

# West Nile virus infection

## Annual Epidemiological Report for 2017

### Key facts

- For 2017, eight EU/EEA Member States reported 208 West Nile virus (WNV) infections, of which 201 (97%) were locally acquired.
- The majority of locally acquired cases were reported by Romania and Italy, representing 33% and 26% of EU cases respectively.
- The EU notification rate for locally acquired cases was 0.05 cases per 100 000 population, which is comparable with the rate in 2016.
- For 2017, 25 deaths linked to locally acquired West Nile virus infections were reported by Romania (n=14), Greece (n=5), Hungary (n=4), Croatia (n=1) and Italy (n=1).
- Greece reported cases again in 2017 after two consecutive years without any WNV infections.

### Methods

This report is based on data for 2017 retrieved from The European Surveillance System (TESSy) on 14 March 2019. TESSy is a system for the collection, analysis and dissemination of data on communicable diseases.

For a detailed description of methods used to produce this report, refer to the *Methods* chapter [1]. An overview of the national surveillance systems is available online [2]. A subset of the data used for this report is available through ECDC's online *Surveillance atlas of infectious diseases* [3].

This report is based on data collected through two complementary processes:

- real-time reporting during the period of high mosquito activity (June–November); and
- annual data collection. Countries that did not detect any cases during the year are asked to report 'zero cases'. All other countries are encouraged to report complementary data on detected cases if considered relevant.

For 2017, 28 EU/EEA countries reported data (Denmark, Germany and Liechtenstein did not report). All data were case-based except for data from Belgium. Twenty-five countries used the EU case definition. France and the United Kingdom used an alternative case definition and Finland did not specify the case definition it used. Reporting was compulsory in 26 countries and voluntary in France and the United Kingdom. Surveillance was comprehensive in all reporting countries and mostly passive.

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## Epidemiology

For 2017, eight EU/EEA Member States reported 208 WNV infections, 201 (97%) of which were locally acquired (Table 1). Seventy-three per cent (n=147) of locally acquired cases were confirmed.

Most locally acquired cases were reported by Romania (n=66) and Italy (n=53), representing 33% and 26% of EU cases respectively (Table 1, Figure 1).

Overall, the number of cases decreased compared with 2016, particularly in Hungary, Italy and Romania. Greece reported cases again after two consecutive years without any WNV infections. France reported two WNV cases, while the last autochthonous case was reported in 2015.

The EU notification rate for locally acquired cases was 0.05 cases per 100 000 population, which is comparable with the rate in 2016.

For 2017, 25 deaths linked to locally acquired WNV infections were reported by Romania (n=14), Greece (n=5), Hungary (n=4), Croatia (n=1) and Italy (n=1). The case fatality among infections with known outcome was 12.4%. All affected Member States except for Italy provided data on hospitalisation status. Of the 148 WNV infections with reported hospitalisation status, 88% (n=130) were hospitalised. For 2017, 145 neuroinvasive cases, 38 non-neuroinvasive cases and 18 infections among blood donors were reported, with a proportion of neuroinvasive infections among symptomatic WNV infections of 79%. Infections among blood donors were reported by Italy (n=16) and Austria (n=2).

For 2017, seven travel-related cases were reported. One case each had travelled to Croatia, Greece, Romania, Serbia, Slovakia and South Africa and one case was reported with an unknown place of infection.

