humans who become infected with WNV through the bite of an infected mosquito will develop a mild illness or will not become sick at all. However, in a small fraction (<1%), encephalitis (inflammation of the brain) or meningitis (infection of the membranes surrounding the brain and spinal cord) will develop; approximately 10% of these patients will die. The elderly are recognized to be at higher risk than the rest of the population for the development of severe illness following WNV infection. It is likely that persons with compromised immune systems are also at higher risk.

The human and animal epidemic of WNV encephalitis which began in the northeastern United States in the summer and fall of 1999 underscored the ease with which emerging infectious pathogens can be introduced into new areas. The persistence of virus activity through 2002 indicates that WNV has become established in North America . This dramatic introduction and spread across the United States of a disease not previously seen in the Western Hemisphere reinforces the need to rebuild the public health system to prevent and respond to potential future introductions of other emerging infections.

WNV was recognized in the United States in late August 1999 when an alert infectious disease clinician at the Flushing Medical Center in Queens , New York , reported to the New York City Department of Health an unusual syndrome of fever and severe muscle weakness in several elderly patients. Eventually, 62 cases of human illness

with WNV were recognized in the New York City area in 1999.

Laboratory studies of the virus demonstrated it was essentially identical to a WNV strain which had been isolated from geese in Israel in 1998, and all viruses identified in New York were indistinguishable by molecular typing techniques, indicating the outbreak resulted from a single introduction. When and how that introduction occurred is uncertain, but based on the wide circulation of the virus in the New York City area by August 1999, the virus likely was introduced several months earlier with subsequent unnoticed amplification in nature. Testing of a limited number of banked specimens from birds and humans have found no evidence of WNV in New York prior to 1999. Among the possibilities for how it was introduced are through an infected bird, through infected mosquitoes, or through an infected human.

In 2000, WNV was detected in 12 northeast and mid-Atlantic states. A total of 21 persons were found to be infected, 19 with severe illness and 2 with milder symptoms. Randomly conducted household surveys where residents were asked to provide blood specimens were conducted in Richmond County (Staten Island) and Suffolk County, New York, and in Fairfield County, Connecticut – all areas with intense epizootic activity. Infection rates in the three locations were 0.46%, 0.11%, and 0%, respectively – far lower than the 2.6% seen the year before in northern Queens. In 2001, 359 counties in 27 states and Washington, DC, reported WNV activity, including 66 human illnesses, to ArboNET, a web-based, surveillance data network maintained by 54 state and local public health agencies and CDC. This activity represented a marked increase from 2000 in both geographic range and number of cases.

Current West Nile Virus Spread

This year, as you know, WNV infection has continued to expand geographically, reaching epidemic proportion in some states. As of September 22, 2002, surveillance in humans, birds, mosquitoes, and horses has detected WNV activity in 42 states and Washington, DC. Among humans, 1,672 cases with laboratory evidence of recent WNV infection have been reported from 31 states and Washington, DC. Among the 1,586 patients for whom data are available, the median age was 55 years, with age ranging from 1 month to 99 years; 855 patients were male; and the dates of illness onset ranged from June 10 to September 21. A total of 89 human deaths have been reported.

Building on lessons learned from the anthrax attack, we have activated our emergency operations center to coordinate our response, deploying field epidemiologists, vector-borne disease experts, and communications specialists to assist state and local health departments in the affected states in conducting surveillance, investigating cases, and implementing prevention and control efforts. As part of this effort, we have utilized the National Pharmaceutical Stockpile contract aircraft to rapidly transport specimens to CDC laboratories for diagnostic testing. In addition, we have provided education to health care workers, utilized the Health Alert Network (HAN) and the *Epidemic Information Exchange (Epi-X)* systems to disseminate information to clinicians and public health officials, and held press telebriefings – all critical activities both for this disease outbreak and for strengthening our future response capabilities.

CDC, FDA, and HRSA, in collaboration with blood collection agencies and state and local health departments, are investigating a series of cases of WNV infections in recipients of organ transplantation and blood transfusion. An initial investigation in Georgia and Florida has demonstrated transmission of WNV in four recipients of solid organs from a single donor. The source of the organ donor's infection remains unknown and an investigation of the numerous transfusions of blood products that the organ donor received is ongoing.

Since the report of these cases, CDC has been informed of other patients with WNV infection diagnosed after receiving blood products within a month of illness onset. One of these patients also received an organ transplant. All of these patients resided in

areas with high levels of WNV activity; investigations are underway to determine whether transfusion or transplantation was the source of WNV transmission. In each instance, precautionary measures, including withdrawal of unused blood products from donors whose blood was given to these patients, has been initiated.

WNV was isolated from a unit of frozen plasma that had been withdrawn as a result of one of these investigations. This finding indicates that the virus can survive in some blood components and probably can be transmitted by transfusion. In contrast, another investigation has found that a patient who received a unit of blood potentially-contaminated with WNV did not develop serologic evidence of subsequent WNV infection.

