

## Hantavirus infection

Reporting on 2014 data retrieved from TESSy\* on 19 November 2015

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### Key facts

- 3 752 cases were reported to TESSy in 2014.
- The notification rate was 0.8 cases per 100 000 population.
- Hantavirus infections are widely distributed across Europe, with the exception of some Mediterranean countries which reported a very low number of cases.

### Methods

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• Twenty-seven EU/EEA countries reported cases, while six countries (Cyprus, Ireland, Italy, Lithuania, Malta and Spain) reported zero cases. Data were not available from Denmark, Iceland, Liechtenstein and Portugal.

• Eighteen countries used the EU case definition. An alternative case definition was used by the Czech Republic, France, Germany, Poland and the United Kingdom. Belgium, Cyprus, Finland, Ireland and Italy did not specify their definition or it was unknown.

• Reporting is voluntary in four countries and compulsory in 22 (Cyprus did not supply this information). The surveillance systems are mostly passive, except in Belgium, the Czech Republic, Slovakia and the United Kingdom where active systems are in place. Systems are mostly case-based, except in Belgium, Croatia and Bulgaria (Annex 1).

### Epidemiology

In 2014, 3 752 cases were reported, 3 667 of which were confirmed. This was a 74% increase from 2013 when 2 160 cases were recorded, but a 19.9% decrease from 2012 (4 686 recorded cases). Most of the cases (90.4%) were reported from five countries (Croatia, Germany, France, Finland and Sweden), with Finland reporting 55.7% of the cases (Figure 1). In 2013, most of the cases (91%) were reported from three countries (Germany, Finland and Sweden), with Finland reporting 78% of the cases (versus 18.2% of the total cases in 2012).

Over the last years, large variations were noted in the number of reported cases, and since 2008 a peak has been observed every other year (n=4538 in 2008; n=2471 in 2009).

The case notification rate was 0.8 cases per 100 000 population, higher than the rate reported in 2013 (0.4 cases per 100 000 population, but lower than in 2012 (1.1 cases per 100 000 population).

The notification rate in Finland was high during the period 2010–2014, with the highest rate in 2014 (38.32 cases per 100 000 population). Germany had a higher notification rate in 2014 (0.71 cases per 100 000 population) than in 2013 (0.20 cases), but much lower than in 2012 (3.45 cases) when a large outbreak occurred. The notification rate for Sweden increased from 0.51 cases per 100 000 population in 2012 to 4.33 cases in 2014, reaching similar levels to those reported in 2010 and 2011 (Table 1).

