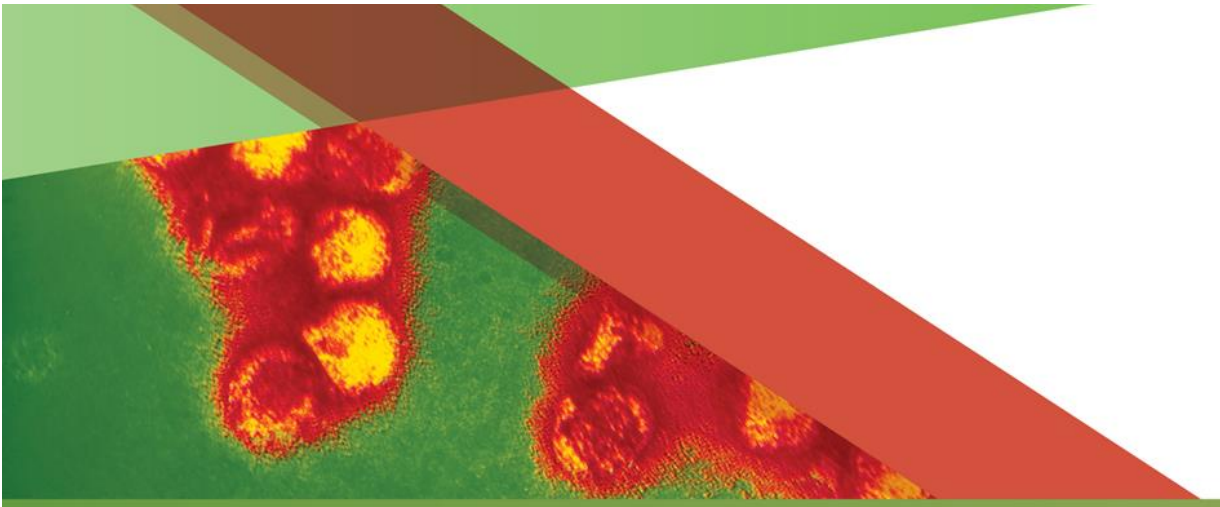


SURVEILLANCE REPORT

Annual Epidemiological Report for 2021

Tick-borne encephalitis

Key facts

- For 2021, there were 3 027 tick-borne encephalitis (TBE) cases reported from 25 EU/EEA countries, 2 949 (97.4%) of which were confirmed.
- The EU/EEA notification rate for 2021 was 0.71 per 100 000 population, which is a slight decrease compared with the results from 2020.
- Cases were more frequently reported among men (male-to-female ratio: 1.5:1) and in the age group 45–64 years.
- Tick-borne encephalitis presented a seasonal pattern. For 2021, 90% of confirmed cases occurred between June and November in the EU/EEA, with July being the month with the highest number of reported cases (n=717).

Introduction

Tick-borne encephalitis (TBE) is an infection of the central nervous system caused by tick-borne encephalitis virus (TBEV) (genus *flavivirus*) which is primarily transmitted by infected ticks (genus *Ixodes*), and occasionally through the consumption of unpasteurised dairy products from infected ruminants [1,2]. Among the several viral subtypes of TBEV, the European subtype (TBEV-Eu) is predominantly found in Europe [2]. A major proportion of persons infected with TBEV remain asymptomatic. Among those who develop symptoms, the disease may present in a varied range of severity from mild non-specific fever-like symptoms to severe neurological symptoms. The clinical manifestation usually follows a biphasic course, with symptoms like fever, fatigue, headache, myalgia and nausea during the first phase followed by neurological symptoms like meningitis and encephalitis in the second phase. Long-term neurological sequelae have also been observed. In the absence of specific antiviral treatment against TBEV, symptomatic and supportive treatment remains the mainstay. Vaccination is considered to be the most effective means to prevent TBE [3].

Suggested citation: European Centre for Disease Prevention and Control. Tick-borne encephalitis. In: ECDC. Annual epidemiological report for 2021. Stockholm: ECDC; 2024.

