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Surveillance, Reporting, and Submission of Specimens for Confirmed or Suspected Cases of Arboviral Encephalitis

With the recent introduction of West Nile virus (WNV) to the eastern United States, the Minnesota Department of Health (MDH) is increasing surveillance efforts for this virus and endemic arboviruses. This update outlines the epidemiology of West Nile virus and arboviruses endemic to Minnesota and provides instructions for submitting clinical specimens from suspected arboviral encephalitis case patients to the MDH Public Health Laboratory.

West Nile Virus

In the late summer of 1999, the first domestically acquired human cases of West Nile encephalitis in the U.S. were documented in the New York City area. Concurrently, WNV caused a large epizootic among wild birds (especially American crows) in the same area. Previously, WNV was endemic to Africa, the Middle East, and southern Europe. Since its initial discovery in North America, the WNV epizootic among birds has spread quickly to 29 eastern and central U.S. states and the District of Columbia (Figure 1). Most human West Nile encephalitis cases have been reported from the East Coast and southeastern U.S. (Florida and Georgia). When this issue of the *Disease Control Newsletter* went to press in July 2002, WNV had been confirmed in two crows in Minnesota (one in Hennepin County and one in Mille Lacs County). It is anticipated that WNV will be identified throughout much of Minnesota this summer.

WNV is maintained in a mosquito-bird transmission cycle. Several mosquito and bird species may be involved in this cycle, but the relative importance of each species is not well understood.

As with other arboviral infections, the highest risk of transmission is during late summer (mid-July through early September). Most human WNV infections are asymptomatic or result in a mild febrile illness. However a small percentage of patients (especially the elderly) may develop encephalitis, with approximately 150-300 asymptomatic or mild cases for each West Nile encephalitis case. About 14% of West Nile encephalitis patients die from WNV infection.

LaCrosse Encephalitis

LaCrosse encephalitis (LAC) is the most commonly reported arboviral infection in Minnesota. The disease, which primarily affects children, is transmitted through the bite of infected *Ochlerotatus triseriatus* (Eastern Tree Hole) mosquitoes. Persons are exposed to infected mosquitoes in wooded or shady areas inhabited by this mosquito, especially in areas where water-holding containers (e.g., waste tires, buckets, or cans) are abundant and may be utilized as mosquito breeding habitat. The virus is maintained primarily through transovarial transmission (virus passed from female mosquito to her eggs), with seasonal amplification in small mammals (e.g., eastern chipmunks and gray squirrels). During 1985-2001, 101 cases of LAC were reported to MDH, with a median of five cases per year. Cases of LAC have been reported from 17 southeastern counties in Minnesota (Figure 2). Case patients' ages ranged from less than 1 year to 49 years, with a median of 6 years. One to three percent of LAC cases are fatal, and approximately 15% of patients experience long-term neurologic

sequelae.

Western Equine Encephalitis

Western equine encephalitis (WEE) occurs infrequently in Minnesota, often as part of a regional epidemic or epizootic in midwestern U.S. states and southern Canada. The most recent reports were single cases in 1999 and 1983, and 15 cases in 1975. The virus is transmitted to humans and horses through the bite of *Culex tarsalis* mosquitoes when virus-infected vector populations are high. The mosquitoes usually feed on birds and maintain WEE virus in a mosquito-bird cycle of transmission. However, when vector populations rise in mid-summer, a significant portion of the mosquito's feeding may switch to mammalian hosts, such as humans and horses (both are considered dead-end hosts for WEE virus, since other mosquitoes cannot become infected by feeding on an infected person or horse). Severe human infections usually occur among infants and adults over 50 years of age. Five to 15 percent of clinical WEE cases are fatal.

Eastern Equine Encephalitis

Eastern equine encephalitis (EEE)

continued on page 18...

