

Tick-borne encephalitis

Annual Epidemiological Report for 2019

Key facts

- For 2019, twenty-five EU/EEA countries reported 3 411 cases of tick-borne encephalitis (TBE), 3 246 (95.2%) of which were confirmed.
- The EU/EEA notification rate for 2019 is 0.7 per 100 000, which represents an increase compared to the stable rate of 0.6 reported for the three previous years.
- Cases were more frequently reported among men (1.5 M:1 F) and in the age group 45–64 years.
- TBE presents a seasonal pattern. In 2019, 95% of confirmed cases occurred between May and November, July being the month with the highest number of reported cases (n=720).

Introduction

TBE is a flavivirus (TBEV) infection of the central nervous system transmitted by infected ticks (genus *Ixodes*) or, on rare occasions, through unpasteurised dairy products [1]. TBE is endemic in several central, north and eastern European countries, with the highest incidence historically found in the Baltic and central European countries. The majority of the infections caused by the circulating virus subtype, TBEV-Eu, are asymptomatic (up to 75%), while the symptomatic ones typically present with a biphasic illness [2].

Methods

This report is based on data for 2019 retrieved from The European Surveillance System (TESSy) on 9 October 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 *Introduction to the Annual Epidemiological Report* chapter [3].

An overview of the national surveillance systems is available online [4].

A subset of the data used for this report is available through ECDC's online *Surveillance atlas of infectious diseases* [5].

For 2019, 25 EU/EEA countries reported data on TBE (Cyprus, Denmark, Iceland, Malta, Liechtenstein, and Portugal did not report). Twenty-one countries used the EU case definition, two countries (Germany and Italy) reported using another case definition and two countries (Croatia and Luxembourg) did not specify which case definition was used.

Twenty reporting countries have a comprehensive surveillance system. Reporting is compulsory in 19 countries, voluntary in five (Belgium, France, Luxembourg, the Netherlands and the United Kingdom) and 'not specified' in one country (Croatia). Surveillance systems are mostly passive and all data were case-based except for data from Belgium and Bulgaria.

Epidemiology

For 2019, 3 411 TBE cases were reported to TESSy from EU/EEA countries, 3 246 (95.2%) of which were confirmed (0.7 cases per 100 000 population, Table 1). Of 2 706 cases with known outcome, 20 died (case fatality: 0.7%). Three countries reported no cases (Greece, Luxemburg and Romania).

The notification rate was highest in Lithuania (25.4 cases per 100 000 population), followed by Czechia (7.3) and Estonia (6.2; Table 1, Figure 1). The highest number of confirmed cases in 2019 were reported by Czechia (n=773), Lithuania (n=711) and Germany (n=445; Table 1).

The EU/EEA notification rate for 2019 was 0.7 per 100 000, which represents an increase compared to the stable rate of 0.6 reported for the three previous years. Compared to 2018 data, the notification rate has increased substantially for Lithuania, from 13.7 to 25.4 cases per 100 000.

Data on importation status were available for 2 947 confirmed cases, 1.8% (n=54) of which were travel-associated. Imported cases were reported by eleven countries, with Germany reporting the highest number (n=22). Among imported cases where the place of infection was specified, 39 cases were reported to have been infected in EU Member States, and two cases had a travel history outside the EU/EEA (India and Russia). In 2019, Ireland and Spain reported their first TBE case in TESSy and for both countries these were imported cases.

Of the 1 632 (50.3%) confirmed cases for which information on immunisation status was available, 1 605 cases (98.3%) were reported as not vaccinated and 27 (1.7 %) had a history of receiving between one and four doses of TBE vaccine. Fifteen cases reported having received ≥ 3 vaccine doses, seven of the 15 cases had information available on when the last dose was received, which averaged up to five years before the onset of symptoms in 2019 (range: seven years).