**Table 1. Distribution of locally acquired West Nile virus infections by country and year, EU/EEA, 2013–2017**

Country	2013		2014		2015		2016		2017			
	Reported cases	Rate	Reported cases	Rate	Reported cases	Rate	Reported cases	Rate	Reported cases	Rate	ASR	Confirmed cases
Austria	0	0.0	2	0.0	6	0.1	5	0.1	6	0.1	0.1	5
Belgium	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.0	0
Bulgaria	0	0.0	0	0.0	2	0.0	2	0.0	1	0.0	0.0	0
Croatia	0	0.0	.	.	0	0.0	0	0.0	5	0.1	0.1	5
Cyprus	0	0.0	0	0.0	0	0.0	1	0.1	0	0.0	0.0	0
Czech Republic	1	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.0	0
Denmark	.	.	.	.	.	.	.	.	.	.	.	.
Estonia	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.0	0
Finland	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.0	0
France	0	0.0	0	0.0	1	0.0	0	0.0	2	0.0	0.0	2
Germany	.	.	.	.	.	.	.	.	.	.	.	.
Greece	86	0.8	15	0.1	0	0.0	0	0.0	48	0.4	0.4	10
Hungary	35	0.4	10	0.1	18	0.2	44	0.4	20	0.2	0.2	8
Iceland	.	.	.	.	.	.	.	.	0	0.0	0.0	0
Ireland	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.0	0
Italy	126	0.2	24	0.0	61	0.1	76	0.1	53	0.1	0.1	53
Latvia	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.0	0
Liechtenstein	.	.	.	.	.	.	.	.	.	.	.	.
Lithuania	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.0	0
Luxembourg	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.0	0
Malta	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.0	0
Netherlands	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.0	0
Norway	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.0	0
Poland	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.0	0
Portugal	.	.	.	.	1	0.0	0	0.0	0	0.0	0.0	0
Romania	24	0.1	23	0.1	32	0.2	93	0.5	66	0.3	0.3	64
Slovakia	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.0	0
Slovenia	1	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.0	0
Spain	0	0.0	0	0.0	0	0.0	3	0.0	0	0.0	0.0	0
Sweden	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.0	0
United Kingdom	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.0	0
<b>EU/EEA</b>	<b>273</b>	<b>0.07</b>	<b>74</b>	<b>0.02</b>	<b>121</b>	<b>0.03</b>	<b>224</b>	<b>0.05</b>	<b>201</b>	<b>0.05</b>	<b>0.04</b>	<b>147</b>

ASR: age-standardised rate

∴ no data reported.

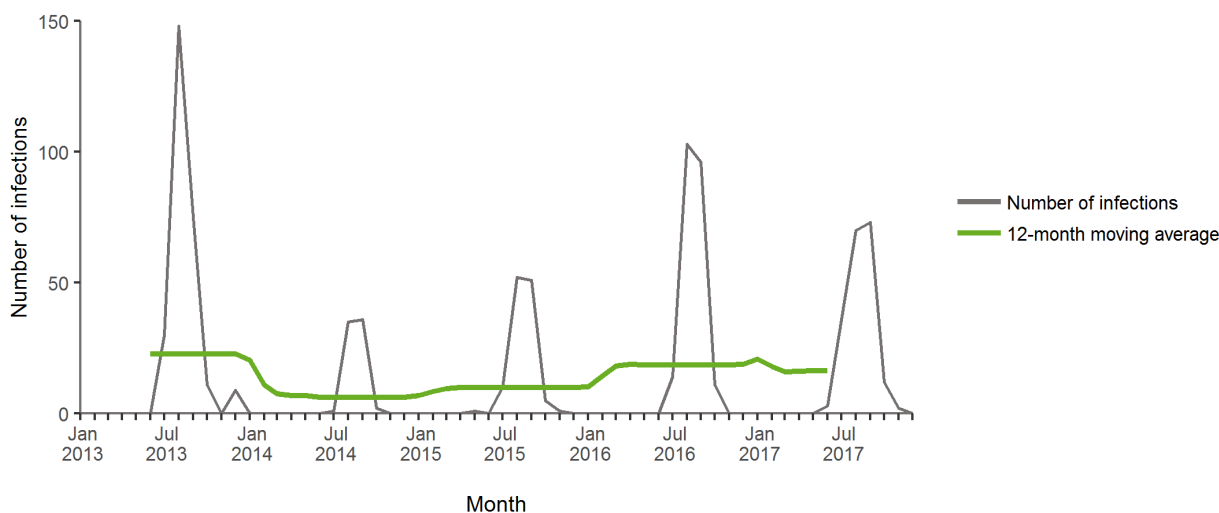
**Figure 1. Distribution of locally acquired West Nile virus infections by country, EU/EEA, 2017**



Source: Country reports from Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Estonia, Finland, France, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and the United Kingdom.

