# West Nile virus

**West Nile virus (WNV) is spread to humans by mosquitoes and is found on every continent except Antarctica**

## Key messages

- **West Nile virus (WNV) is usually found in birds and typically circulates via mosquitoes that bite birds.**
- **WNV can spread to animals, birds and humans from a mosquito bite.**
- **Currently, the main risk of WNV for United Kingdom (UK) residents continues to be travel to endemic (risk) areas overseas.**
- **WNV infection is rare in UK travellers.**
- **Most people infected with WNV do not have any symptoms.**
- **Approximately 20 percent of people infected with WNV develop symptoms, including fever, headache, tiredness, body aches, nausea and a rash.**
- **Immunocompromised travellers, people over 50 years old, or with underlying medical conditions (such as cancer, diabetes, hypertension and kidney disease) are at greatest risk of severe illness. This can include infection of the central nervous system.**
- **There is no vaccine to prevent WNV in humans - travellers should avoid mosquito bites day and night when visiting risk areas.**

## Overview

West Nile virus (WNV) belongs to a family of viruses called Flaviviridae, along with other viruses such as dengue and yellow fever. WNV is found in birds, though the virus can spread to humans via a mosquito bite. Some mosquitoes readily bite birds and mammals, including humans, so spread the virus. As WNV is an infection which passes from mosquitoes to humans, it is known as a zoonotic disease.

WNV was first discovered in a woman with fever in the West Nile district of Uganda in 1937 [1]. Over the last 50 years, human infections of WNV have been reported in many countries worldwide.

## Risk areas

WNV is present in every continent, except Antarctica [2-4].

In Europe and the Mediterranean region, outbreaks and occasional cases of animal and human WNV infection were reported in the 1950s [3]. Since then, WNV has become more established and is widespread across mainland Europe, with an expanding geographical range and longer transmission seasons, potentially linked to climate factors [3-4].

Locally acquired WNV cases have not been reported in the UK [5-7]. However, in 2010, a mosquito species that can spread the virus, *Culex modestus*, was found in the UK for the first time since 1944, and is now established in wetlands in Essex and Kent near the Thames estuary [5-7].

Other mosquitoes that could potentially spread WNV, such as *Aedes vexans*, are present in some areas of England associated with flooded river landscapes. In March 2025, fragments of WNV RNA were found in female *Aedes vexans* mosquitoes in Nottinghamshire, England. These were detected in research study samples collected in July 2023. This is the first evidence of WNV in any mosquito in the UK. The probability of a human outbreak of WNV in the UK is currently considered, at most; very low. As of June 2025, no locally acquired human cases of WNV have been reported in the UK [7].

The European Centres for Disease Prevention and Control (ECDC) carries out WNV surveillance during the transmission season and provides regular updates on WNV cases in Europe [2].

In 1999, WNV was imported into New York and spread rapidly throughout the United States (US), causing a large outbreak [8]. It has since been detected in all US states, apart from Alaska and Hawaii [7]. In December 2014, the first human case of WNV in Brazil was reported [9]. Since then, the virus has spread widely and is now established in the Americas from Canada to Venezuela [8].

Maps showing WNV activity in the US are available [10].

## Risk for travellers

Risk of catching WNV during travel depends on how many WNV infected mosquitoes are found at the destination and how much time the traveller spends there (so a longer stay in a WNV risk area may result in more exposure to infected mosquitoes). Certain groups, including people who are immunosuppressed (a reduced ability to fight infection), those over 50 years of age and people with existing medical conditions, are at increased risk of severe illness.

## West Nile virus in UK travellers

WNV infection is rare in UK travellers. As of June 2025, a total of seven confirmed human cases of WNV infection have been reported in UK residents since 2000. All seven cases were linked to travel abroad [5]. It is possible that other cases with mild symptoms have not been reported or recognised, as most WNV infections either have no symptoms (asymptomatic) or cause mild symptoms.

## Transmission

The main hosts of WNV are birds and the principal vectors are mosquitoes, mostly (although not exclusively) *Culex* mosquitoes [11]. The virus is maintained in a mosquito-bird-mosquito cycle, and in mosquitoes by vertical transmission (adults to eggs).

Transmission occurs primarily through the bite of an infected mosquito [7]. Humans are more likely to become infected when living near, working in or visiting areas with human-biting mosquitoes co-located with infected birds. *Culex* spp. mosquitoes mainly bite in the evenings and at night, but other mosquitoes capable of spreading WNV may bite at other times [7].

Humans, horses and occasionally other animals, become accidental hosts when bitten by an infected mosquito. Humans and animals serve as dead-end hosts (while they may become infected, humans and animals do not spread this infection). This means that WNV does not spread directly from person-to-person [8].

