

West Nile Virus

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Introduction

West Nile Virus (WNV) is a mosquito-borne virus of the *Flaviviridae* family within the genus *Flavivirus*. Other Flaviviruses include yellow fever, dengue fever and Japanese encephalitis viruses.

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Epidemiology

(Data from the [Travel Health Surveillance Section](#) of the Health Protection Agency Communicable Disease Surveillance Section)

Global Epidemiology

West Nile virus (WNV) was first isolated from a febrile woman in the West Nile district of Uganda in 1937 (1) . The disease is indigenous to Africa, the Middle East, Asia, and Australia (the Kunjin variant of WNV) and large outbreaks and sporadic cases have occurred in Europe. In 1999, the virus appeared in New York and has since spread rapidly throughout North America, and later to Canada, Mexico, Central America, and the West Indies.

WNV is now considered endemic in the USA and Canada, with 9,862 cases including 264 deaths reported from the USA (2) and 1388 cases including 14 deaths from Canada (3) in 2003. One human case was reported in the Cayman Islands in 2001, in a resident of the Islands, who had no recent travel history. (4) More recently, in February 2005, three human cases were serologically confirmed in Villa Clara and Sancti Spiritus provinces in central Cuba.(5)

Outbreaks and sporadic cases of human WNV infection have occurred in Europe since the 1950s including Albania, Portugal, Slovakia, Moldavia, Ukraine, Hungary, Romania, Russia, Israel, Czech Republic, Italy, (6) and more recently, four locally-acquired human infections were reported in the south of France in 2003. (7)

The three most notable European outbreaks include:

1. Southern Russia in 1999 involving 826 clinical cases including 40 deaths; of which 183 were serologically confirmed. (8)
2. Romania in 1996 involving 393 laboratory-diagnosed cases including 17 deaths. (9)
3. Israel in 2000, when 417 confirmed cases including 35 deaths were reported. (10)

Other countries outside Europe where human infections have been serologically confirmed include Algeria, Azerbaijan, Central African Republic, Democratic Republic of the Congo, Egypt, Ethiopia, India, Madagascar, Nigeria, Pakistan, Senegal, South Africa, and Uganda. (6)

Epidemiology of WNV in European travellers

West Nile virus infections have rarely been reported in travellers. The vast majority of those who are infected however, show no or mild symptoms only, and it may therefore be under-recognised.

There have however, been several case reports of imported WNV in European travellers in recent years. In 2002, an 82-year old Frenchman was diagnosed with the virus in France on his return from Atlanta, Georgia, USA. (11) In the Netherlands, there have been three cases of WNV infection reported in travellers from endemic areas, one in 2002, (12) and two reports in 2003 of a 69-year old man diagnosed with WNV shortly after his return from Ontario, Canada, (13) and a female who had visited Kansas, USA. (14) Most recently, in July 2004, two tourists from the Republic of Ireland contracted the virus while on holiday in the Algarve region of Portugal. (15) All these travellers recovered.

The Health Protection Agency conducts an annual enhanced surveillance scheme in the United Kingdom between June and October. More information about the scheme can be found at http://www.hpa.org.uk/infections/topics_az/west_nile/menu.htm. So far no cases of imported West Nile virus infection in the UK have been detected as of November 2004.

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Risk for travellers

The risk of contracting WNV during travel to areas with WNV activity is low and is determined by several factors including travel destination, length of exposure in endemic areas, the intensity of WNV transmission at time of travel and the season of travel. Certain groups, including persons over 50 years of age, persons with pre-existing medical conditions and the immunocompromised are at increased risk of severe illness if they contract WNV.

Travellers to areas where there is WNV activity should be aware of the risk and take appropriate anti-mosquito measures.

<http://www.nathnac.org/healthprofessionals/iba.html>

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Transmission

The main host of WNV are birds and the principle vectors are mosquitoes. WNV has been isolated from more than 40 species of mosquito(6,16) but is mainly transmitted by mosquitoes of the genus *Culex*, most commonly *C. pipiens*, *C. restuans* and *C. salinarius*. The virus is usually maintained in a mosquito-bird-mosquito cycle, however, when environmental conditions are favourable, mosquitoes proliferate, and the risk of WNV transmission to humans increases.

Culex spp. mosquitoes feed mainly during the hours between dusk and dawn. Humans, horses and occasionally other animals, become accidental hosts when bitten by an infected mosquito. Humans and animals serve as dead-end hosts. There is no person-to-person transmission.

There have been isolated reports of other routes of transmission within the United States. Transmission has occurred after occupational exposure to birds (17) and following accidental exposure to WNV in the laboratory. WNV has been transmitted during blood transfusion and organ transplantation (18,19). The risk of transfusion-mediated transmission in the USA has been reduced following improved screening of donated blood for WNV. One case of intrauterine transmission and a single case of lactation-associated transmission have been described. (20,21)

The peak transmission season in temperate regions (Russia, North America, and Canada) is from late summer to early autumn when there is high mosquito activity. In tropical countries transmission is year round.

The transmission of WNV is not well understood and continues to be explored. The rapid spread of WNV across the USA has been attributed to the ability of the virus to infect so many species of mosquito and the wide distribution of the virus by infected migratory birds. In the UK, although both bird hosts and the *Culex* spp. mosquito are present, the virus has not yet been detected in birds, animals or humans (22), and it seems unlikely to become established in the mosquito population (23).

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Signs & Symptoms

The incubation period is 1-6 days. Most cases (80%) of WNV are asymptomatic or mild and go unreported. Less than 20% will experience a mild, self-limited flu-like illness characterised by fever, headache, myalgias and a maculopapular rash. About 1 in every 150 cases progress to a more serious neurological illness of meningitis and/or encephalitis. Patients with neurologic disease may have headache, neck stiffness, disorientation, muscle weakness, seizures, flaccid paralysis or coma. In these situations, case fatality ranges from 4-14% (9, 24, 25) but may be as high as 15-29% in the elderly. (26)

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Treatment

There is no specific anti-viral treatment, but rather supportive intervention.

Health care professionals should be aware of the signs and symptoms of West Nile virus and be sure to include a travel history when interviewing patients. Specialist advice should be sought when persons suspected of having WNV infection are evaluated, and specific testing can be performed (for testing, see the link below for the HPA).

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Prevention

Prevention is by surveillance, mosquito control and mosquito bite avoidance.

<http://www.nathnac.org/healthprofessionals/iba.html>

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Links

West Nile virus: A contingency plan to protect the public's health. Department of Health, available at www.hpa.org

West Nile Virus: Centres for Disease Control.
www.cdc.gov/ncidod/dvbid/westnile/site_index.htm

West Nile Virus: Health Protection Agency
www.hpa.org.uk/infections/topics_az/west_nile/menu.htm

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