From 2013–2017, no significant trend in the number of reported locally acquired WNV infections was observed. However, two peaks occurred in 2013 and 2016.

**Figure 2. Distribution of locally acquired West Nile virus infections by month, EU/EEA, 2013–2017**

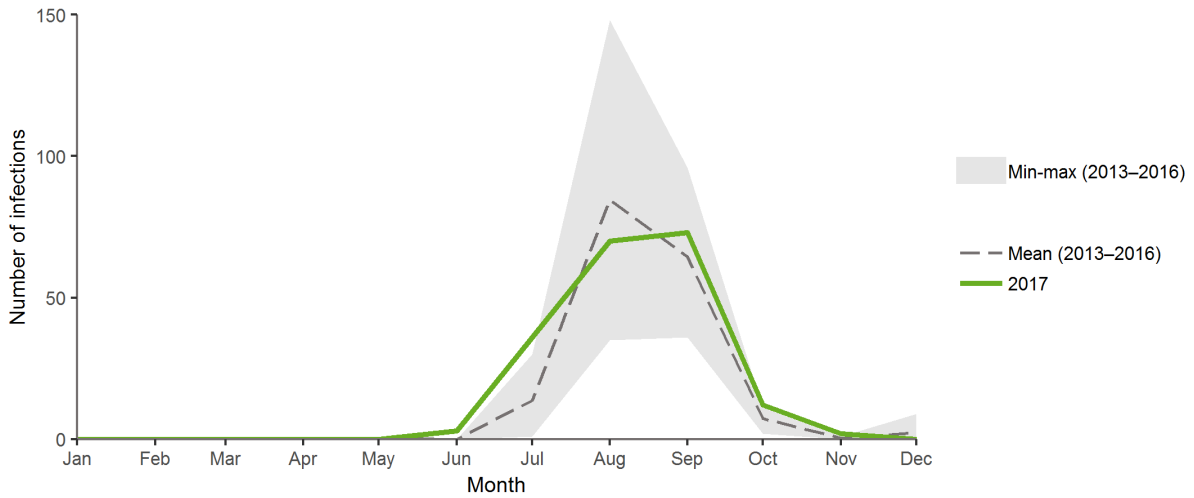


Source: Country reports from Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, Estonia, Finland, France, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Romania, Slovakia, Slovenia, Spain, Sweden and the United Kingdom.

WNV infections show a strong seasonal pattern, with the first cases usually reported in June and most cases occurring from July–October. The peak season coincides with the period when mosquito vectors are most active and the ambient temperature is sufficiently high for virus multiplication in the vectors in the EU/EEA. The peak of

infections in 2017 was recorded in September, which is slightly later than the mean during the 2013–2016 period (Figure 3).