**Table 1. Reported hantavirus infection cases: number and rate per 100 000 population, EU/EEA, 2010–2014**

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Country	2010		2011		2012		2013		2014					
	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	National data	Report type	Reported cases	Rate	ASR	Confirmed cases
Austria	31	0.4	36	0.4	219	2.6	35	0.4	Y	C	74	0.9	0.9	74
Belgium	212	2.0	190	1.7	62	0.6	.	.	Y	A	76	0.7	.	0
Bulgaria	3	0.0	3	0.0	3	0.0	15	0.2	Y	A	9	0.1	0.1	8
Croatia	.	.	.	.	154	3.6	6	0.1	Y	A	209	4.9	5.0	209
Cyprus	.	.	.	.	.	.	0	0.0	Y	C	0	0.0	0.0	0
Czech Republic	8	0.1	9	0.1	9	0.1	12	0.1	Y	C	3	0.0	0.0	3
Denmark	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Estonia	5	0.4	12	0.9	19	1.4	19	1.4	Y	C	26	2.0	2.0	26
Finland	1443	27.0	1834	34.1	841	15.6	1685	31.1	Y	C	2089	38.3	38.3	2089
France	.	.	101	0.2	164	0.3	15	0.0	Y	C	105	0.2	0.2	105
Germany	2016	2.5	305	0.4	2825	3.5	161	0.2	Y	C	571	0.7	0.7	571
Greece	1	0.0	3	0.0	1	0.0	2	0.0	Y	C	2	0.0	0.0	2
Hungary	11	0.1	7	0.1	8	0.1	2	0.0	Y	C	6	0.1	0.1	3
Iceland	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Ireland	0	0.0	0	0.0	1	0.0	1	0.0	Y	C	0	0.0	0.0	0
Italy	.	.	.	.	.	.	0	0.0	Y	C	0	0.0	0.0	0
Latvia	4	0.2	4	0.2	12	0.6	8	0.4	Y	C	6	0.3	0.3	6
Liechtenstein	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lithuania	0	0.0	0	0.0	0	0.0	0	0.0	Y	C	0	0.0	0.0	0
Luxembourg	0	0.0	0	0.0	23	4.4	.	.	Y	C	3	0.5	0.5	3
Malta	0	0.0	0	0.0	0	0.0	0	0.0	Y	C	0	0.0	0.0	0
Netherlands	0	0.0	0	0.0	0	0.0	1	0.0	Y	C	1	0.0	0.0	0
Norway	21	0.4	39	0.8	13	0.3	19	0.4	Y	C	42	0.8	0.8	42
Poland	6	0.0	8	0.0	3	0.0	8	0.0	Y	C	54	0.1	0.1	50
Portugal	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Romania	4	0.0	4	0.0	3	0.0	4	0.0	Y	C	14	0.1	0.1	14
Slovakia	1	0.0	3	0.1	6	0.1	14	0.3	Y	C	14	0.3	0.2	14
Slovenia	17	0.8	17	0.8	182	8.9	6	0.3	Y	C	25	1.2	1.2	25
Spain	0	0.0	0	0.0	0	0.0	0	0.0	Y	C	0	0.0	0.0	0
Sweden	416	4.5	351	3.7	48	0.5	119	1.2	Y	C	418	4.3	4.3	418
United Kingdom	1	0.0	0	0.0	1	0.0	4	0.0	Y	C	5	0.0	0.0	5
<b>EU/EEA</b>	<b>4200</b>	<b>1.2</b>	<b>2926</b>	<b>0.7</b>	<b>4597</b>	<b>1.1</b>	<b>2136</b>	<b>0.4</b>	.	<b>C</b>	<b>3676</b>	<b>0.8</b>	<b>0.8</b>	<b>3667</b>

Source: Country reports. Legend: Y = yes, N = no, C = case based, - = no report, ASR: age-standardised rate

In 2014, Finland reported the highest number of cases (n=2089) of all reporting countries, followed by Germany (n=571) and Sweden (n=418).

**Figure 1. Number of reported hantavirus infection cases, EU/EEA, 2014**

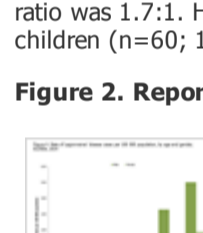


Source: Country reports from Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Romania, Slovakia, Slovenia, Spain, Sweden, the United Kingdom.

### Age and gender distribution

The incidence of hantavirus infection was higher among males (1.0 cases per 100 000 population) than among females (0.6 cases per 100 000 population). The male-to-female ratio was 1.7:1. Hantavirus infections were predominantly reported in adults, with 74.4% of cases in the age groups 25–44 and 45–64 years. A few cases were reported in children (n=60; 1.6% of the cases), with a rate of 0.02 cases per 100 000 in the 0–4-year age group and 0.11 cases per 100 000 population for the 5–14-year-olds.

**Figure 2. Reported hantavirus infection cases, by age and gender, EU/EEA, 2014**



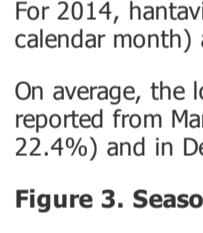
Source: Country reports from Austria, Bulgaria, Croatia, Cyprus, the Czech Republic, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Romania, Slovakia, Slovenia, Spain, Sweden, the United Kingdom.

### Seasonality

For 2014, hantavirus cases were reported all year round, with a peak in January (n=546 cases, mainly from Finland (458 cases); 15% of all cases in 2014 with information about calendar month) and in July and August (n=722 cases; 21% of all cases in 2014 with information about month).

On average, the lowest number of cases in the period 2010–2013 was reported between February and April, followed by a peak in May. In 2014, the lowest number of cases was reported from March to June, followed by a peak in July and August (Figure 3). Remarkably, the highest number of cases in Finland in 2014 was reported in January (468 cases, 22.4%) and in December (13.2%).