Stockholm, April 2024

Methods

This report is based on data for 2021 retrieved from The European Surveillance System (TESSy) on 25 October 2022. 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 Introduction to the Annual Epidemiological Report chapter [4].

An overview of the national surveillance systems is available online [5].

A subset of the data used for this report is available through ECDC's online Surveillance atlas of infectious diseases [6].

For 2021, 25 European Union and European Economic Area (EU/EEA) countries reported data on TBE. Of the EU/EEA countries, Cyprus, Denmark, Iceland, Malta and Portugal did not report data to ECDC. Due to the withdrawal of the United Kingdom from the EU on 1 February 2020, data from the United Kingdom are no longer collected by ECDC. Twenty-two countries used the EU case definition, Germany and Italy reported using a case definition other than the EU case definition, and Croatia did not specify which case definition was used. Twenty-one reporting countries reported having a comprehensive surveillance system. Reporting was compulsory in 21 countries, voluntary in three (Belgium, France and the Netherlands) and was not specified for Croatia). Belgium and Bulgaria reported aggregated data while all other countries reported case-based data.

Epidemiology

For 2021, 25 EU/EEA countries reported data on TBE with 3 027 TBE cases being reported by 23 EU/EEA countries. Two EU/EEA countries reported zero cases. Twenty-two EU/EEA countries reported 2 949 (97.4%) confirmed cases and three EU/EEA countries reported zero confirmed cases (Table 1) (Ireland, Luxembourg and Lichtenstein). The highest number of confirmed cases for 2021 were reported by Czechia (n=589), Sweden (n=533) and Germany (n=417) (Table 1).

The EU/EEA notification rate for 2021 was 0.7 per 100 000 population. The notification rate was highest in Lithuania (13.1 cases per 100 000 population), followed by Latvia (11.7) and Estonia (6.2) (Table 1, Figure 1). The notification rates showed a gradual increase from 2017 to 2020 followed by a drop in the notification rate in 2021. Compared with 2020 data, there has been increase in the notification rates in six of the reporting countries, no change in six of the reporting countries and a decrease in 10 of the reporting countries.

Data on importation status were available for 2 733 confirmed cases, of which 1.6% (n = 44) were travel associated and 98.4% (n=2689) were locally acquired.

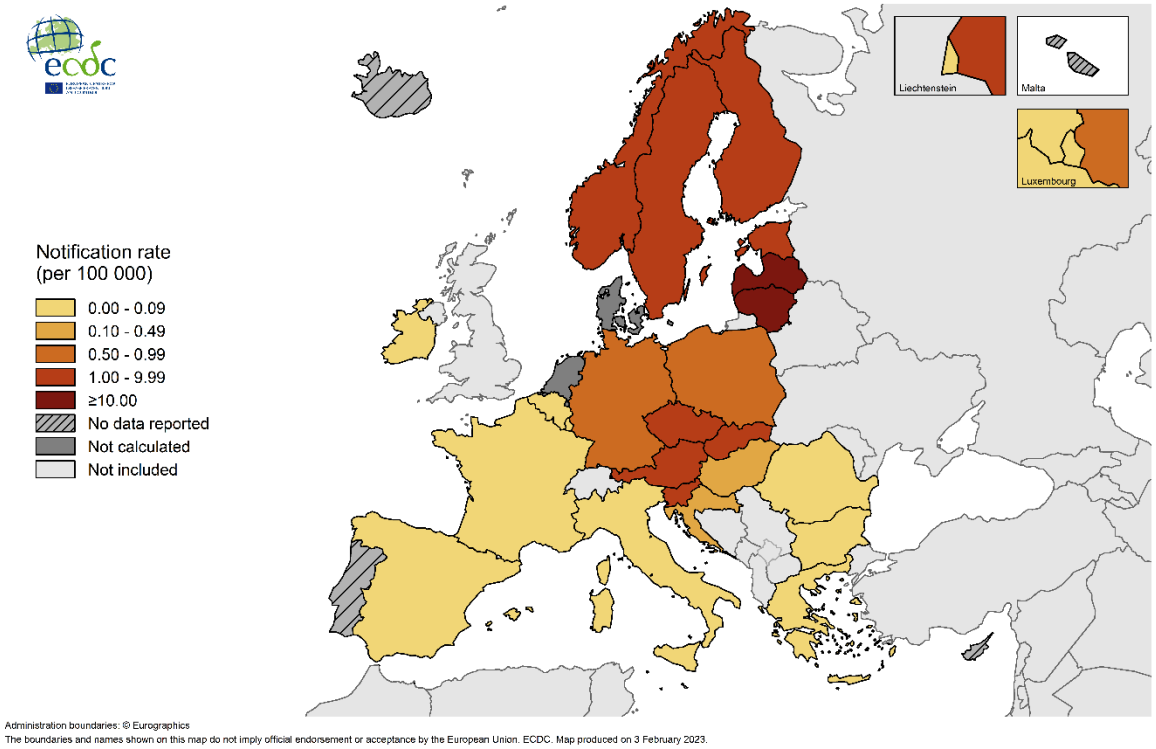
Of the 2 070 (70.2%) confirmed cases for which information about vaccination status was available, 1 930 (93.2%) were reported as not vaccinated against TBE. Of the 140 vaccinated cases, 27 had only received one dose, 24 had received two doses, 56 had received at least three doses and 33 had received an unknown number of doses.