Inside:

**Melanoma and Skin Cancer
Detection and Prevention 19**

**Annual Emerging Infections in
Clinical Practice and Emerging
Health Threats Conference -
November 15, 2002 20**

Figure 1. U.S. Counties Reporting West Nile Virus-infected Birds, January 2001 - June 2002

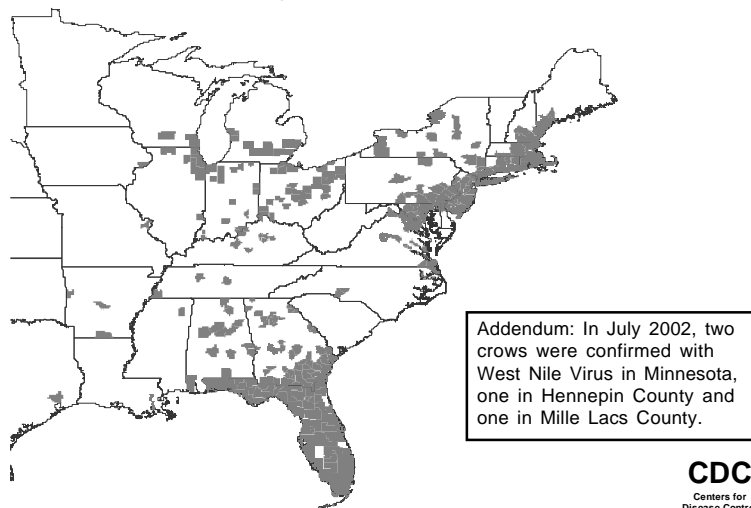
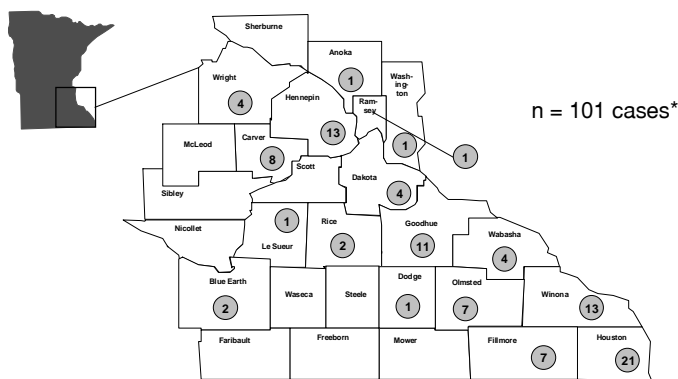


Figure 2. Reported Cases of LaCrosse Encephalitis by County of Residence, Minnesota, 1985-2001



* Cases include confirmed and probable cases

rarely is reported in Minnesota. Similar to WEE, this virus is maintained in a mosquito-bird transmission cycle, and cases are reported in horses and, occasionally, humans. The enzootic vector mosquito is *Culiseta melanura*, a bird-feeding mosquito that reproduces in hardwood swamps or tamarack bogs. This mosquito is not abundant in Minnesota. However, in years with warm wet conditions, they may be present in numbers sufficient to amplify the virus in bird populations. Other species of mosquitoes, including several that are significant pests in Minnesota, may feed on these birds and then on humans or horses. Until 2001, there was no recent evidence of EEE in Minnesota. However, during 2001, a large outbreak of EEE in horses

(approximately 75 cases) occurred in Wisconsin, with transmission in Minnesota (one equine case each in Blue Earth, Kanabec, and Anoka counties) and Iowa (one equine case). Human cases of EEE are rare, and none were reported in the three-state region during 2001. Similar to other endemic arboviruses, most EEE infections in humans are asymptomatic; however, among symptomatic patients (mainly children) the case fatality rate exceeds 50%, and approximately 80% of surviving patients have significant sequelae.