Table 1. Distribution of confirmed tick-borne encephalitis cases and rates per 100 000 population by country, EU/EEA, 2015–2019

Country	2015		2016		2017		2018		2019		
	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate	ASR
Austria	79	0.9	96	1.1	123	1.4	170	1.9	106	1.2	1.2
Belgium	1	0.0	1	0.0	3	0.0	3	0.0	4	0.0	0.0
Bulgaria	2	0.0	0	0.0	1	0.0	0	0.0	1	0.0	0.0
Croatia	26	0.6	6	0.1	10	0.2	22	0.5	13	0.3	0.3
Cyprus	.	.	.	.	.	.	.	.	.	.	.
Czechia	349	3.3	565	5.4	677	6.4	712	6.7	773	7.3	7.2
Denmark	-	-	-	-	-	-	4	0.1	-	-	-
Estonia	115	8.7	80	6.1	84	6.4	85	6.4	82	6.2	6.1
Finland	68	1.2	61	1.1	82	1.5	79	1.4	69	1.3	1.2
France	10	0.0	15	0.0	2	0.0	25	0.0	4	0.0	0.0
Germany	218	0.3	353	0.4	486	0.6	583	0.7	445	0.5	0.5
Greece	1	0.0	0	0.0	0	0.0	2	0.0	0	0.0	0.0
Hungary	22	0.2	14	0.1	14	0.1	30	0.3	17	0.2	0.2
Iceland	.	.	.	.	.	.	.	.	.	.	.
Ireland	0	0.0	0	0.0	0	0.0	0	0.0	1	0.0	0.0
Italy	5	0.0	48	0.1	24	0.0	39	0.1	37	0.1	0.1
Latvia	141	7.1	91	4.6	178	9.1	100	5.2	118	6.1	5.8
Liechtenstein	.	.	.	.	.	.	.	.	.	.	.
Lithuania	336	11.5	633	21.9	474	16.6	384	13.7	711	25.4	24.1
Luxembourg	1	0.2	0	0.0	0	0.0	0	0.0	0	0.0	0.0
Malta	.	.	.	.	.	.	.	.	.	.	.
Netherlands	-	-	4	-	3	-	6	-	3	-	-
Norway	9	0.2	12	0.2	16	0.3	26	0.5	35	0.7	0.7
Poland	115	0.3	211	0.6	196	0.5	148	0.4	197	0.5	0.5
Portugal	.	.	.	.	.	.	.	.	.	.	.
Romania	0	0.0	0	0.0	1	0.0	4	0.0	0	0.0	0.0
Slovakia	80	1.5	169	3.1	75	1.4	156	2.9	161	3.0	2.9
Slovenia	62	3.0	83	4.0	102	4.9	153	7.4	111	5.3	5.0
Spain	0	0.0	0	0.0	0	0.0	0	0.0	1	0.0	0.0
Sweden	268	2.7	238	2.4	365	3.7	359	3.5	355	3.5	3.5
UK	0	0.0	0	0.0	0	0.0	2	0.0	2	0.0	0.0
EU-EEA	1 908	0.4	2 680	0.6	2916	0.6	3 092	0.6	3246	0.7	0.7