Table 1. Number of confirmed tick-borne encephalitis cases and rates per 100 000 population by country and year, EU/EEA, 2017–2021

Country	2017		2018		2019		2020		2021		
	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate	ASR
Austria	123	1.4	171	1.9	106	1.2	250	2.8	135	1.5	1.5
Belgium	3	0.0	3	0.0	4	0.0	7	0.1	2	0.0	0.0
Bulgaria	1	0.0	0	0.0	1	0.0	2	0.0	1	0.0	0.0
Croatia	10	0.2	22	0.5	13	0.3	14	0.3	4	0.1	0.1
Cyprus	ND	NR	ND	NR	ND	NR	ND	NR	ND	NR	NR
Czechia	687	6.5	714	6.7	771	7.2	849	7.9	589	5.5	5.5
Denmark	ND	NR	4	0.1	ND	NR	ND	NR	ND	NR	NR
Estonia	84	6.4	85	6.4	82	6.2	70	5.3	82	6.2	6.1
Finland	85	1.5	79	1.4	69	1.3	91	1.6	160	2.9	2.8
France	2	0.0	25	0.0	4	0.0	46	0.1	30	0.0	0.0
Germany	486	0.6	582	0.7	445	0.5	711	0.9	417	0.5	0.5
Greece	0	0.0	2	0.0	0	0.0	0	0.0	4	0.0	0.0
Hungary	14	0.1	30	0.3	17	0.2	18	0.2	6	0.1	0.1
Iceland	ND	NR	ND	NR	ND	NR	ND	NR	ND	NR	NR
Ireland	0	0.0	0	0.0	1	0.0	0	0.0	0	0.0	0.0
Italy	24	0.0	39	0.1	37	0.1	55	0.1	18	0.0	0.0
Latvia	178	9.1	100	5.2	175	9.1	149	7.8	222	11.7	11.3
Liechtenstein	ND	NR	ND	NR	ND	NR	ND	NR	0	0.0	0.0
Lithuania	474	16.6	384	13.7	711	25.4	679	24.3	365	13.1	12.5
Luxembourg	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.0
Malta	ND	NR	ND	NR	ND	NR	ND	NR	ND	NR	NR
Netherlands	3	NR	6	NR	3	NR	5	NR	3	NR	NR
Norway	16	0.3	26	0.5	35	0.7	41	0.8	71	1.3	1.3
Poland	196	0.5	148	0.4	197	0.5	114	0.3	181	0.5	0.5
Portugal	ND	NR	ND	NR	ND	NR	ND	NR	ND	NR	NR
Romania	1	0.0	4	0.0	0	0.0	0	0.0	1	0.0	0.0
Slovakia	75	1.4	154	2.8	162	3.0	185	3.4	72	1.3	1.3
Slovenia	102	4.9	153	7.4	111	5.3	187	8.9	52	2.5	2.4
Spain	0	0.0	0	0.0	1	0.0	0	0.0	1	0.0	0.0
Sweden	0	0.0	359	3.5	355	3.5	267	2.6	533	5.1	5.2
United Kingdom	0	0.0	2	0.0	2	0.0	ND	NR	ND	NR	NR
EU-EEA	**2564**	**0.5**	**3092**	**0.6**	**3302**	**0.7**	**3740**	**0.9**	**2949**	**0.7**	**0.7**

