

# TBE in Slovenia

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**ECDC risk status: endemic** (data as of end 2022)

## 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.<sup>1</sup> In 1955, the virus was isolated from a tick *I. ricinus*.<sup>2</sup>

Notification of TBE cases as well as deaths due to TBE has been mandatory in Slovenia since 1977. Only cases with central nervous system involvement and laboratory confirmation are notified. Surveillance data has been collected within the communicable diseases surveillance system by the National Institute of Public Health of Slovenia (NIPH).

The number of TBE reported cases in Slovenia varies every year. In the period from 1983 to 2016, the number of annually reported TBE cases was between 62 and 531 (incidence rates between 3.0 and 26.6/100,000), which amounts to a mean of 206 cases/year, and a mean annual incidence rate of 10.3/100,000. In contrast to reports on increasingly higher incidence rates of TBE during the last two decades from many endemic countries, in Slovenia the reported incidence rates during the last 35 years have shown no apparent increasing or decreasing trend. Occurrence of the disease presumably fluctuates due to

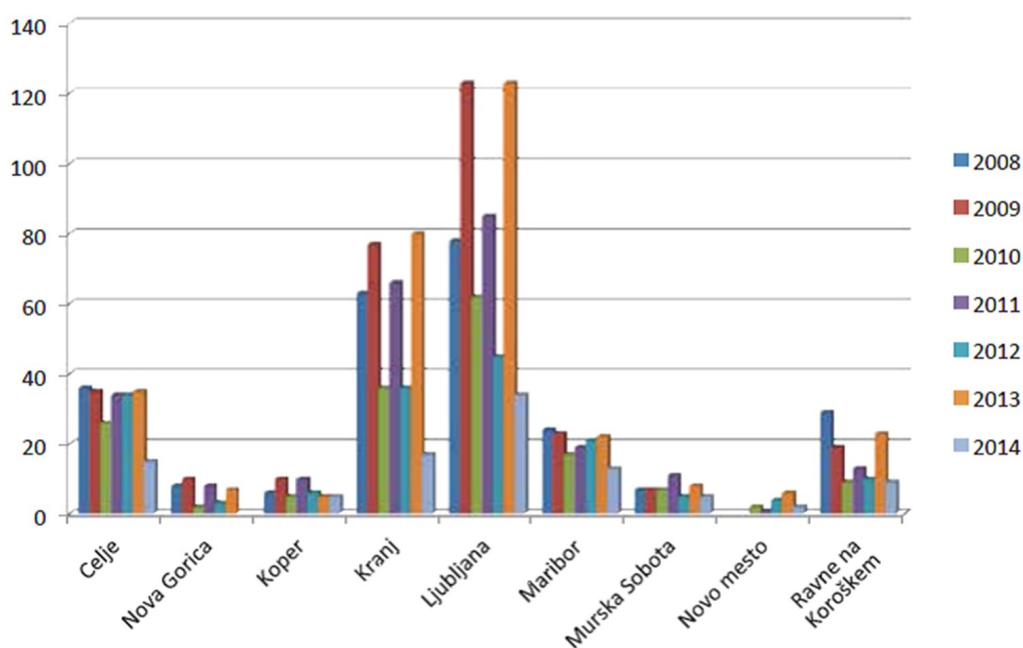
climatic factors influencing tick activity and population number of small forest mammals, different weather conditions during summer months in different years and other possible factors (e.g., changes in leisure activities) that have not been investigated yet.

