

EPI CONNECTIONS

April 2007

A Bimonthly Newsletter of the Communicable Disease Division

Zoonotic Season, 2007

West Nile Virus (WNV)

In 1999, Dr. Tracey McNamara, a veterinarian at the Bronx Zoo, investigated an increased level of crow mortality at the zoo. Her analysis discovered an association between crow mortality and human deaths in New York; further investigation confirmed WNV. The disease has since become endemic with 43 states reporting 4,261 human cases in 2006, a 42% increase from 2005. WNV reached Colorado in 2002, and the state has since reported over 3,700 cases. In 2006, Colorado Department of Public Health and Environment (CDPHE) received 345 WNV case reports comprised of fever (81%), meningitis (10%), and encephalitis (9%) cases, including 7 deaths. The reports represent a 225% increase from the 106 cases reported in 2005.

Boulder County also experienced a dramatic increase in WNV reports from 5 cases in 2005 to 74 cases in 2006, and corresponds to a change in rate from 2 per 100,000 in 2005 to 25 per 100,000 in 2006. For specific county rate data, please see the graphic below. Differences between seasons may account for the increase:

- Over 100 positive *Culex* mosquito pools in 2006 (none in 2005)
- Two times more *Culex* mosquitoes collected in 2006
- Increase in 2006 bird population (anecdotal data, Boulder County Audubon Society)
- Boulder County residents lack protection (only 9% practice all 3 personal protective behaviors: wearing DEET, dressing in long sleeves and pants, and decreasing outdoor activity from dusk until dawn)

The Boulder County WNV cases lived primarily in Longmont (47%) and Boulder (30%), with fewer cases residing in Lafayette (14%), Louisville (7%), Superior (1%), and Erie (1%). The youngest case was 15 years old, the oldest case was over 90 years old, and the median age was 50 years old. The cases were predominantly white (89%), non-Hispanic (89%), and female (58%). Similar to the state numbers, the Boulder County patients experienced mostly fever (89%), with a smaller percentage reporting meningitis (7%), and encephalitis (4%) cases. Sixteen percent of the patients were hospitalized and one person died as a result of his infection.

Clinically, WNV fever patients present with malaise, headache, myalgia, fever, muscle weakness, chills, anorexia, rash, eye pain, and lymphadenopathy. The duration of symptoms for fever cases is 3 to 6 days, though extreme fatigue, malaise, and weakness can last for weeks, and occasionally years. WNV neuroinvasive patients are usually over 50 years old and present with severe muscle weakness, acute flaccid paralysis, ataxia and extrapyramidal signs, cranial nerve abnormalities, myelitis, optic neuritis, Guillain-Barre syndrome, and

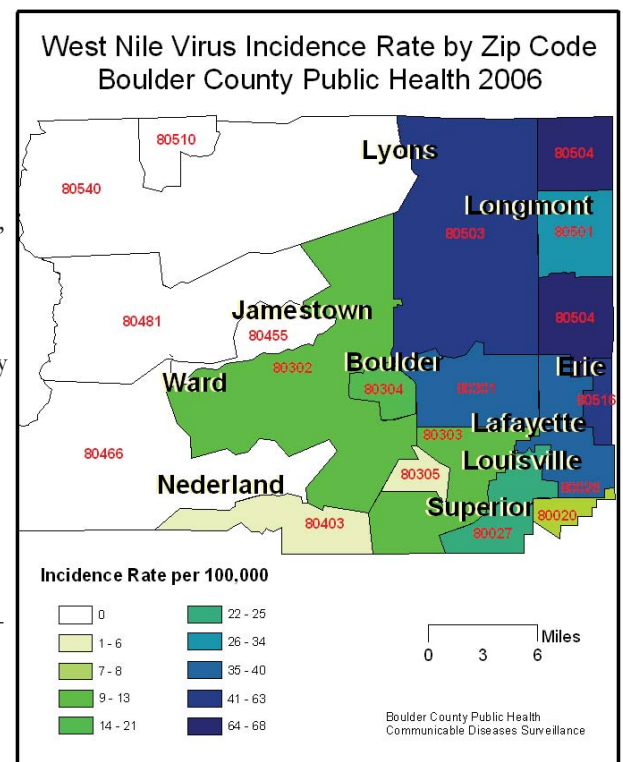
respiratory paralysis. The case-fatality rate for neuroinvasive disease is 8%, and overall it is 2%.

Treatment is supportive, often requiring hospitalization, intravenous fluids, respiratory support, and prevention of secondary infections. Recommended diagnostic testing for WNV IgM antibody should be performed for patients with a clinically compatible illness during the summer months (June through October) when most WNV activity occurs. In the absence of any proven therapy or treatment for WNV, clinicians should consider the clinical value when testing patients with a mild fever in the absence of neurological symptoms.

References

West Nile Virus, Guidelines for Emergency Departments and Health Care Provider, CDPHE. Denver CO, 2004.