**Figure 3. Seasonal distribution of reported hantavirus infection cases, EU/EEA, 2014 compared with 2010–2013**



Source: Country reports from the Czech Republic, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Poland, Romania, Slovakia, Slovenia, Spain, Sweden, the United Kingdom.

### Enhanced surveillance in 2014

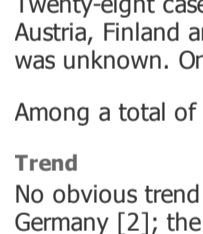
Twenty-eight cases of hantavirus infection were identified as travel-related: 19 were reported in Germany; two each in France, Sweden, and the United Kingdom; one each in Austria, Finland and Norway. Out of the 28 travel-related cases, 19 were imported from another EU country. However, for most of the cases (n=2146, 62%) importation status was unknown. One hantavirus pulmonary syndrome case originating from Panama was reported by the United Kingdom [1].

Among a total of 804 documented cases, three fatalities were notified in EU countries in 2014. In 2013, six deaths among 269 documented cases were recorded.

### Trend

No obvious trend can be detected in Figure 4. Every other year (2010, 2012 and 2014), a peak can be noticed. The peak in mid-2012 is mainly attributable to an outbreak in Germany [2]; the peak at the end of 2013 and at the beginning of 2014 can be attributed to the outbreak in Finland.

**Figure 4. Trend and number of reported hantavirus infection cases, EU/EEA, 2010–2014**



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

### Discussion

Two main hantaviruses cause clinical infections in Europe: Puumala virus, which is transmitted by bank voles and widely distributed in Europe, and Dobrava virus, which is transmitted by stripe field mice and yellow-necked mice and present in the Balkans and central and eastern Europe.

Fluctuations in hantavirus epidemiology appear to be driven by changing landscape attributes and climatic parameters which lead to increased food availability for rodents and prolonged virus survival [3, 4]. There are at present no indicators stating whether there is a real increase in hantavirus cases in Europe.

If variables like temperatures and forest cover levels remain at their current levels, models predict that the incidence of haemorrhagic fever with renal syndrome (e.g. caused by hantavirus such as Puumala and Dobrava) may increase in places where the disease is already present, but will not spread further [3]. However, some extension of the geographic distribution of cases was reported in France in 2014 [5].

Another aetiological agent responsible for haemorrhagic fever with renal syndrome is Seoul hantavirus, which is carried by brown rats (*Rattus norvegicus*). Only a few human cases of Seoul hantavirus infection have been reported, mostly in Asia and more recently (2012) in France and the UK [6] [7].

### Public health conclusions

Avoidance of virus-contaminated dust during work or leisure time is essential. Airborne dust should be avoided when areas containing rodent droppings are cleaned, and moist cleaning with disinfectants is recommended. For people with underlying disease, face masks should be used.

Wild rodents taken into homes as pets or to laboratories for research purposes have caused infections.

Since Puumala virus remains infective outside the host for an unusually long period (up to two weeks at room temperature), the risk of infection can persist even after the rodents have been removed.

Suggestions to prevent hantavirus and improve the communication strategy include [8]:

1. A common case definition at the European level
2. Sharing information on prevention and communication strategies among countries
3. Assessing the impact of prevention to support evidence-based preventive measures
4. A better understanding of the risk factors, risk groups, and the effectiveness of preventive measures through multidisciplinary collaboration among experts
5. Assessing the impact of communication strategies on relevant target groups with regard to disease awareness, knowledge, and preventive measures to improve communication.

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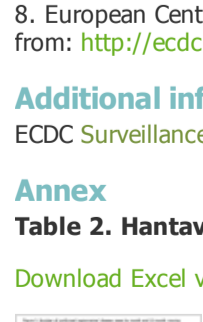
### Additional information

ECDC Surveillance Atlas of Infectious Diseases

### Annex

**Table 2. Hantavirus infection, surveillance systems overview, 2014**

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\* The European Surveillance System (TESSy) is a system for the collection, analysis and dissemination of data on communicable diseases. EU Member States and EEA countries contribute to the system by uploading their infectious disease surveillance data at regular intervals.