

Hantavirus infection

Annual Epidemiological Report for 2019

Key facts

- For 2019, 29 countries reported 4 046 cases of hantavirus infection (0.8 cases per 100 000 population), mainly caused by Puumala virus (98%).
- During the period 2015–2019, the overall notification rate fluctuated between 0.4 and 0.8 cases per 100 00 population, with no obvious long-term trend.
- In 2019, two countries (Finland and Germany) accounted for 69% of all reported cases.
- In the absence of a licensed vaccine, prevention mainly relies on rodent control, avoidance of contact with rodent excreta (urine, saliva or droppings), and properly cleaning and disinfecting areas contaminated by rodent excreta.

Introduction

Hantaviruses are rodent-borne viruses that can be transmitted to humans by contact with faeces/urine from infected rodents or dust containing infective particles. There are several hantaviruses, with different geographical distributions and they cause different clinical diseases. Each hantavirus is specific to a rodent host. Three main clinical syndromes can be distinguished after hantavirus infection: haemorrhagic fever with renal syndrome (HFRS), mainly caused by Seoul, Puumala and Dobrava viruses which are prevalent in Europe; nephropathia epidemica, a mild form of HFRS caused by Puumala virus, and hantavirus cardiopulmonary syndrome, which may be caused by Andes virus, Sin Nombre virus, and several others prevalent in the Americas. The clinical presentation varies from sub-clinical, mild, and moderate-to-severe, depending in part on the causative agent of the disease [1]. In most cases, humans are infected through direct contact with infected rodents or their excreta. There is no curative treatment and eliminating or minimising contact with rodents is the best way to prevent infection.

Methods

This report is based on data for 2019 retrieved from The European Surveillance System (TESSy) on 17 November 2020. 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 [2].

An overview of the national surveillance systems is available online [3].

A subset of the data used for this report is available through ECDC's online *Surveillance atlas of infectious diseases* [4].

In 2019, 27 EU/EEA countries reported case-based data and two countries (Belgium and Bulgaria) reported aggregate data (Denmark and Liechtenstein did not report). Twenty countries used the EU case definition for viral haemorrhagic fevers, five countries used an alternative case definition, and four countries did not specify the definition they used. Surveillance was comprehensive in all countries except Belgium (sentinel system) and was mostly passive. Belgium, Czechia, Portugal, Slovakia and the United Kingdom conducted active disease surveillance.

Epidemiology

For 2019, 29 countries reported 4 046 cases, 4 023 (99.4%) of which were classified as confirmed (Table 1). The remaining eleven (0.6%) cases were reported as probable. Nine countries reported zero cases. In 2019, the number of notifications per 100 000 inhabitants was 0.8, similar to 2017, which was the highest rate observed over the past five years.

Two countries (Finland and Germany) accounted for 69% of all reported cases (Table 1, Figure 1). The notification rate was highest in Finland at 22.5 cases per 100 000 population, followed by Slovenia at 11.9 cases per 100 000 population.

Puumala virus (PUUV) was the most commonly identified pathogen, accounting for 1 935 (97.5%) of 1 984 laboratory-confirmed cases with available information on the causative agent. Hantaan virus (HTNV) was identified in 21 cases (all in Slovakia) and Dobrava virus (DOBV) in 27 cases. One case of Andes orthohantavirus (ANDV) was reported in Austria. No cases of Saaremaa virus (SAAV) were reported.

Table 1. Distribution of hantavirus infection cases and rates per 100 000 population by country and year, EU/EEA, 2015–2019

