Chapter 13

TBE in Slovenia

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ECDC risk status: endemic *(last edited in May 2025, update for 2024: 79 reported cases)*

History and current situation

TBE is endemic in Slovenia, and the incidence rate is one of the highest in the EU. In Slovenia, TBE virus was confirmed for the first time in 1953 with isolation of the virus from a patient's blood.[1] In 1955, the virus was isolated from a tick *Ixodes Ricinus.*[2]

Notification of TBE cases as well as deaths due to TBE has been mandatory in Slovenia since 1977.[3] In the past, case definition for TBE surveillance was not available. It was at the treating physicians' discretion to establish TBE diagnosis for clinical management purposes and report such cases also for surveillance purposes. In recent years, Slovenia has adopted the EU case definition of TBE for the purposes of epidemiological surveillance.[4] Cases with central nervous system involvement and laboratory confirmation or cases with central nervous system involvement and an epidemiological link (exposure to common source – unpasteurized dairy products) are notified. Surveillance data has been collected within the communicable diseases surveillance system by the National Institute of Public Health of Slovenia (NIPH).[5]

The number of TBE reported cases in Slovenia varies every year. In the period from 1983 to 2023, the number of annually reported TBE cases was between 62 and 532 (incidence rates between 3.0 and 26.6/100,000), which amounts to a mean of 194 cases/year, and a mean annual incidence rate of 9.6/100,000 (Figure 1). In contrast to reports on increasingly higher incidence rates of TBE during the last decade from many EU countries,[6] in Slovenia the reported incidence rates during the last decade (2014 - 2023) have decreased compared to the previous two decades (1994 – 2013) (Figure 1). Diverging long-term trends in the occurrence of TBE fluctuates due to multiple factors: virus evolution, climatic factors influencing changes in tick activity and population, number of small forest mammals, as well as human behavior (e.g., changes in leisure activities) play an important role. In addition, changes in surveillance systems, diagnostic methods and vaccination policies can also have an effect on the observed trend.[6,7]

TBE occurs seasonally in Slovenia, usually from May to October, with a peak in June and July, which is linked to tick activity.[8] In recent years an increase in the number of the cases in the elderly has been observed.[3] Since 2014, TBE incidence rates have been the highest in the 55–64 age group in most years, with males being more frequently affected than females (Figure 2). In men, the 65–74 age group and in women the 45–54 age group followed, with the second highest rates in the period 2014 - 2023. In contrast to the TBE incidence, the disease burden expressed in disability-adjusted life years (DALYs) was higher in children aged 5–14 years than in adults aged 50–74 years.[9]

The endemic area for TBE is most of Slovenia, except for the area along the Adriatic Sea. In the past decade (2014 – 2023) cases of TBE were recorded in all Slovenian statistical regions (Figure 3). Although some regions in Slovenia have a higher 10-year average number of TBE cases than others, TBE occurs throughout the country, with the most affected areas in the north and central regions down to the southwestern part of the country, excluding the coastal region.

People who are staying in the endemic areas (temporarily or permanently) have a higher risk for TBE infection. These are mainly people working in forestry, wood and wood-processing industries and construction. The risk is also higher among farmers, if their farmlands are located near forested areas, which present a natural habitat for ticks. There have also been observations of increased TBE incidence among people who visit forests for recreational purpose or forest fruit-picking. An epidemiological study that included 1,564 cases of TBE in Slovenia showed that 82.3% of cases had a tick bite on one or multiple sites on the body. The estimated duration of tick attachment was less than 6 h in 23.5% of TBE cases. Long attachments (more than 24 h) were reported by 10% of the patients. The tick bite occurred while the TBE patients were engaged in leisure time activities (sports or camping, 32.8%), mushroom or berry picking (30.2%), or farming (23.3%). Almost two-thirds of TBE patients reported that they had practiced at least one of the recommended preventive measures, most frequently self-inspection, and least often repellent use.[10]