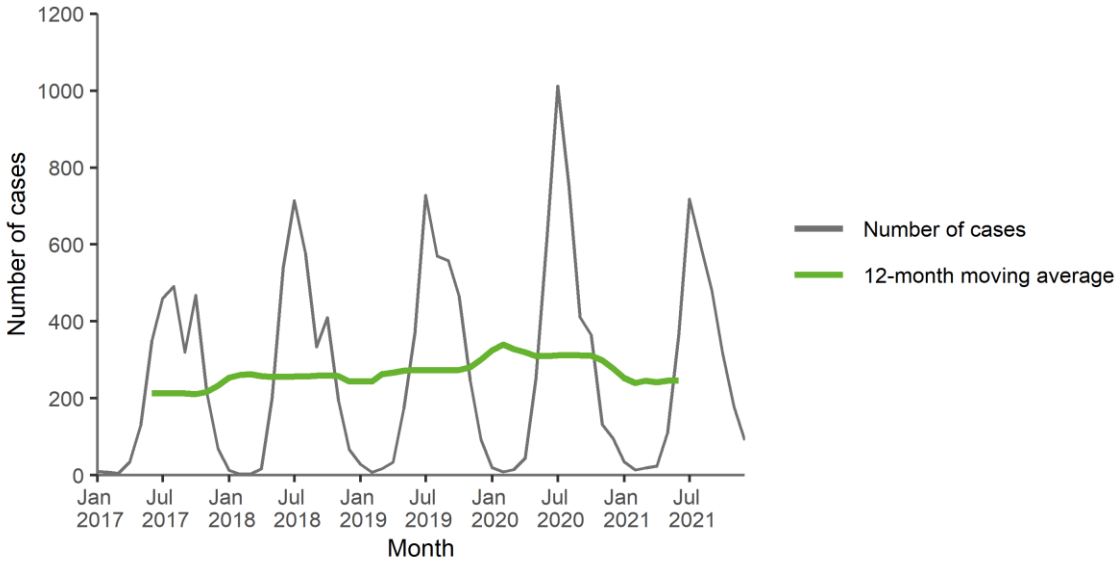
Source: Country reports.
ASR: age-standardised rate.
ND: no data reported.
NR: no rate calculated.

Figure 1. Confirmed tick-borne encephalitis cases per 100 000 population by country, EU/EEA, 2021