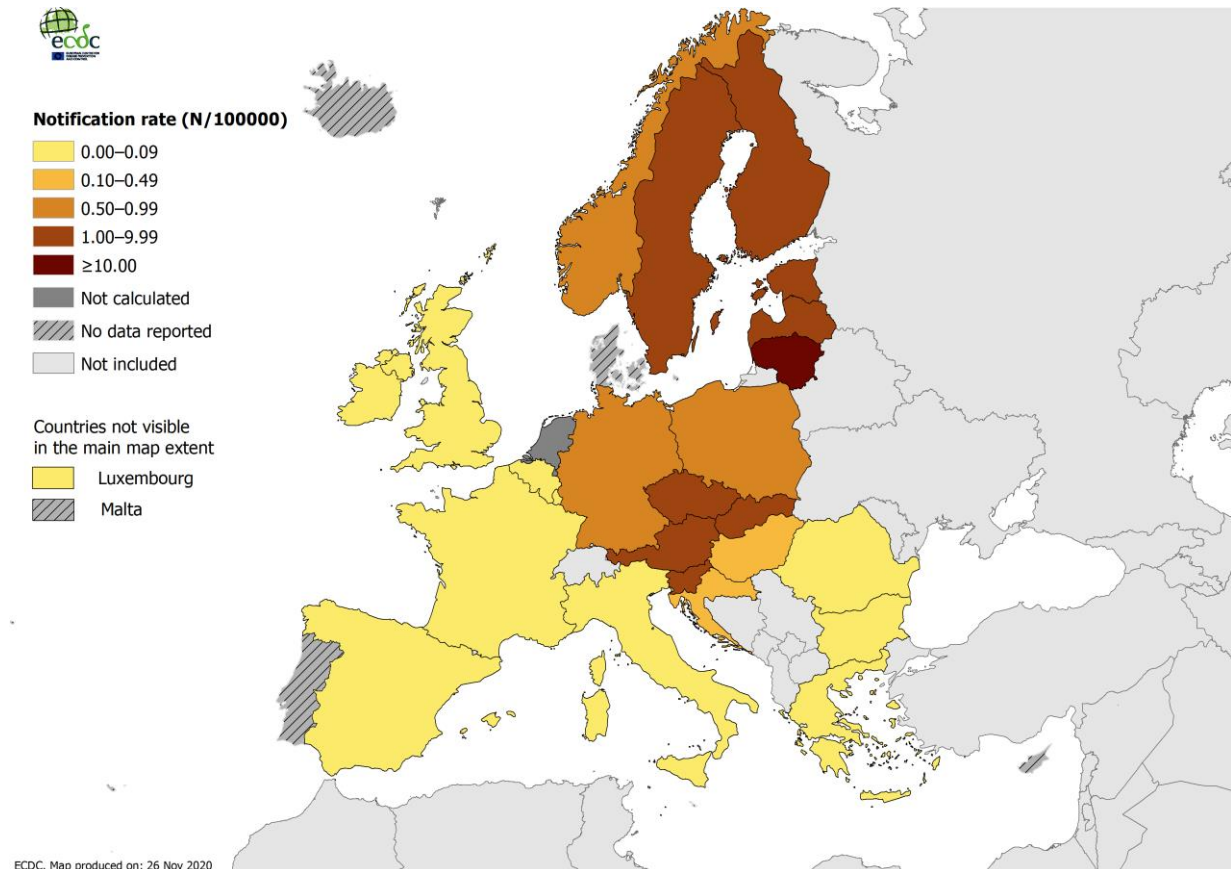
Source: Country reports.

.: no data reported

-.: no rate calculated.

ASR: age-standardised rate

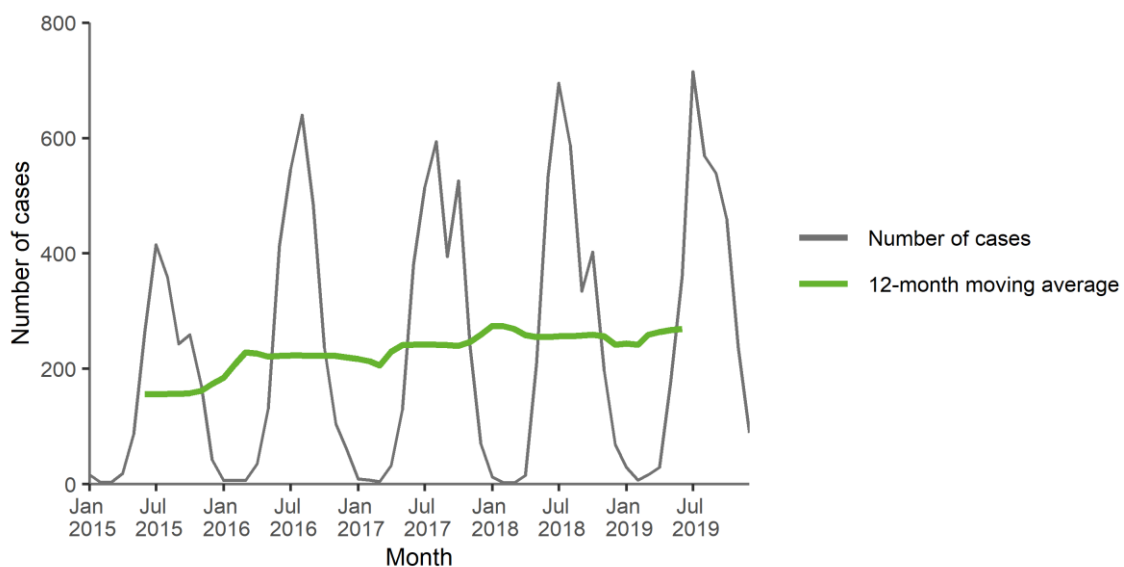
Figure 1. Distribution of confirmed tick-borne encephalitis cases per 100 000 population by country, EU/EEA, 2019