Preventive measures against TBE include the use of repellents, appropriate clothing and daily inspection of the skin to remove ticks. The most effective method of preventing TBE is vaccination.[11] Mandatory vaccination against TBE was introduced in Slovenia in 1986 for those at risk of occupational exposure, and in 1990 for students at risk of exposure during curricular training, while the rest of the population needed to pay for the vaccination

themselves. TBE vaccination coverage in Slovenia remained low: by 2007, the proportion of the general population reporting to ever have been vaccinated against TBE was 12.4%.[12] From 2019, Slovenia introduced TBE vaccination for adults and children in the national vaccination program, for children at first after the age of three years, then later changed to after the age of one year, and for adults who reach 49 years of age in the current year. Vaccination for this group is carried out with three doses of vaccine, paid for from the compulsory health insurance. As a general rule, the three-dose basic vaccination is financed. Those who have previously started vaccination on a "self-pay" basis may be vaccinated with the following three doses at the expense of the mandatory health insurance. Vaccination is also available to people who delayed TBE vaccination (children born in 2016 or later and adults who reached 49 years of age in 2019 or later and have not yet received three doses at the expense of the mandatory health insurance).[13] In Slovenia the vaccination coverage among children with at least one dose of TBE vaccine enrolled in this program born between 2016 and 2019 ranged from 35.2 - 52.2%. The vaccination coverage among adults with at least one dose of TBE vaccine enrolled in this program born between 1970 and 1973 ranged from 14.7 - 21.1%.[14]

Overview of TBE in Slovenia

Table 1: TBE in Slovenia	
Virus subtypes isolated	European subtype of TBE virus (TBEV) present in Slovenia. Relatively high genetic variability of Slovenian TBEV with correlation between geographical and phylogenetic clustering was detected.[15]
Reservoir animals	Rodents; TBEV antibodies were detected in 5.9% of rodent sera. Bank voles had higher rate of infection than mice.[16]
Percentage infected ticks	In Slovenia the main vector is *Ixodes ricinus* and the prevalence of TBEV tick infection is 0.47%.[17]
Dairy product transmission	In previous decades one food-borne outbreak of TBE was reported in Slovenia associated with consumption of raw goat milk (3 cases).[18,19]
Case definition used by authorities	Slovenia adopted the EU case definition for epidemiological surveillance of TBE.[4]
Completeness of case detection and reporting	No data.
Type of reporting	Reporting of TBE cases is mandatory in Slovenia. Cases with central nervous system involvement and laboratory confirmation or cases with central nervous system involvement and epidemiological link (exposure to common source – unpasteurized dairy products) are notified.[5]
Other TBE surveillance	Not established.
Special clinical features	A biphasic course of the illness was reported by 56% of patients. Adults (15 – 60 years old) more often presented with fever, headache, stiff neck and photophobia, whereas seniors (more than 60 years old) more frequently reported fatigue, altered consciousness and decreased muscle strength, these differences indicating a more classic course of TBE in the younger group and a somehow different and more severe acute disease in the older group.[20] Direct comparison of clinical and epidemiological characteristics of TBE in children and adults revealed differences in several clinical and laboratory features and corroborates the previous conclusion that TBE in childhood is a milder illness than TBE in adults.[21]
Licensed vaccines	FSME-IMMUN.[22]

Table 1 continued	
Vaccine recommendations	TBE vaccination for adults and children included in the Slovenian national vaccination program. For children after the age of one year and for adults who reach 49 years of age in the current year. Vaccination is carried out with three doses of vaccine, paid for by the mandatory health insurance. As a general rule, the three-dose basic vaccination is financed. Those who have previously started vaccination on a "self-pay" basis may be vaccinated with the following three doses at the expense of the mandatory health insurance. As a “catch-up”, vaccination is also available to people who have not yet been TBE vaccinated (children born in 2016 or later and adults who have reached 49 years of age in 2019 or later and have not yet received three doses at the expense of the mandatory health insurance).[13]
Vaccine uptake	In Slovenia the vaccination coverage among children with at least one dose of TBE vaccine enrolled in national vaccination program born between 2016 and 2019 ranged from 35.2 - 52.2%. The vaccination coverage among adults with at least one dose of TBE vaccine enrolled in this program born between 1970 and 1973 ranged from 14.7 - 21.1%.[14]
National Reference center for TBE	National Institute of Public Health Trubarjeva cesta 2, 1000 Ljubljana, Slovenia https://nijz.si/

