



RAPID RISK ASSESSMENT

Review of the epidemiological situation of West Nile virus infection in the European Union

Update 19 September 2011

Main conclusions and recommendations

In the ongoing 2011 West Nile virus transmission season, cases have been reported from newly affected geographical areas. This was not entirely unexpected since areas with favourable ecological parameters for the interaction between migratory birds, resident birds, competent mosquito vectors and humans are known to be at risk for the establishment of active and efficient transmission of the virus to humans. Further geographical extension of affected areas is therefore likely in the coming years.

Multi-sectoral collaboration and intensified surveillance made it possible to detect West Nile virus in new areas and identify WNV lineage 1 and lineage 2, which are now both circulating in Europe.

EU Member States are responding to this situation with the implementation of preventive measures, including the safeguarding of blood supplies. However, important gaps remain in our current knowledge of West Nile virus epidemiology, and further research and studies are needed in this context.

Source and date of request

Initial rapid risk assessment on 3 September 2010.

First update of the rapid risk assessment on 1 October 2010.

Internal decision for a second update on 14 September 2011.

Public health issue

West Nile virus infection in humans reported from several European Member States.

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Disease background information (1)

West Nile virus (WNV) is transmitted by mosquitoes (mainly of the genus *Culex*) with wild birds as its natural hosts. Birds play a role in the geographic dispersion of WNV.

Human cases have been reported from several countries since the 1960s, but it appears that the frequency of outbreaks may have accelerated over the past 15 years (2).

In Europe, following the large urban outbreak in Bucharest (Romania) (3), WN virus transmission was identified in humans and/or horses in several countries:

- Czech Republic, 1997 (4)
- France, 2000, 2003, 2004, and 2006 (5-7)
- Italy, 1998, 2008–2010 (8-13)
- Hungary, 2000–2008 (14)
- Romania, 1997–2001 and 2008–2010 (15-17)
- Spain, 2004 (18, 19)
- Portugal, 2004 (20)
- Greece, 2010 (21)

The pattern of local outbreaks in successive years suggests that the virus is endemic in Europe. This is supported by the detection of virus in overwintering mosquitoes in the Czech Republic and Romania (22).

In humans, an incubation period of two to 14 days precedes symptoms. Eighty percent of infections are asymptomatic. In clinical cases, symptoms range from mild fever and malaise, moderately severe disease (high fever, headache and muscle ache) to meningitis or encephalitis, sometimes fatal. Severe manifestations are particularly evident in the elderly and the debilitated (23). No specific treatment or vaccines are currently available. The main preventive measures are aimed at informing the at-risk human population, reducing exposure to mosquito bites and exclusion of blood donations from donors visiting or living in affected areas.

Phylogenetically, WN viruses are assigned into at least two main lineages. Lineage 1 has been identified in the majority of outbreaks in humans and horses in Europe and the Americas. Until 2004, lineage 2 had not been detected outside Africa, but since then it has appeared repeatedly: in 2004 and 2005–2008 in Hungary, in 2007 in Volgograd, Russia, with the first evidence in human febrile cases, and in 2008 in wild hawks and a captive kea in Austria (24,25). Finally, in 2010 a large outbreak with WNV lineage 2 was reported from Greece with 262 human cases (21,26,27).

Infections through organ transplantation and blood transfusion have been documented in North America (28-30).

Event background information

To date in 2011, 86 human cases of West Nile fever have been reported in the EU, with 74 cases in Greece, eight cases in Romania, and four cases in Italy. In the neighbouring countries, 125 cases have been declared, with 103 cases in the Russian Federation, 15 cases in Israel, three cases in Turkey, three cases in Albania and one case in the former Yugoslav Republic of Macedonia.

According to the World Organisation for Animal Health (OIE), 14 cases in horses have been reported in 2011: 13 from Greece and one from Spain. In addition, on 15 September two foci with positive horses were reported in the Provinces of Venezia and Pordenone, Italy (31,32). No other EU Member State has reported cases in horses so far this year.

The following information summarises the available information on these events. The map illustrates where recent reported human cases of WNV infection were reported (EU and neighbouring countries).

Figure: Reported human cases of West Nile fever for the EU and neighbouring countries, as of 15 September 2011



Greece

In Greece, the cases of WNV this year follow the large outbreak in 2010 when 262 probable and confirmed cases were reported, including 197 neuroinvasive cases and 35 deaths (21). From 1 January to 14 September 2011, Greece reported 74 cases, including 57 neuroinvasive cases as well as five deaths which occurred in people over 65 years and with underlying diseases (33). According to the EU case definition, 43 cases were confirmed, 31 were probable, as of 14 September (34). The age of autochthonous neuroinvasive cases ranges between 21 and 89 years old (median age 70 years) (33).