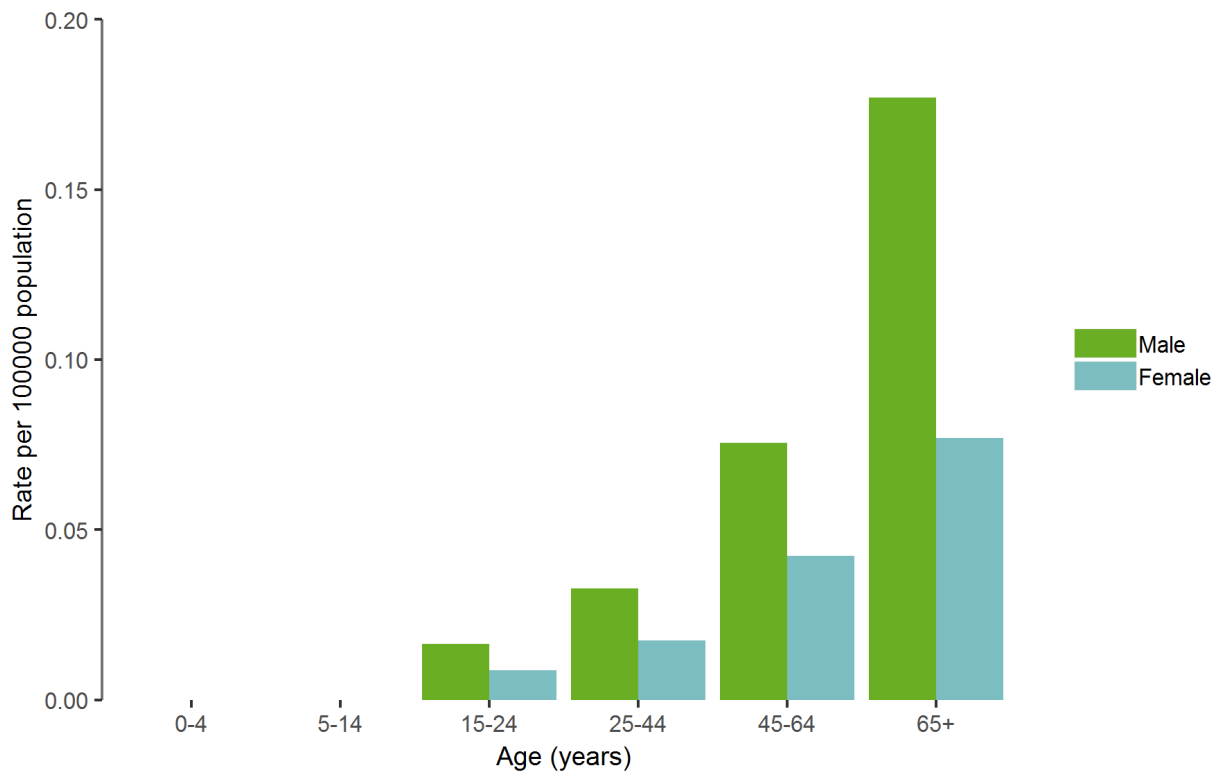
**Figure 3. Distribution of locally acquired West Nile virus infections by month, EU/EEA, 2017 and 2013–2016**



Source: Country reports from Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, Estonia, Finland, France, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Romania, Slovakia, Slovenia, Spain, Sweden and the United Kingdom.

In 2017, the overall rate of WNV infections was higher among men than women (0.06 cases and 0.03 cases per 100 000 population respectively) and the overall male-to-female ratio was 1.8:1 (Figure 4). Notification rates in men and women increased with age and were highest in the age group over 64 years (0.18 and 0.08 cases per 100 000 population respectively).

**Figure 4. Distribution of locally acquired West Nile virus infections by age, EU/EEA, 2017**



## Discussion

The notification rate of WNV infections in the EU/EEA and the case fatality among those with a known outcome in 2017 was similar to 2016, but higher than in 2014 and 2015. In 2017, the proportion of neuroinvasive infections among symptomatic WNV infections was 79% and therefore comparable to the proportion in 2016 (85%).

Overall, the number of infections decreased compared with 2016, particularly in Hungary, Italy and Romania. However, the number of neuroinvasive infections in Romania increased in 2016 and 2017 compared with 2013–2015. The case fatality rate in Romania for 2017 (21%) was slightly lower than in 2016 (30%), but considerably higher than in the four years prior to 2016 (range 0–6.7%). Case fatalities in 2016 and 2017 were considerably higher than those previously recorded during WNV outbreaks in Romania: 4.8% in the 1996 epidemic and 10.2% during the 2010 outbreak [4]. The upsurge in the number of neuroinvasive infections and increase in fatal cases may be related to the emergence of a more pathogenic viral strain [4].

After two consecutive years without any WNV infections, Greece reported cases again in 2017. A WNV outbreak occurred in southern Greece with 48 cases, of which five were fatal. More than 80% of the cases were identified in areas not previously affected [5].