Clinical Presentation of West Nile Encephalitis and Endemic Arboviral Infections

Most human infections with WNV or other arboviruses are clinically inapparent. Most clinically apparent

infections are febrile illnesses associated with various neurologic manifestations, ranging from mild aseptic meningitis to fulminant and fatal encephalitis. Signs and symptoms may include fever, headache, stiff neck, myalgia, arthralgia, fatigue, confusion or other changes in mental status, nausea, vomiting, meningismus, cranial nerve abnormalities, paresis or paralysis, sensory deficits, altered reflexes, abnormal movements, convulsions, and coma. Arboviral meningitis or encephalitis cannot be distinguished clinically from some other central nervous system infections. Cases of arboviral encephalitis are reported from June through September, with most occurring from late July through August.

Laboratory Testing for WNV and Endemic Arboviruses

The MDH Public Health Laboratory has an arbovirus panel available, and physicians who see suspected cases of arboviral encephalitis are encouraged to submit clinical specimens to MDH for testing. Several tests for human samples are available at MDH:

Serum:

- WNV: IgM antibody capture ELISA, IgG ELISA (Positive tests are forwarded to the Centers for Disease Control and Prevention for confirmation.)
- LAC, EEE, WEE, and St. Louis encephalitis: IgM IFA

Collection of acute and convalescent (i.e., approximately 2-4 weeks after acute sample) serum samples is encouraged.

Cerebrospinal fluid:

- WNV and endemic arboviruses: TaqMan assay (PCR), Vero cell culture

Call MDH at (612) 676-5414 or 1-877-676-5414 to report a suspected case or to arrange testing.

When WNV eventually is found in Minnesota, many asymptomatic or mildly ill patients may request arbovirus testing, especially if they were bitten by mosquitoes. The likelihood of WNV (or other arbovirus) infection in these patients is very small, and MDH does not encourage testing in these instances.

Arbovirus Surveillance in Minnesota continued ...

MDH investigates all reported suspected cases of arboviral illness to learn the clinical details of the case and to determine where the patients may have been exposed to virus-infected mosquitoes. MDH also works with the

Metropolitan Mosquito Control District to test mosquitoes from locations where cases may have been exposed and other high-risk areas. MDH tests equine samples for WNV, WEE, and EEE. The most sensitive way to

identify WNV in an area is to detect the epizootic in wild birds. Therefore, Minnesota residents are encouraged to report dead birds (especially American crows and blue jays) to MDH by calling (612) 676-5414 or 1-877-676-5414.

Melanoma and Skin Cancer Detection and Prevention

Annually, approximately 1,200 Minnesotans (more than three each day) are diagnosed with *in situ* or invasive melanoma of the skin. More than 120 Minnesotans die of melanoma each year. With summer activities underway, health care providers should remind patients, especially those with fair skin, to

protect themselves and their children by avoiding sun exposure during midday, wearing protective clothing, and using sunscreen.

Melanoma of the skin is one of the few cancers with increasing incidence in the last decade, both nationwide and in Minnesota. Since 1973, the

incidence of melanoma in regions covered by the Surveillance, Epidemiology, and End Results (SEER) program, which covers approximately 10% of the U.S. population, quadrupled among men and tripled among women. Although the rate of increase slowed in the 1990s, the age-adjusted incidence rate in Minnesota increased from 13 per 100,000 in 1988, when statewide cancer registration began, to 21 per 100,000 in 1998 (Figure 1).

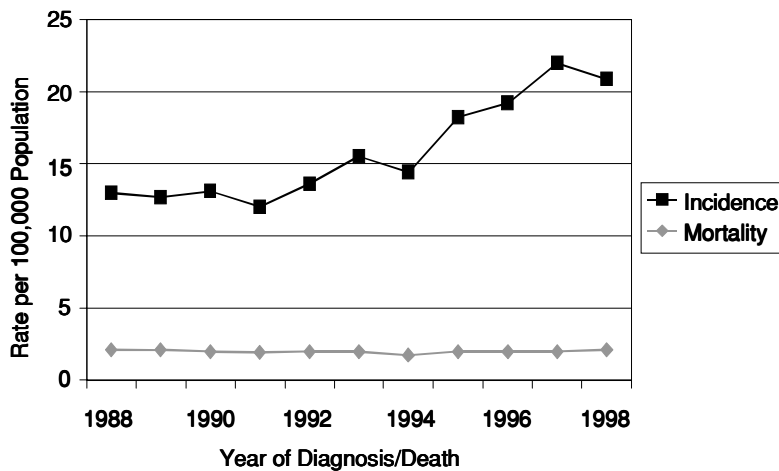
Currently, approximately one-third of melanomas are diagnosed at the *in situ* stage, compared to 3% in 1973. Partly due to earlier diagnosis, mortality rates for melanoma of the skin have not increased significantly over the last decade, despite increasing incidence (Figure 1).