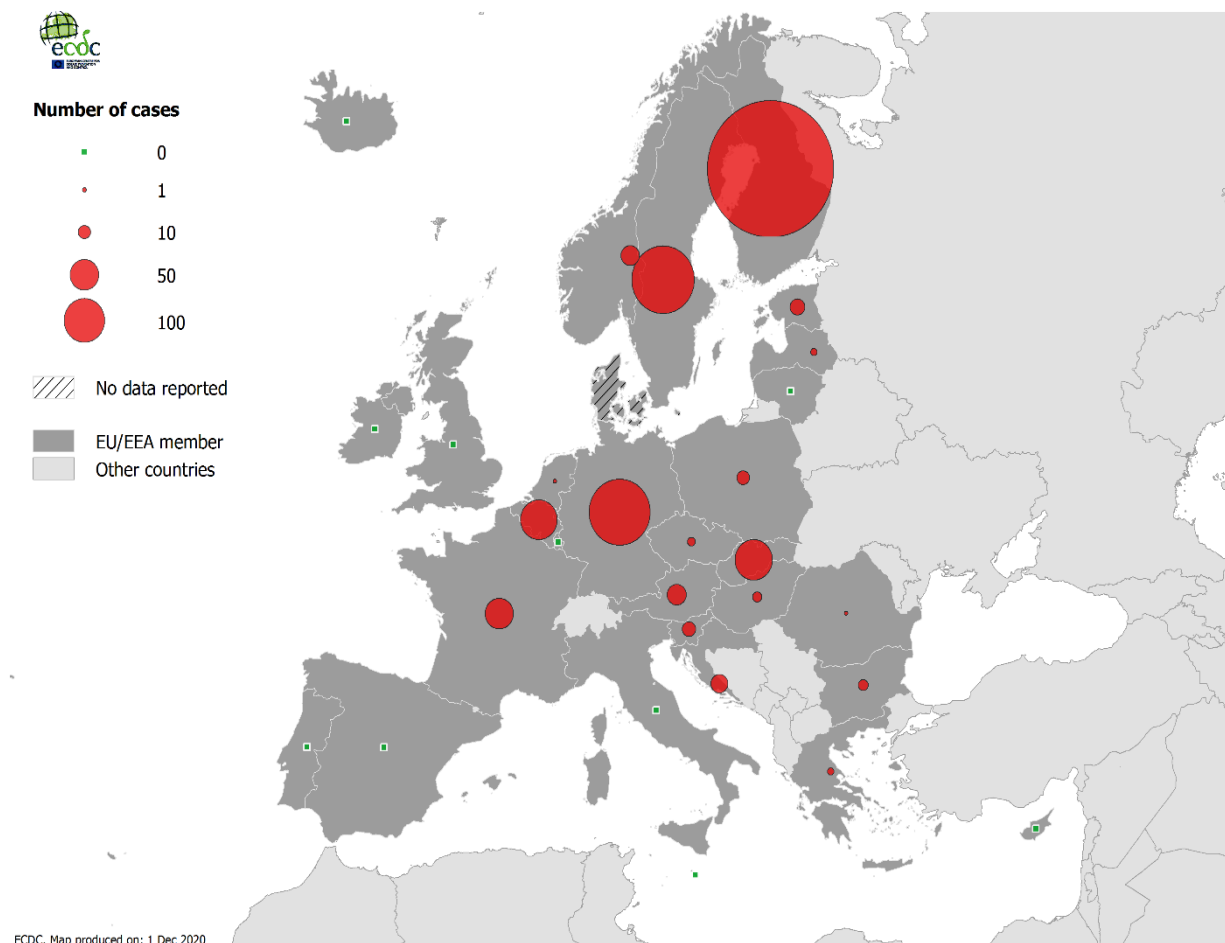
Country	2015		2016		2017		2018		2019	
	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate
Austria	22	0.3	30	0.3	90	1.0	24	0.3	276	3.1
Belgium	44	0.4	38	0.3	123	1.1	85	0.7	57	0.5
Bulgaria	1	0.0	10	0.1	8	0.1	7	0.1	6	0.1
Croatia	10	0.2	31	0.7	389	9.4	18	0.4	191	4.7
Cyprus	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Czechia	7	0.1	10	0.1	17	0.2	4	0.0	15	0.1
Denmark	.	.	.	.	.	.	.	.	.	.
Estonia	14	1.1	11	0.8	26	2.0	15	1.1	26	2.0
Finland	1463	26.7	1663	30.3	1246	22.6	999	18.1	1256	22.8
France	142	0.2	58	0.1	236	0.4	55	0.1	130	0.2
Germany	829	1.0	282	0.3	1731	2.1	235	0.3	1534	1.8
Greece	1	0.0	1	0.0	2	0.0	3	0.0	1	0.0
Hungary	9	0.1	7	0.1	16	0.2	6	0.1	13	0.1
Iceland	-	-	-	-	-	-	0	0.0	0	0.0
Ireland	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Italy	-	-	0	0.0	0	0.0	0	0.0	0	0.0
Latvia	0	0.0	8	0.4	4	0.2	3	0.2	5	0.3
Liechtenstein	.	.	.	.	.	.	.	.	.	.
Lithuania	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Luxembourg	13	2.3	1	0.2	15	2.5	0	0.0	8	1.3
Malta	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Netherlands	1	0.0	2	0.0	6	0.0	1	0.0	0	0.0
Norway	11	0.2	10	0.2	26	0.5	21	0.4	11	0.2
Poland	6	0.0	8	0.0	14	0.0	11	0.0	9	0.0
Portugal	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Romania	6	0.0	0	0.0	12	0.1	1	0.0	4	0.0
Slovakia	21	0.4	6	0.1	53	1.0	88	1.6	94	1.7
Slovenia	8	0.4	12	0.6	76	3.7	12	0.6	252	12.1
Spain	0	0.0	0	0.0	1	0.0	0	0.0	0	0.0
Sweden	285	2.9	92	0.9	158	1.6	243	2.4	155	1.5
United Kingdom	4	0.0	0	0.0	0	0.0	0	0.0	3	0.0
EU-EEA	2897	0.6	2280	0.4	4249	0.8	1831	0.4	4046	0.8