France reported two WNV infections, while their last autochthonous case was reported in 2015. These two human cases follow several episodes of WNV circulation around the Mediterranean in France since 2000, mostly detected among equids [6]. The two cases in 2017 were reported from Alpes-Maritimes along the border with Italy, an area where no human WNV infections had previously been reported.

## Public health implications

No vaccine against WNV infection in humans is available. Personal protection from mosquito bites is advisable for individuals residing in or visiting affected areas, especially the elderly and immunocompromised people who are at higher risk of developing severe symptoms. Personal protective measures to reduce the risk of mosquito bites include the use of mosquito repellent in accordance with instructions indicated on the product label and wearing long-sleeved shirts and trousers. In addition, window and screen doors can keep mosquitoes out.

To prevent transfusion-transmitted WNV infections, during the active virus transmission period, EU/EEA countries should implement 28-day blood donor deferral or nucleic acid testing of prospective donors who have visited or live in an affected area. Donors of organs, tissues and cells living in or returning from an affected area should be tested for WNV infection.

Mosquito vectors may be controlled through larval source reduction and measures against adult mosquitoes. Vector breeding sites include stagnant and often dirty water collections in dishes, buckets, barrels and cans, flowerpots, rain gutters, discarded tires and other containers that can collect water. In urban environments, infrastructure such as underground heating, sewage pipes and basements liable to flooding can act as breeding and resting sites for vectors. Specific methods for vector control to prevent transmission of WNV have seldom been evaluated for their impact on reducing human cases [7].

In addition to surveillance of human infections, WNV surveillance in other vertebrate hosts, such as equids and birds, and vectors may support the early detection of virus circulation [8].

## References

1. European Centre for Disease Prevention and Control. Introduction to the Annual Epidemiological Report. In: ECDC. Annual epidemiological report for 2017 [Internet]. Stockholm: ECDC; 2017 [cited 14 March 2019]. Available from: <http://ecdc.europa.eu/annual-epidemiological-reports/methods>
2. European Centre for Disease Prevention and Control. Surveillance systems overview [Internet, downloadable spreadsheet]. Stockholm: ECDC; 2018 [cited 14 March 2019]. Available from: <http://ecdc.europa.eu/publications-data/surveillance-systems-overview-2017>
3. European Centre for Disease Prevention and Control. Surveillance atlas of infectious diseases [Internet]. Stockholm: ECDC; 2018 [cited 4 February 2019]. Available from: <http://atlas.ecdc.europa.eu/public/index.aspx?Dataset=27&HealthTopic=60>
4. Popescu CP, Florescu SA, Cotar AI, Badescu D, Ceianu CS, Zaharia M, et al. Re-emergence of severe West Nile virus neuroinvasive disease in humans in Romania, 2012 to 2017-implications for travel medicine. *Travel Med Infect Dis.* 2018 Mar - Apr;22:30-35.
5. Mavridis K, Fotakis EA, Kioulos I, Mpellou S, Konstantas S, Varela E, et al. Detection of West Nile Virus–Lineage 2 in *Culex pipiens* mosquitoes, associated with disease outbreak in Greece, 2017. *Acta Trop.* 2018 Jun;182:64-68.
6. Franke F, Grard G, Lecollinet S, Ramalli L, Gallian P, L’ambert G, et al. Infections à virus West-Nile dans les Alpes-Maritimes, 2017. *Med Maladies Infect.* 2018 Jun;48(4):S109.
7. Bellini R, Zeller H, Van Bortel W. A review of the vector management methods to prevent and control outbreaks of West Nile virus infection and the challenge for Europe. *Parasit Vectors.* 2014 Jul 11;7:323.
8. Gossner CM, Marrama L, Carson M, Allerberger F, Calistri P, Dilaveris D, et al. West Nile virus surveillance in Europe: moving towards an integrated animal-human-vector approach. *Euro Surveill.* 2017 May 4;22(18). Available from: <http://www.eurosurveillance.org/content/10.2807/1560-7917.ES.2017.22.18.30526>