The following prefectures reported cases with neuroinvasive disease: Attiki/East Attica (12 cases), Attiki/North Attica (one case), Attiki/West Attica (one case), Chalkidiki (two cases), Evoia (one case), Imathia (three cases), Karditsa (eight cases), Kozani (one case), Larisa (seven cases), Pella (three cases), Serres (four cases), Thessaloniki (six cases), Trikala (four cases) and Viotia (four cases) (33).

It should be noted that WNV lineage 2 was isolated from a patient sample taken during the acute phase of the illness. Sequences of the NS3 gene were identical to those obtained in 2010 from *Culex* mosquitoes and blood donors in the country; these are also similar to the strain previously identified in Hungary.

At the end of June 2011, WNV circulation was detected by seroconversions of sentinel chickens in Central Macedonia. OIE reported 13 cases in horses in 2011 (as of 15 September 2011); affected were the regions of Attiki (nine cases), Central Macedonia (one case) and Thessaly (three cases). (32).

Romania

As of 8 September, the Romanian National Institute for Public Health has reported five confirmed human cases of neuroinvasive WNV infection in Bucharest municipality. All cases had disease onset between 21 and 31 August 2011. The mean age of the cases is 77 years, with three males and two females. None of the cases has a history of travelling abroad or receiving a transfusion. Since 1997, there have been 29 confirmed cases of WNV infection in Bucharest, with nine cases reported in 2010 (35,36).

Additionally, the Romanian National Institute for Public Health reports one confirmed case in the Galati district, with onset of symptoms on 8 July, and two cases (one confirmed and one probable) in Constanta district with onset of disease on 10 August and 28 July, respectively. Galati and Constanta districts are considered as areas at

risk of WNV transmission. Since 1997, 21 (Galati) and 16 (Constanta) cases were reported from these districts (37).

Italy

On 9 September, Italy reported three human cases of neuroinvasive infection from two provinces through the Early Warning and Response System (EWRS): Treviso (two cases) and Venezia (one case). A fourth case was reported on 13 September from the Treviso province. Three of the cases are seniors (females of 64 and 88 years of age and an 83-year-old male); one case is a 33-year-old, immunocompromised male who had undergone a kidney transplantation. The 88-year-old female ultimately died. All cases had onset of disease between 20 August and 1 September 2011 (38).

For comparison, Italy reported three confirmed cases of WN fever (non-neuroinvasive disease) in 2010, all three in the Veneto region (31).

Additionally, the National Reference Centre for the study of Exotic Animal Diseases in Italy identified two mosquito pools positive by PCR for WNV in Friuli-Venezia Giulia and Veneto. On 15 September, WNV-positive horses were reported from Venezia and Pordenone provinces (31,32).

Other EU countries (39)

In the other EU Member States no human cases of WNV infection have been reported to date. In 2010, apart from Greece, Italy and Romania, suspected and confirmed human cases were also reported from Hungary (15 cases), Portugal (one suspected case) and Spain (one confirmed case in Cadiz district) (1).

In 2011, the OIE confirmed the WNV infection of a horse in the district of Cadiz (southern Spain) (32,39). So far this year no human cases have been reported from Spain.

Situation in the EU neighbouring countries

In 2011, human cases of WNV infection were reported from the following countries:

- Former Yugoslav Republic of Macedonia: The national health authorities report one confirmed case of WNV infection in early September 2011. This marks the first time a case was confirmed in the country (40).
- Albania: Two cases of West Nile fever with meningo-encephalitis were identified in the prefecture of Lezha (northwest) between the last week of July and early August 2011. At the same period in 2010, a 14-year-old child was infected with WNV in the southeast prefecture of Korca which borders Greece. Lezha prefecture is a lagoon and is known to be at risk for WNV infection as *Culex* mosquitoes are abundant in the area. One case reported by Greece, was probably acquired in Albania, as can be concluded from the patient's travel history during the incubation period (41,42).
- Israel: As of 15 September, Israel reported a total of 15 probable and confirmed cases located in the following districts: Central (seven cases), Haifa (four cases), Northern (two cases), and Tel Aviv (two cases) (43).
- Turkey: The National Public Health Agency confirmed three cases in Sakarya, Mugla and Antalya provinces, all identified during the 2nd and 3rd week of August 2011. In 2010, 47 West Nile fever cases (12 confirmed with neutralisation test) were reported for the first time in Turkey (44).
- Russian Federation: As of 15 September, the total number of West Nile fever cases in the Russian Federation is 103: Astrakhan Oblast (15 cases), Rostov Oblast (seven cases), Volgograd Oblast (50 cases), Voronezh Oblast (31 cases) (45).