Peak WNV transmission season in temperate regions, such as Canada, the USA and Russia, is late summer to early autumn when there is high mosquito activity. In mediterranean countries peak season is also late summer, but can start as early as spring. In tropical countries, transmission is year-round.

While a bite from an infected mosquito is the main way to catch WNV, there have been isolated reports of non-mosquito spread, such as transmission during blood transfusion and organ transplants [8, 11]. The UK NHS Blood and Transplant (NHSBT), in collaboration with UK Health Security Agency surveillance programmes, monitors blood donors who have travelled to areas affected by WNV. As of November 2024, no positive WNV cases have been identified in UK blood donors [12].

The World Health Organization (WHO) advises there has been one reported case of an infected pregnant woman passing WNV on to her unborn baby (transplacental or mother-to-child infection). WHO also states that a very small proportion of human infections have occurred by WNV infected mothers passing the virus to their babies during breastfeeding. No human-to-human spread of WNV through casual contact has been documented, and no transmission of WNV to health care workers has been reported when standard infection control precautions are followed. WNV infection in laboratory workers working with infected animal material has been reported [11].

## Signs and symptoms

The incubation period (the time it takes for symptoms to appear after being bitten by an infected mosquito) of WNV is usually from two to six days, but ranges from two to 14 days, and can be up to 21 days in immunosuppressed people [11]. Most human infections (80 percent) do not cause any symptoms [8, 11] or are very mild and go undiagnosed.

Symptoms, if present, usually include a mild, self-limiting flu-like illness with fever, headache, muscle pain and a red, bumpy (maculopapular) rash.

However, about one in every 150 cases develops more serious neurological symptoms, including meningitis (inflammation of brain lining and spine), encephalitis (brain inflammation) or acute flaccid paralysis (when one or more limbs become weak or floppy) or other neurological symptoms. Those with neurologic disease may experience high fever, headache, neck stiffness, disorientation, muscle weakness, tremors, convulsions, flaccid paralysis and coma [7]. Although this is rare, in these situations, the fatality rate can be up to 17% [11].

Risk factors for severe illness include older age, underlying illnesses such as cancer, high blood pressure (hypertension), kidney disease and genetic factors [7, 11].

Persistent problems affecting the brain, spinal cord and nerves (known as neurological complications) have been reported in people who develop severe disease [13].

Extreme tiredness is common after both WNV infection and the rare neurological complications that can occur [14]. Depression and personality changes have also been observed after the acute illness had resolved [15].

Immunity is considered to follow infection, although how long this lasts is unknown [16].

## Diagnosis and treatment

Supportive care is an essential part of managing people with WNV. However, there is no specific treatment [7].

Healthcare professionals should be aware of the signs and symptoms of WNV and make sure they obtain a full travel history when assessing returned travellers. WNV infection should be considered in anyone in the UK with unexplained neurological symptoms associated with recent or concurrent fever, when no other diagnosis has been identified. This is particularly important for people who live near or visited areas where *Culex modestus* mosquitoes have been found [7].

Specialist advice from local infection services must be sought when people suspected of having WNV infection are evaluated. Information about diagnostic tests and initial management of suspected cases is available from the UK Health Security Agency (UKHSA). Appropriate serum and/or cerebrospinal fluid samples from suspect cases should be sent to the UKHSA Rare and Imported Pathogens Laboratory.

WNV infection in animals and humans is notifiable to the relevant UK health agencies: UKHSA and Public Health Scotland, or for animal disease the Animal and Plant Health Agency (APHA) and Scotland: APHA Field Services. For suspected animal and bird cases in Scotland, see also: West Nile virus: how to spot and report the disease.

## Preventing WNV infection

There is currently no vaccine to prevent WNV infection in humans. For travellers, prevention must focus on awareness and the importance of good mosquito bite avoidance measures should be emphasised. While *Culex* mosquitos mainly bite at night, others bite at different times of day, so 24-hour mosquito bite protection is recommended.

To try to prevent WNV infection while travelling:

- be aware of WNV risks in certain destinations
- follow effective mosquito bite prevention advice

As climate changes, such as mild winters and longer warm seasons, increased mosquito activity may result, enabling WNV to spread to new regions. Surveillance of human cases, together with monitoring of birds, animals and insects, and mosquito eradication is essential for effective WNV control [17, 18].

## Resources

- European Centre for Disease prevention and Control: West Nile virus infection
- Insect and tick bite avoidance
- Government of Canada: Surveillance of West Nile virus
- UK Health Security Agency: Mosquito bite avoidance: advice for travellers
- UK Health Security Agency: First detection of West Nile virus in UK mosquitoes
- US Centers for Disease Control and Prevention: West Nile Virus

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