Source: Country reports.

∴: no data reported

-: no rate calculated.

ASR: age-standardised rate

Figure 1. Distribution of hantavirus infection cases by country, EU/EEA, 2019

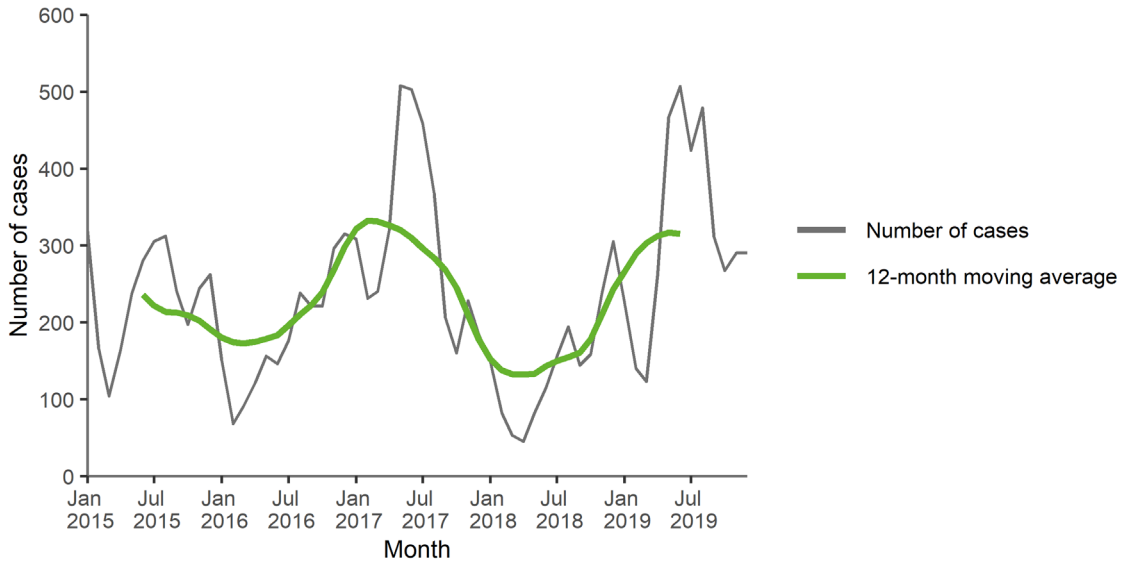
Source: Country reports from Austria, Belgium, Bulgaria, Croatia, Cyprus, Czechia, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and the United Kingdom.

During the period 2015–2019, the number of reported cases ranged from 1 831 in 2018 to 4 249 in 2017, with no obvious trend discernible.

In 2019, countries reported hantavirus cases all year round, but there was a peak during the period May to August (Figure 2). Between May and November, the number of cases was similar to or higher than the maximum recorded in 2015–2018.