Figure 1: TBE case numbers over time, Slovenia, 1983-2023

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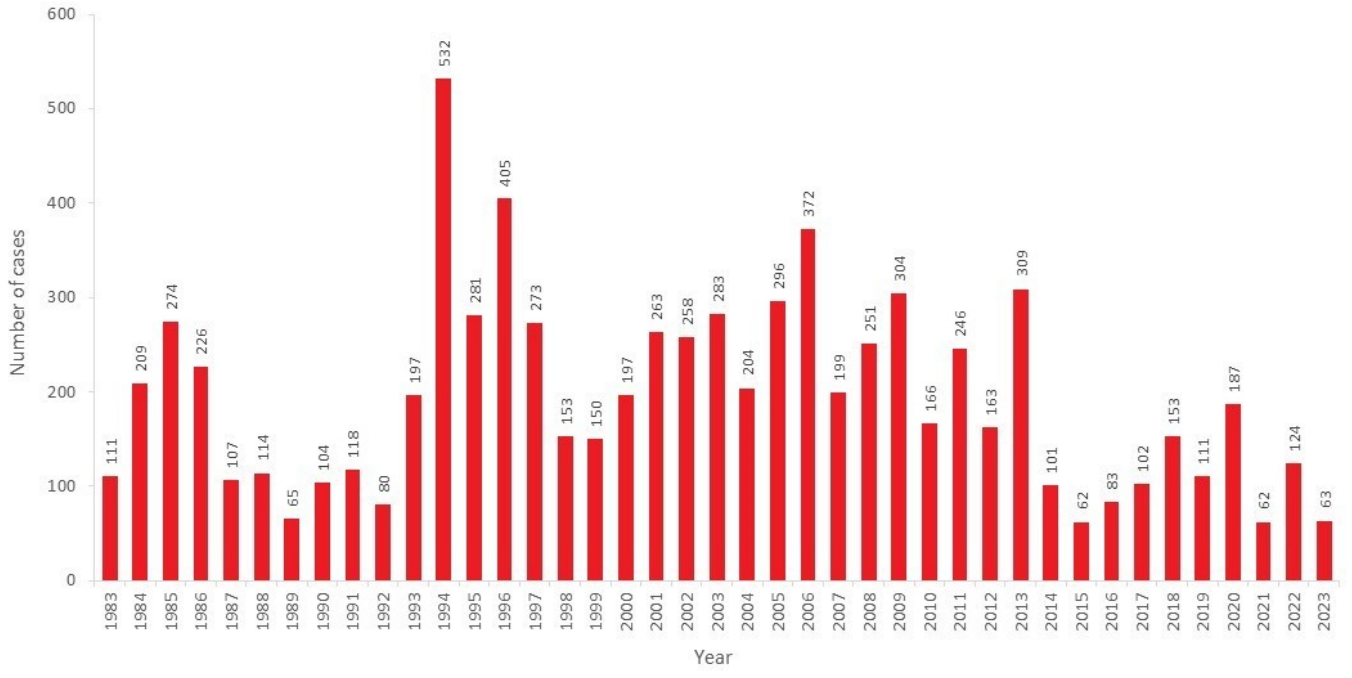
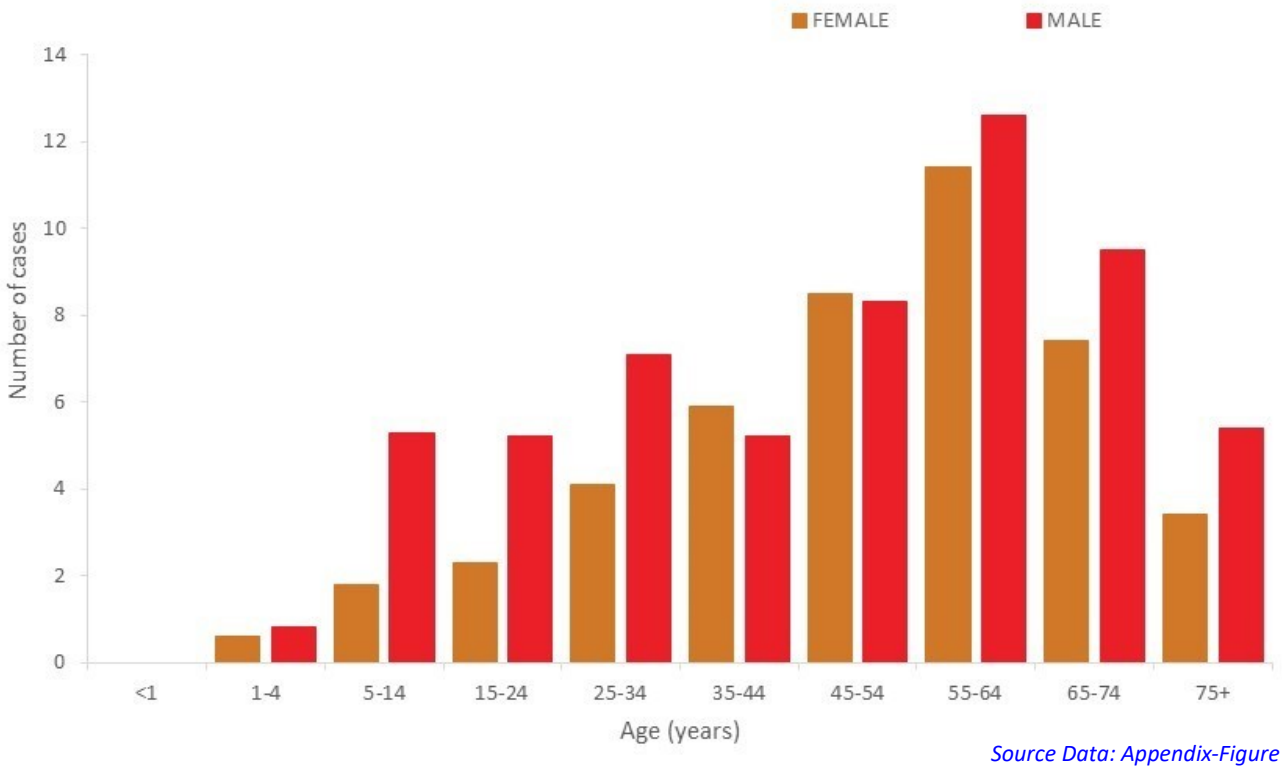