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

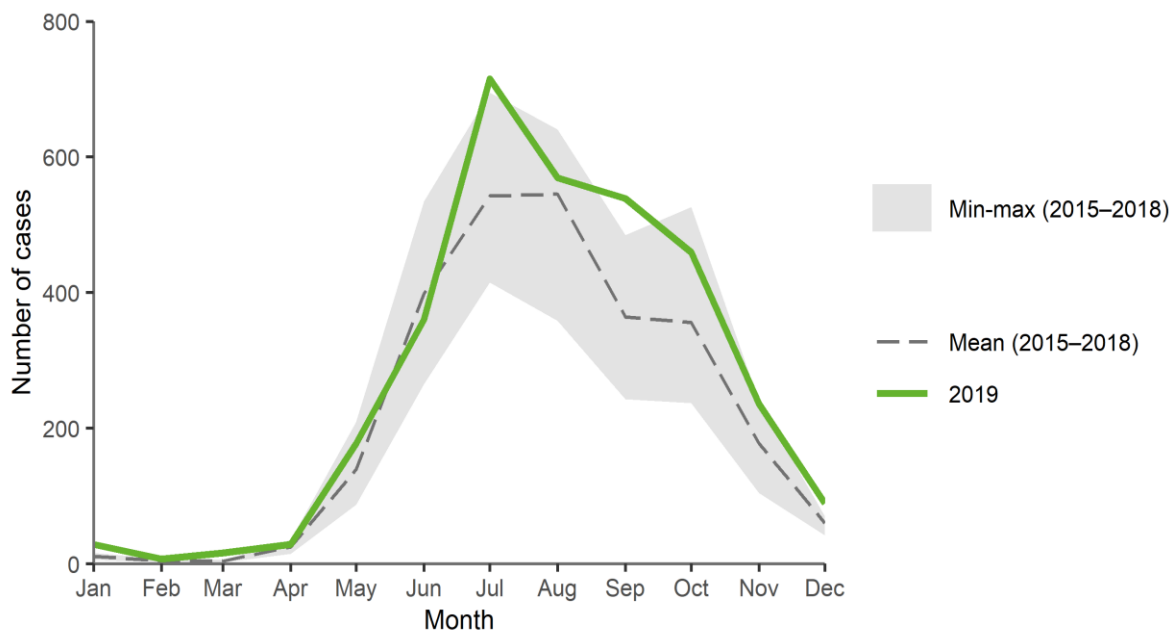
TBE cases generally display a seasonal peak in the months of July and August. In 2019, the reported cases showed the expected pronounced seasonality, with 95% of confirmed cases reported between May and November. A total of 720 cases were reported during the 2019 peak in July, representing 22% of confirmed cases. The bimodal distribution detected for 2017 and 2018 was not seen for the 2019 data (Figures 2, 3).

Figure 2. Distribution of confirmed tick-borne encephalitis cases by month, EU/EEA, 2015–2019