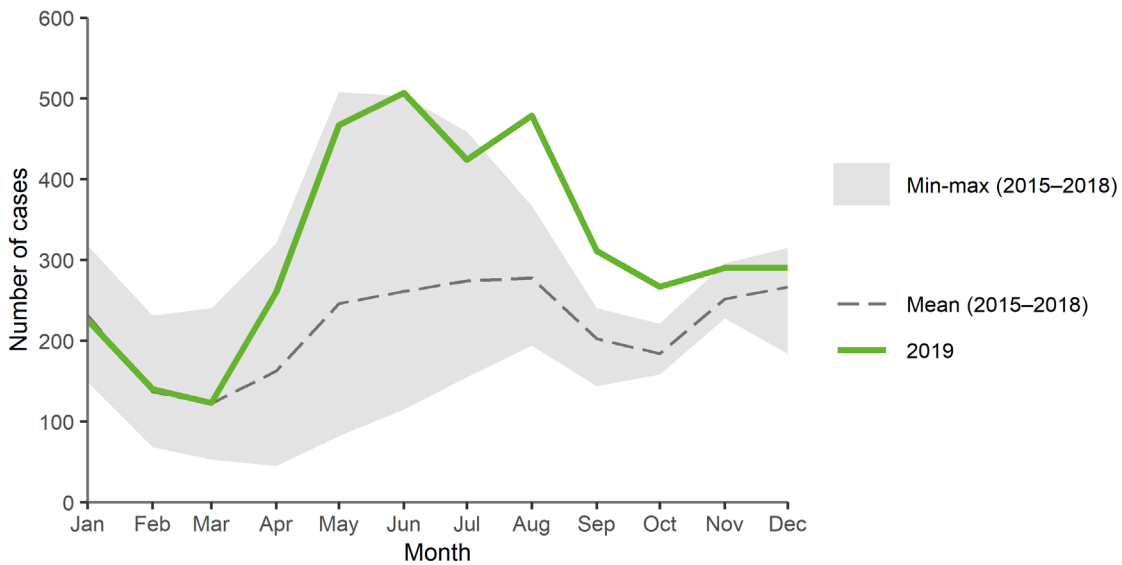
Of the 2 045 cases with available information on importation status, 48 (2.3%) were travel associated. Of the 36 travel-associated cases with known probable country of infection, two thirds were infected in the EU/EEA.

Figure 2. Distribution of hantavirus infection cases by month, EU/EEA, 2015–2019



Source: Country reports from Austria, Cyprus, Czechia, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Latvia, Lithuania, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, the United Kingdom.

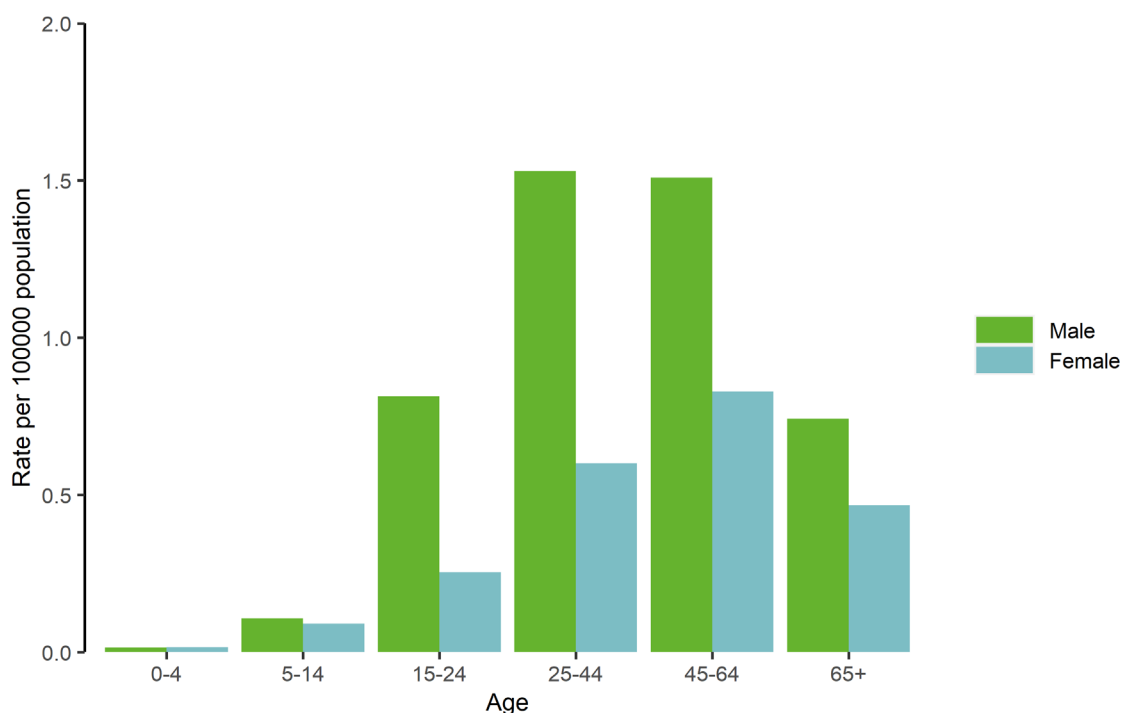
Figure 3. Distribution of hantavirus infection cases by month, EU/EEA, 2019 and 2015–2018