Melanoma tends to occur at younger ages than many other cancers; nearly a third of melanomas are diagnosed among persons under 50 years of age. Although men tend to be at higher risk than women, young women are more likely to be diagnosed with melanoma than men of the same age (Figure 2).

The American Cancer Society (ACS) recommends that adults receive a check-up with a skin examination every 3 years for persons 20 to 40 years of age, and annually thereafter. Additional information regarding melanoma of the skin and skin changes which should be reported to a physician are available on the ACS website at <http://www.cancer.org>. Information about skin cancer prevention is also available from the Centers for Disease Control and Prevention at <http://www.cdc.gov>.

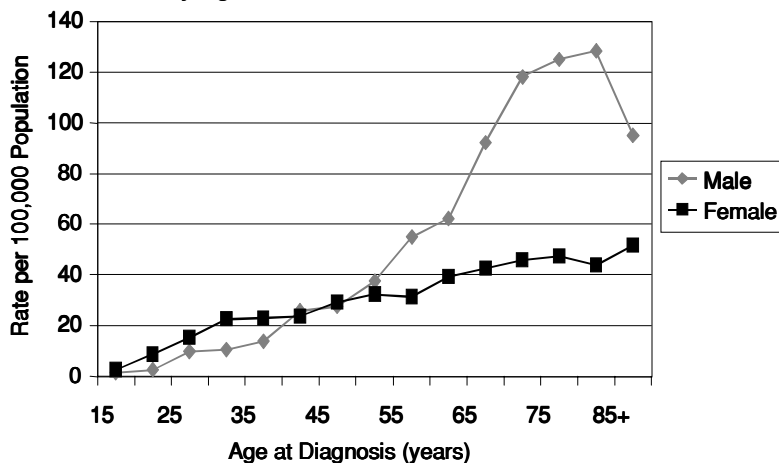
For more information about the occurrence of cancer in Minnesota or the Minnesota Cancer Surveillance System, visit <http://www.health.state.mn.us/divs/dpc/cdee/mcss.htm>.

Figure 1. Melanoma of the Skin, Minnesota, 1988-1998*



* Rates are age-adjusted to the 1970 U.S. population. Incidence rates include *in situ* and invasive cancers.

Figure 2. Incidence of Melanoma of the Skin Among Whites by Age and Gender, Minnesota, 1995-1998*



* Includes *in situ* and invasive cancers

Annual Emerging Infections in Clinical Practice and Emerging Health Threats Conference - November 15, 2002

Highlights of this 8th annual conference:

- Dr. Marci Layton, New York City Department of Health, speaking about the medical and public health response to terrorism in New York;
- Dr. Philip Tarr, University of Washington School of Medicine, on the medical management of *E. coli* O157:H7;
- Dr. Cynthia Whitney, CDC, on

pneumococcal disease in the era of Prevnar

- Dr. Scott Fridkin, CDC, discussing resistant *S. aureus* in the community and in healthcare settings;
- Dr. Michael Osterholm, University of Minnesota, speaking about bioterrorism preparedness from the perspective of Washington; and

- A bioterrorism table-top exercise with a panel of local medical and public health experts;

Registration materials will be available soon through University of Minnesota Continuing Medical Education. Enrollment for this conference will fill quickly; please register early.

Jan K. Malcolm, Commissioner of Health

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The *Disease Control Newsletter* toll-free telephone number is 1-800-366-2597.