West Nile Virus, Centers for Disease Control and Prevention, National Center for Infectious Diseases, Division of Vector-Borne Infectious Diseases. Atlanta GA, 2006.





Epi-Eye

A Look Outside Our Community and Around the World

**National Public Health Week
April 2-8, 2007**

National Public Health Week is an opportunity to reflect on our global community and the struggles of public health practitioners around the world. The World Bank and WHO categorized high-, middle-, and low-income countries and their associated mortality. During 2002, an estimated 57 million people died, including 11 million children. Tobacco use was responsible for 1 in 10 adult deaths. Most high-income residents lived until at least age 70 and died of chronic diseases. Less than half of middle-income country residents lived until 70 years old and died of infectious disease, pregnancy complications, or injury. Less than a quarter of low-income country residents lived until age 70 (33% of the deaths were <14 years old), and most died of infectious disease.

**The 5 Leading Causes of Death
by World Bank Income Estimates
(Broad Income Group, 2005 Projections)**

High-income countries	Deaths	%
1. Coronary heart disease	1,380,000	16.9
2. Stroke/other cerebrovascular diseases	770,000	9.5
3. Trachea, bronchus, lung cancers	470,000	5.8
4. Lower respiratory infections	340,000	4.2
5. Chronic obstructive pulmonary disease	320,000	3.9
Middle-income countries	Deaths	%
1. Stroke/other cerebrovascular diseases	3,140,000	14.8
2. Coronary heart disease	2,900,000	13.7
3. Chronic obstructive pulmonary disease	1,720,000	8.1
4. HIV/AIDS	750,000	3.5
5. Trachea, bronchus, lung cancers	620,000	2.9
Low-income countries	Deaths	%
1. Coronary heart disease	3,290,000	11.4
2. Lower respiratory infections	2,720,000	9.5
3. HIV/AIDS	2,060,000	7.2
4. Stroke/other cerebrovascular diseases	1,830,000	6.4
5. Perinatal conditions	1,780,000	6.2

Hantavirus pulmonary syndrome (HPS)

HPS was first recognized in 1993 in the western United States and has since been identified throughout the country. Colorado has consistently reported high numbers of HPS, with 32 cases reported since 2000. Boulder County Public Health (BCPH) received its first 2 reports of HPS in the summer of 2005 (*Epi Connections*, August 2005). The disease progression of these two cases, however, was atypical for HPS. Both patients experienced a relatively mild clinical course and were discharged within days of admission.

After exposure to infected rodent excreta, symptoms occur within approximately two weeks. Patients present with a one- to seven-day history of fever, chills, and myalgia. Severe pain in the legs and back is also a common complaint, and half of patients report nausea, vomiting, and diarrhea. Common cold symptoms, such as cough, rhinorrhea, sinusitis, or sneezing, are not consistent with HPS.

The recommended tool to help distinguish between early hantavirus illness and other viral infections is a complete blood count with differential and platelet count. During the prodromal stage, 92% of HPS patients experience a platelet count of <130,000. All HPS patients will eventually have platelet counts of <100,000. Additional laboratory indicators consistent with prodromal hantavirus infection include elevated lactic dehydrogenase (LDH), elevated aspartate aminotransferase (AST), and reduced serum bicarbonate.

The cardiopulmonary syndrome occurs 4 to 12 hours after onset of dry cough and dyspnea. Important indicators at this stage are pulmonary edema, thrombocytopenia, elevated hematocrit, leukocytosis with circulating myelocytes and promyelocytes, and immunoblasts, recognized as large atypical lymphocytes with deep blue cytoplasm. Lactic acidosis, mild coagulopathy, elevated LDH and hepatic enzymes, and reduced serum albumin are also seen. In HPS patients, hypotension is due to cardiogenic shock with low cardiac output and normal or elevated peripheral vascular resistance. Patients presenting with bilateral alveolar-interstitial infiltrates and hypotension and plasma lactate greater than 4 meq/L have a higher risk of mortality.

Supportive care is critical in reducing patient mortality, which ranges from 36% to 50%. Patients should be transported to a critical care unit as early as possible for aggressive intensive care including early use of inotropic agents, such as dobutamine and diligent fluid management, guided by Swan-Ganz catheter data. Oxygenation may be difficult even with mechanical ventilation. No approved antiviral treatment is available for HPS.

To confirm hantavirus infection, an IgM antibody enzyme-linked immunosorbent assay (ELISA) specific for the Sin Nombre virus is the preferred method. The CDPHE laboratory performs the ELISA test, and results are available within 48 hours of receipt. Antibody titers, RT-PCR, viral isolation, and immunohistochemical staining (for postmortem samples) are other methods for confirming infection.

Reference

Hantavirus Pulmonary Syndrome, Guidelines for Emergency Departments and Health Care Providers. CDPHE, 2005.