To better assess the risk of WNV transmission through blood transfusion or organ transplantation, CDC is actively engaged with FDA, HRSA, blood collection agencies, hospitals, and health departments to identify and follow-up additional possible cases. CDC has requested public health authorities to determine if persons reported with WNV infection donated or received blood transfusions or organs preceding their illness. Prompt reporting of these persons can facilitate withdrawal of potentially infected blood components. Additionally, the Public Health Service will work with industry to identify potential strategies to further increase the safety of the blood supply, including the development and application of assays that could be used to screen blood and plasma donations for WNV.

CDC studies have indicated that some patients with WNV infection have a syndrome similar to that caused by the polio virus. These patients can have paralysis of their arms or legs, and the paralysis can affect the muscles that control breathing. This finding is particularly important since many of these patients were being treated for Guillain-Barré syndrome--treatment which would have no benefit for a poliomyelitis-like syndrome and could lead to severe side effects. It is not known how long the paralysis will last; however, many patients did not significantly improve several weeks after disease onset. CDC is planning long-term follow-up studies of these patients.

Public Health Response

After the outbreak of WNV in 1999, a West Nile Virus Interagency Working Group was formed to facilitate information sharing and coordination of activities among federal agencies with a role in monitoring and control. CDC leads the working group which includes representatives from the Departments of Agriculture, Commerce, Defense, and Interior, the Environmental Protection Agency, and the National Institutes of Health (NIH) who continue to monitor for WNV activity and seek ways to prevent future outbreaks, including research by NIH into the development of an effective vaccine and effective treatment. The working group routinely assembles for telephone conference calls and has provided several briefings to keep Congress informed of ongoing activities. CDC has also conducted weekly conference calls with our state partners to assure coordination of national surveillance.

As with many emerging infectious disease problems, addressing the WNV outbreak also requires a strong partnership between public health and veterinary agencies and the public. Effective systems need to be in place to ensure: 1) effective monitoring for WNV and other mosquito-borne diseases and 2) further development of prevention and control measures, including integrated pest management, public education, optimal mosquito control measures, vaccines and antiviral therapy. Further research on the basic biology of the virus and its natural ecology is also needed.

CDC has been the lead federal agency to respond to the WNV outbreak in humans. Since fiscal year 2000, DHHS and CDC have provided more than \$58 million to state or local health departments to develop or enhance epidemiologic and laboratory capacity for WNV and other mosquito-borne diseases. In fiscal year 2002, approximately \$35 million has been awarded to those public health agencies to address the continued

spread of the virus.

CDC has also provided extramural funding to other federal agencies for related WNV surveillance and diagnostic activities in support of the states. A university-based research cooperative agreement was initiated in fiscal year 2001 to support studies on WNV distribution, pathogenesis, and variability and to provide training to future entomologists, biologists, and other vector-borne specialists. And, in fiscal year 2002, CDC will award funding to three educational institutions to initiate a program to train scientists in vector-borne infectious diseases. Finally, CDC has undertaken an aggressive intramural research program in several scientific areas to address the long-term needs related to epidemic WNV.

Surveillance, combined with professional and public health education, is the best strategy to confront the WNV problem. Among the recommended prevention measures to reduce the risk of exposure to WNV are 1) eliminating any areas of standing water around the house, i.e., draining standing pools, cleaning gutters, and emptying bird baths; 2) minimizing outdoor activities at dawn, dusk, and in the early evening; 3) wearing long-sleeved shirts and pants when outdoors; and 4) applying insect repellent according to package directions to exposed skin and clothing.

In addition to current activities, the following are some specific measures that CDC has implemented since the first WNV outbreak three years ago:

- developing the tests for use at state laboratories to diagnose WNV in humans, making and supplying the reagents used for these tests, and training every state laboratory in how to run them and how to diagnose infection

- implementing Arbo-NET, an electronic surveillance system to track and monitor WNV and other mosquito-borne illnesses;

- convening a national meeting each year to provide public health workers, laboratorians, and local officials an opportunity to exchange the latest information about this disease;

- producing, in collaboration with partners, consensus guidelines for the surveillance, prevention, and control of WNV;

- developing educational materials for health care providers on the clinical aspects and diagnosis of WNV infection as well as public education materials; and

- assisting local officials with guidance on mosquito control.

Conclusions

In conclusion, addressing the threat of emerging infectious diseases such as WNV depends on a revitalized public health system and sustained and coordinated efforts of many individuals and organizations. As CDC carries out its plans to strengthen the nation's public health infrastructure, we will collaborate with state and local health departments, academic centers and other federal agencies, health care providers and health care networks, international organizations, and other partners. We have made substantial progress to date in enhancing the nation's capability to detect and respond to an infectious disease outbreak; however, the emergence of WNV in the United States has reminded us yet again that we must not become complacent. We must continue to strengthen the public health systems and improve linkages with health care providers and colleagues in veterinary medicine and public health. Priorities include strengthened public health laboratory capacity; increased surveillance and outbreak investigation capacity; education and training for clinical and public health professionals at the federal, state, and local levels; and communication of health information and prevention strategies

to the public. A strong and flexible public health infrastructure is the best defense against any disease outbreak.

Thank you very much for your attention. I will be happy to answer any questions you may have.

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