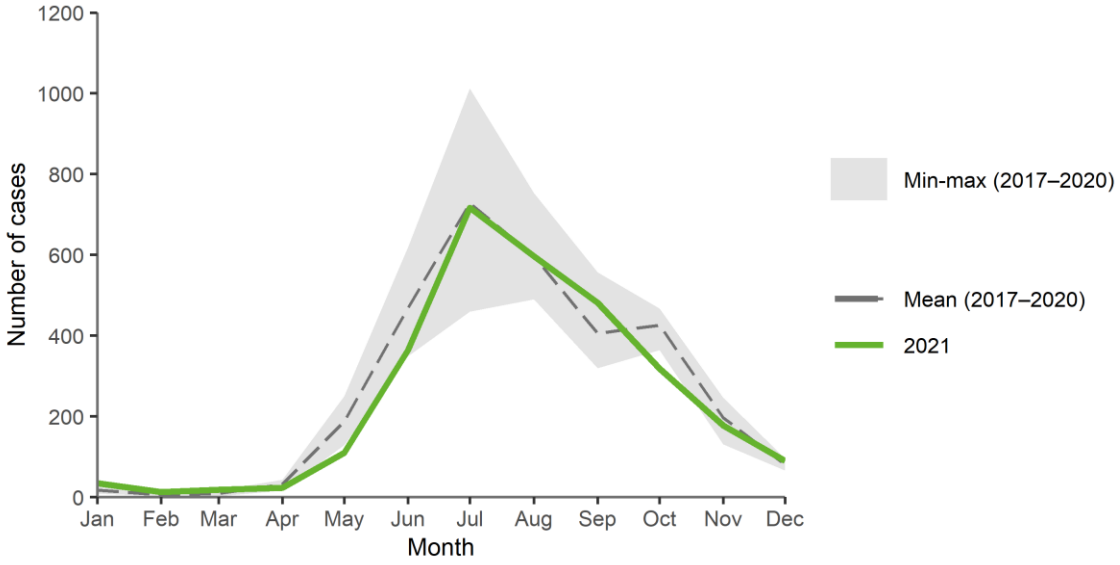
In 2021, a seasonal pattern of cases was observed, consistent with that of the previous years, with 94% of confirmed cases reported from May to November (Figure 2). The highest number of confirmed cases (n=717) was found in July, representing 24% of the confirmed cases (Figure 3).

Figure 2. Number of confirmed tick-borne encephalitis cases by month, EU/EEA, 2017–2021



Source: Country reports from Austria, Czechia, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, the Netherlands, Norway, Poland, Romania, Slovakia, Slovenia, Spain, Sweden.

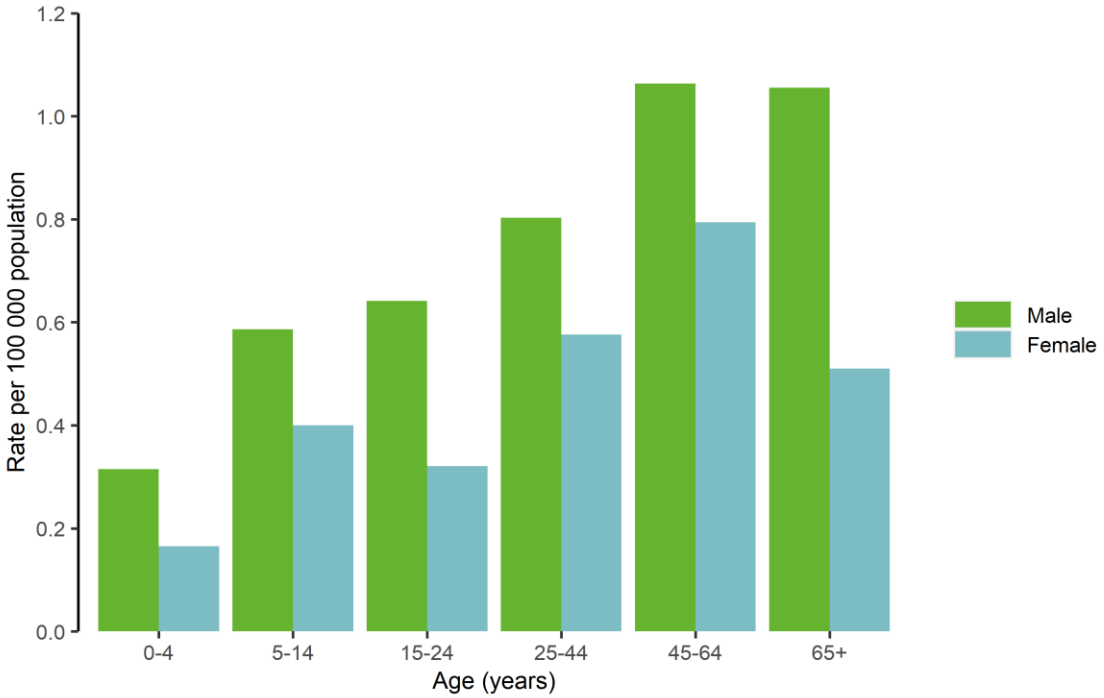
Figure 3. Number of confirmed tick-borne encephalitis cases by month, EU/EEA, 2021 and 2017–2020