ECDC rapid risk assessment for the EU

As of 14 September 2011, with the transmission season still ongoing, the total number of WN fever cases reported in 2011 is expected to be lower than last year (1). The temporal distribution of the European cases this season presents a normal seasonal pattern, with the first cases reported in July, and the bulk of cases occurring in August, followed by an indication of a slowdown reported in September.

Regarding the geographic distribution, most of the countries affected this year were also affected in 2010, i.e. Greece, Romania, Italy, Albania, Turkey, Russia and Israel. The former Yugoslav Republic of Macedonia (one case) did not report any cases last year but is geographically close to the other affected countries. West Nile fever is endemic in several European countries, and it is thus not unexpected that cases are reported every year, even in new areas.

Overall, substantial efforts have been made to strengthen the level of detection in the affected countries. Health professionals (including blood safety authorities) were alerted at the beginning of the season, as were the stakeholders involved in animal and entomological surveillance. In the neighbouring countries, the awareness of WN fever has increased, particularly in Turkey where WNV was included in the national list of mandatory notifiable diseases (as of April 2011). In the light of the epidemiological situation, these efforts need to be continued.

In Greece specifically, the extension of the geographic distribution of reported cases is broader than last year, even though the number of affected prefectures is similar (11 in 2010 and 12 in 2011). In comparison with 2010, when the epicentre of the West Nile virus outbreak was located in Central Macedonia, newly reported cases of West Nile virus in 2011 are from southern prefectures such as Attiki, Viotia and Evoia. In how far this extension is related to strengthened surveillance in the region, or indicates an actual spread of the virus in the country, remains unknown.

The importance of the presence of both WNV lineages 1 and 2 in Europe still needs to be elucidated. There is currently no evidence that viruses from lineage 2 are associated with higher virulence, but this is one of the issues that should be further investigated. Overall, the meaning of lineage 2 circulation on WNV epidemiology in Europe still needs to be understood, as well as its impact on transmission dynamics. WNV virus lineage 2 was identified in Greece in 2010 in human blood donors, and in 2011 a similar virus was isolated from a symptomatic patient. This might indicate that the virus overwintered in Greece.

With WNV transmission established in several European Member States, the public health response remains focused on:

- blood safety.

Deferral or the implementation of systematic NAT screening of blood donors in affected areas remain the cornerstone of prevention of transmission through blood products. ECDC provides a weekly updated overview of affected areas in order to support this activity (46).

In addition, an effort should be made to collect epidemiological information in order to assess the risk to blood safety and record the impact of deferrals on national blood supplies following the implementation of the EU Directive in affected areas.

- Diagnostic capacity

There is a need to pursue efforts to further strengthen laboratory capacity for reliable WN diagnosis.

- Integrated surveillance

The collaboration between public health and veterinary authorities at the national level and sharing surveillance information remains of pivotal importance for the establishment of geographical limits to areas of viral circulation and the assessment of the risk for transmission to humans. Identification of WNV in mosquito pools, birds or equids may provide additional information about the identity of the circulating viruses.

- Personal protective measures and vector control

Personal protection from mosquito bites is advisable to any person resident or visiting the areas where animal and/or human West Nile fever cases have been reported, at least until the end of the mosquito season. Insect repellents are advised when outdoors, as are long sleeves and trousers. In areas with high mosquito populations, good screens on windows and doors can keep mosquitoes out.

Vector control measures that target the immature and adult mosquito stages might contain or limit the spread of an ongoing outbreak when the outbreak is developing and cases are still sporadic. However, the impact of these measures is not well known, therefore it would be of value to estimate the impact and the cost-benefit ratio of the current vector control strategies.

- Increase our current knowledge of the disease

The clear establishment and circulation of lineage 2 WNV in Greece and other EU countries necessitates further in-depth investigations on the transmission dynamics and epidemiology of lineage 2 WNV, particularly vector competence studies and transmission modelling.

A comprehensive description of the clinical presentation of lineage 2 WNV infections, including the long-term sequelae, might support our understanding in how far this is different from the infections with lineage 1 virus.

Finally, appropriate monitoring of the implementation of these measures in all affected countries and countries at risk across Europe is essential in addressing the public health risk due to WNV.

Conclusions

WNV transmission is now established in several European countries. Its further spread is expected in the coming years, particularly to neighbouring countries where favourable ecological parameters exist for the interaction between migratory birds, resident birds, competent mosquito vectors and humans. Multi-sectoral collaboration and enhanced surveillance has made it possible to detect WNV infection in new areas.

Viruses from lineages 1 and 2 affect human health and are confirmed as circulating in Europe. Strong emphasis should be put on analysing the current outbreaks in order to gain more knowledge on the epidemiological and public health consequences of these findings.

This rapid risk assessment will be updated as new information becomes available.

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