Source: Country reports from Austria, Cyprus, Czechia, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Latvia, Lithuania, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, the United Kingdom.

In 2019, people aged 25 years and above accounted for 3 689 (91%) of 4 046 cases with known age (Figure 3). The notification rate peaked in those aged 45–64 years at 1.2 cases per 100 00 population. In all age groups except for the 0–4 years group, hantavirus infection was more common in males, with an overall crude male-to-female ratio of 2:1. Four of the 2 241 cases reported with known outcome died.

Figure 4. Distribution of hantavirus infection rate per 100 000 population, by age and gender, EU/EEA, 2019



Discussion

In 2019, the number of hantavirus infections in the EU/EEA was nearly as high as in 2017. However, there was no evident trend during the 2015–2019 period. Fluctuations in virus circulation levels could be explained by changing landscape attributes and climatic parameters determining food availability for rodents.

Finland and Germany shaped the patterns observed from 2015 to 2019, accounting for over 67% of cases annually. The summer peak corresponds to the increased exposure of urban dwellers during their summer holidays. In northern European countries, a November/December peak is also typical because humans are more frequently in contact with infected rodents in the countryside during these months [5]. The main characteristics of the cases reported in 2019 were very similar to those reported during 2015–2018. Most cases were infected with PUUV, and the disease mostly affected adults over 25 years of age.

Public health implications

Hantavirus infection is an important cause of potentially preventable disease in Europe. In the absence of a licensed vaccine in Europe, prevention mainly relies on rodent control, avoidance of contact with rodent excreta (urine, saliva or droppings), and properly cleaning and disinfecting areas contaminated by rodent excreta [1].

In 2014, ECDC published a report summarising preventive measures and communication strategies for hantavirus infection in Europe [6].

References

1. Avšič-Županc T, Saksida A, Korva M. Hantavirus infections. *Clin Microbiol Infect.* 2019 Apr;21S:e6-e16.
2. European Centre for Disease Prevention and Control. Introduction to the Annual Epidemiological Report. Stockholm: ECDC; 2017 [cited 11 December 2019]. Available from: <http://ecdc.europa.eu/annual-epidemiological-reports/methods>
3. European Centre for Disease Prevention and Control. Surveillance systems overview for 2017 [internet, downloadable spreadsheet]. Stockholm: ECDC; 2019 [cited 11 December 2019]. Available from: <http://ecdc.europa.eu/publications-data/surveillance-systems-overview-2018>
4. European Centre for Disease Prevention and Control. Surveillance atlas of infectious diseases. Stockholm: ECDC; 2019 [cited 12 December 2019]. Available from: <http://atlas.ecdc.europa.eu/public/index.aspx?Dataset=27&HealthTopic=24>
5. Jonsson CB, Figueiredo LT, Vapalahti O. A global perspective on hantavirus ecology, epidemiology, and disease. *Clin Microbiol Rev.* 2010 Apr;23(2):412-41.
6. European Centre for Disease Prevention and Control. Prevention measures and communication strategies for hantavirus infection in Europe. ECDC: Stockholm; 2014 [cited 21 April 2021]. Available from: <https://www.ecdc.europa.eu/en/publications-data/prevention-measures-and-communication-strategies-hantavirus-infection-europe>