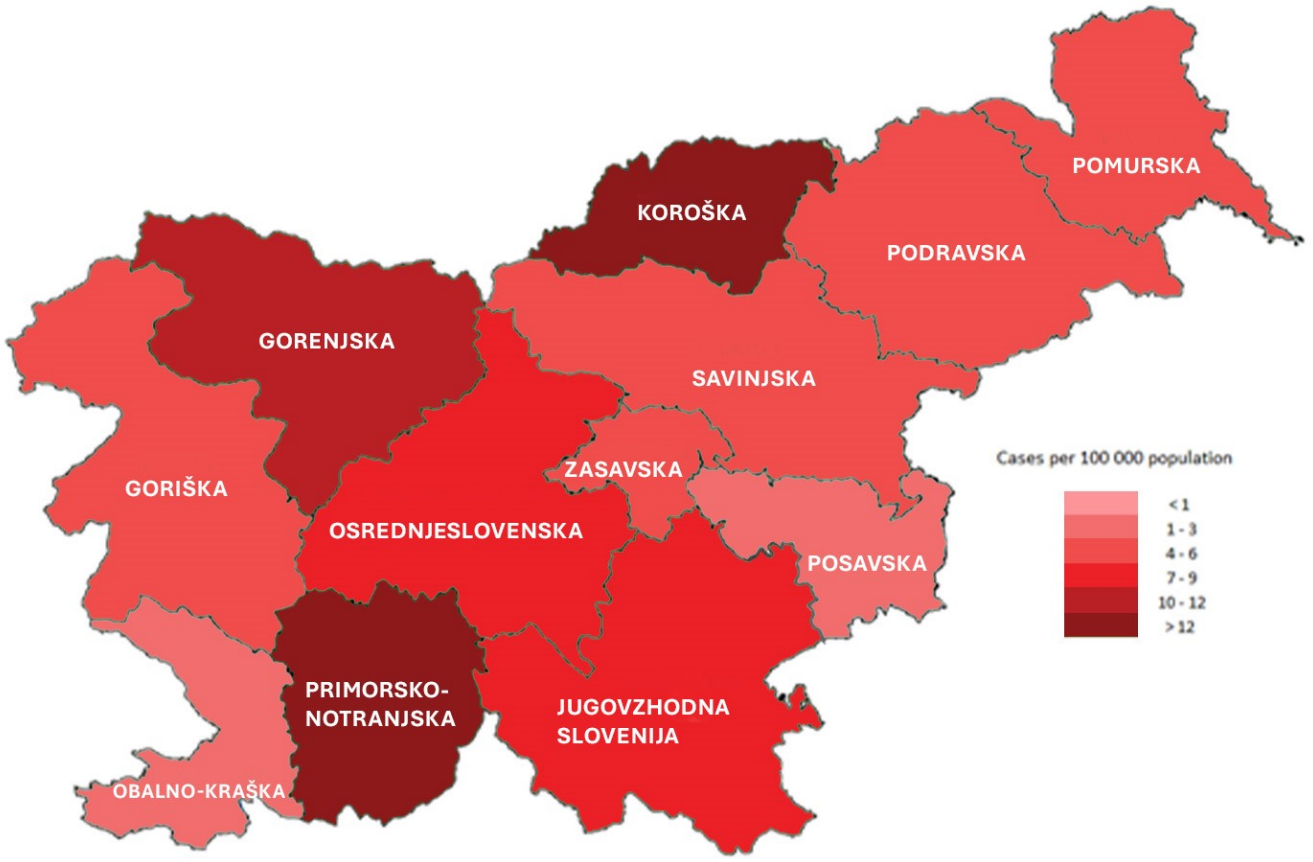
Source Data: Appendix-Figure 1

Figure 2: Age and gender distribution of TBE cases, Slovenia, 2014-2023



Source Data: Appendix-Figure 2

Figure 3: Ten-year average incidence of TBE per 100,000 population by statistical region of residence, 2014–2023



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Appendix

Source data: Figure 1

Year	Number of cases
1983	111
1984	209
1985	274
1986	226
1987	107
1988	114
1989	65
1990	104
1991	118
1992	80
1993	197
1994	532
1995	281
1996	405
1997	273
1998	153
1999	150
2000	197
2001	263
2002	258
2003	283
2004	204
2005	296
2006	372
2007	199
2008	251
2009	304
2010	166
2011	246
2012	163
2013	309
2014	101
2015	62
2016	83
2017	102
2018	153
2019	111
2020	187
2021	62
2022	124
2023	63

Source data: Figure 2

Age group (years)	Males	Females
<1	0	0
1-4	0	1
5-14	2	0
15-24	1	3
25-34	3	4
35-44	2	10
45-54	5	4
55-64	9	3
65-74	5	4
75+	6	1

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