Source: Country reports from Austria, Czechia, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, the Netherlands, Norway, Poland, Romania, Slovakia, Slovenia, Spain, Sweden.

For 2021, the largest proportion of cases and notification rate was reported in people aged 45–64 years (n=1 083, rate=0.9). The male-to-female ratio was 1.5:1, and the notification rates were higher among men in all age groups (Figure 4).

Figure 4. Confirmed tick-borne encephalitis rate per 100 000 population, by age and gender, EU/EEA, 2021



Discussion

The reporting year 2021 marked a slight decrease in the number of TBE cases compared with the previous three years. However, an overall increase in cases in the EU/EEA was observed between 2012 and 2020 [7]. Similar to the previous four years, the highest notification rate was reported by Lithuania, even though within the country it was the lowest rate compared to the previous four years. Latvia, which reported the second-highest notification rate in 2021, also experienced its highest notification rate within the last five years.

The incidence of TBE is influenced by several factors including the abundance of ticks and human behaviour [8]. The abundance of ticks is driven by prevailing environmental conditions like weather and climate and the availability of host reservoirs [9]. Increased outdoor recreational activities can also lead to an increased incidence of TBE [3,10]. The overall coverage and compliance to TBE vaccination has been found to be low in Europe, and in most countries where TBE is considered to be endemic, with significant variability among countries [11].

As in previous years, notification rates were higher among males and among adults aged 45-64 years, possibly due to more frequent exposure to tick bites during outdoor activities associated with occupation or leisure [12]. In addition, recent studies conducted in Scandinavian countries have shown that women compared to men have a higher risk perception, are more prone to use protective measures and have more knowledge on tick-borne disease [13-15].

Incidence rates were consistently high (over 5 per 100 00 population) during the last five years in four countries: Lithuania, Latvia, Estonia and Czechia. Among all the countries that reported cases in 2021, Sweden showed the highest percentage increase in notification rate compared to 2020. At the same time, significant variation in the notification rates between countries compared to 2020 was observed, with both notable increases and decreases. The reasons behind fluctuations in case numbers are multifaceted. Environmental and ecological factors play a significant role and other factors, such as human behaviour, particularly related to outdoor recreational activities, can influence TBE transmission, but are more difficult to account for and harder to predict [12,16,17].

The COVID-19 pandemic might have influenced the epidemiology of TBE in different ways. Changes in case finding, diagnosis, and reporting of TBE cases due to altered healthcare-seeking behaviour and an overburdened work force might have accentuated the underestimation of the true incidence [18-20]. Different non-pharmaceutical interventions and restrictions, on the other hand, could have potentially resulted in increased outdoor activities, resulting in an increased exposure [18,19].

Public health implications

Tick-borne encephalitis is one of the most common tick-borne viral diseases in Europe with an increasing burden [21,22]. Preventive strategies include vaccination and avoidance of tick bites. The World Health Organization recommends that TBE vaccination should be offered to all inhabitants of regions with a notification rate ≥ five per 100 000 population (i.e. high-endemic regions) [23]. Use of personal protective measures like the application of tick repellents and wearing protective clothing to avoid tick bites and removal of ticks from the body can reduce the risk of tick-borne infections, especially while engaging in outdoor activities. As infected dairy products can also transmit the disease, avoiding consumption of unpasteurised dairy products in risk areas is also considered a precaution to avoid infection.

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