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

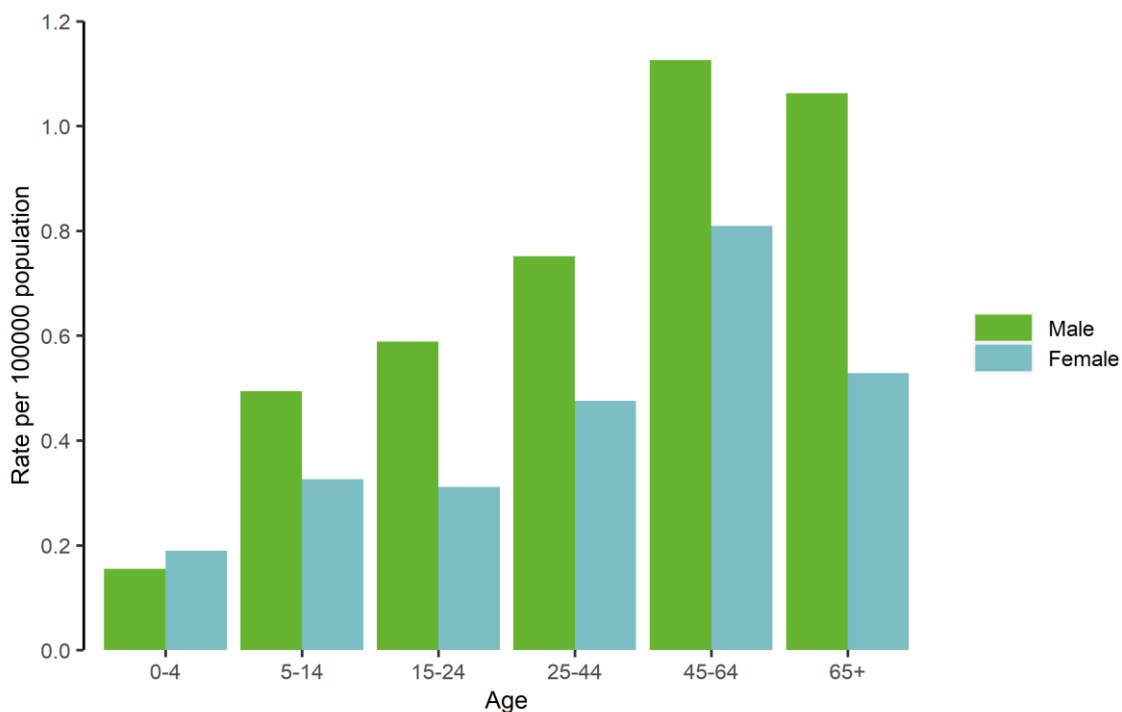
Figure 3. Distribution of confirmed tick-borne encephalitis cases by month, EU/EEA, 2019 and 2015–2018



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

In 2019, the largest proportion of cases were reported in the age group 45–64 years (n=1 272, 39.2%). The male-to-female ratio was 1.5:1, and the notification rates were higher among men in all age groups except for the 0-4 years age range (Figure 4).

Figure 4. Distribution of confirmed tick-borne encephalitis rate per 100 000 population, by age and gender, EU/EEA, 2019



Discussion

TBE became notifiable in the EU in 2012 and the current case definition was adopted in 2018 [1]. The EU notification rate for TBE has fluctuated between 0.4 and 0.7 cases per 100 000 population from 2015 to 2019. For 2019, similar to previous years, the highest notification rates were reported in Lithuania, Czechia and Estonia. Czechia and Norway have shown a steady increase in notification rate from 2015 to 2019.

Notification rates are 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 [2]. In addition, recent studies conducted in Scandinavian countries have shown that women have a higher risk perception than men, are more prone to use protective measures and have more knowledge of tick-borne diseases [6–8]. The majority of cases continue to be diagnosed during the warmer months, with no evidence of a major shift in seasonal pattern [9,10].

Although Denmark did not report TBE data through TESSy for 2019, three cases of TBE were detected in Northern Zealand [11]. In July 2019, a probable case of TBE was detected, acquired in southern England. This is the first report of a probable human case of TBE in the UK [12]. In September 2019, TBEV was detected in ticks in southern England, having previously only been detected in eastern England. This suggested the need to consider TBE as a diagnosis in encephalitis patients in the UK [13].

A recent evaluation of the available serological methods for TBE diagnosis highlighted that for accurate diagnosis of TBE in Europe there is a need for confirmatory neutralisation antibody testing and clinical correlation, with careful history-taking [14].

Public health implications

TBE is an important zoonotic infection for many countries in central, northern and eastern Europe. Residents in and travellers to regions where TBE is endemic in the EU/EEA countries should be aware of the risk of exposure to ticks and protect themselves against tick bites [15]. Immunisation against TBE should also be considered for the most effective protection, in line with relevant national recommendations, particularly for those who engage in extensive outdoor activities.

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