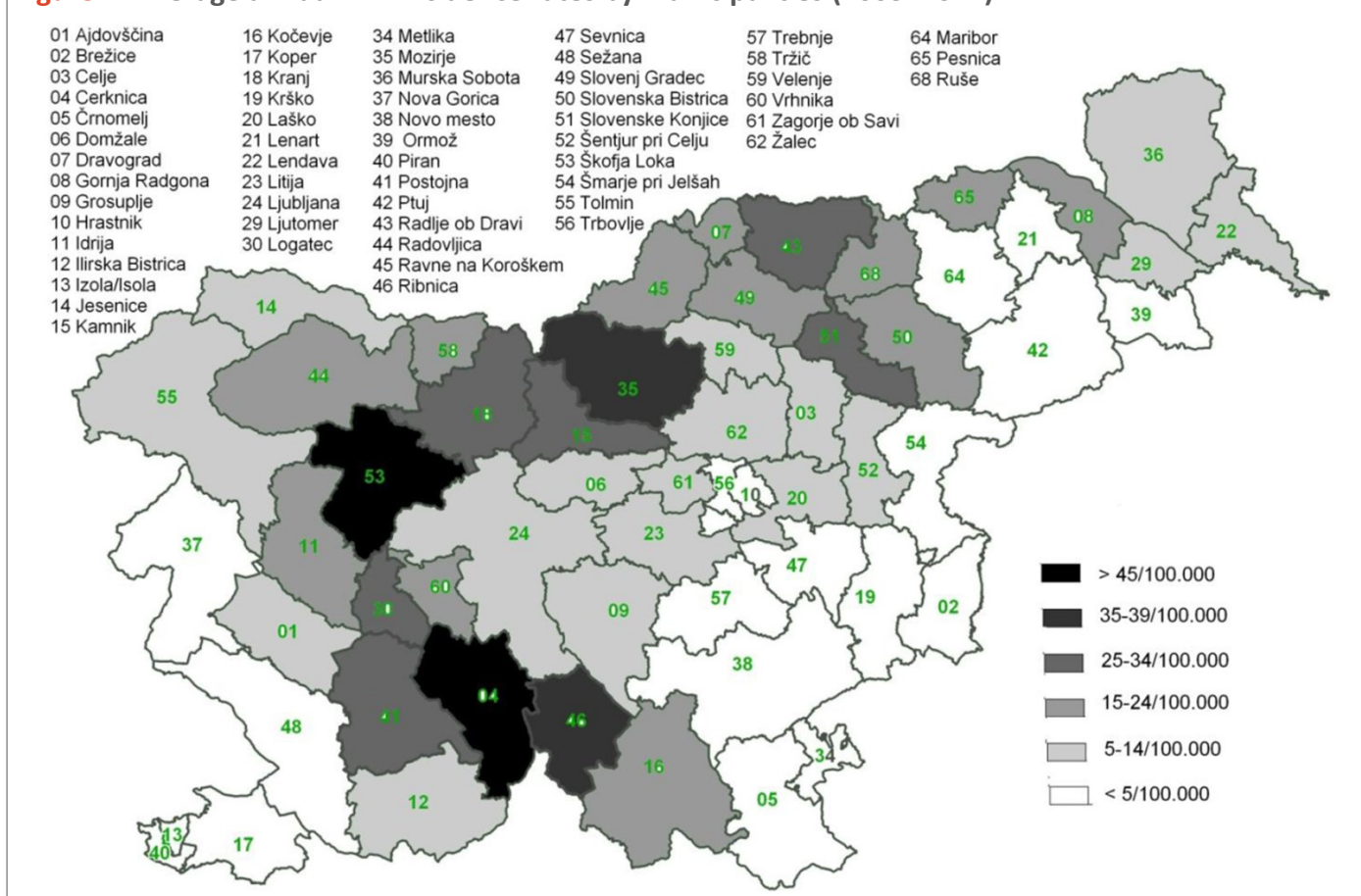
TBE virus is present in all Slovenian regions. Although some regions in Slovenia have higher incidence of TBE than others, TBE occurs throughout the country, with the most affected areas in the north and central regions (Fig. 1). In some administrative units average annual TBE incidence rates exceed 45/100,000 (Fig. 2).

TBE infections occur seasonally, in Slovenia mostly between April and November, with a peak in June and July.<sup>5</sup> In recent years, an increase of the cases in the elderly has been observed. Since 1994, TBE incidence rates have been the highest in the 55–64 age group in most years, with males being more frequently affected than females.<sup>6</sup> In men, the 65–74 age group and in women the 45–54 age group followed, with the second highest rates in most years. In contrast to the TBE incidence, the disease burden expressed in DALYs was higher in children aged 5–14 years than in adults aged 50–74 years.<sup>7</sup>

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-

**Figure 1: Reported TBE cases in Slovenia between 2008 and 2014 by region**<sup>3</sup>



**Figure 2: Average annual TBE incidence rates by municipalities (2003–2012)<sup>4</sup>**

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 hours in 23.5% of TBE cases. Long attachments

(more than 24 hours) 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.<sup>8</sup>

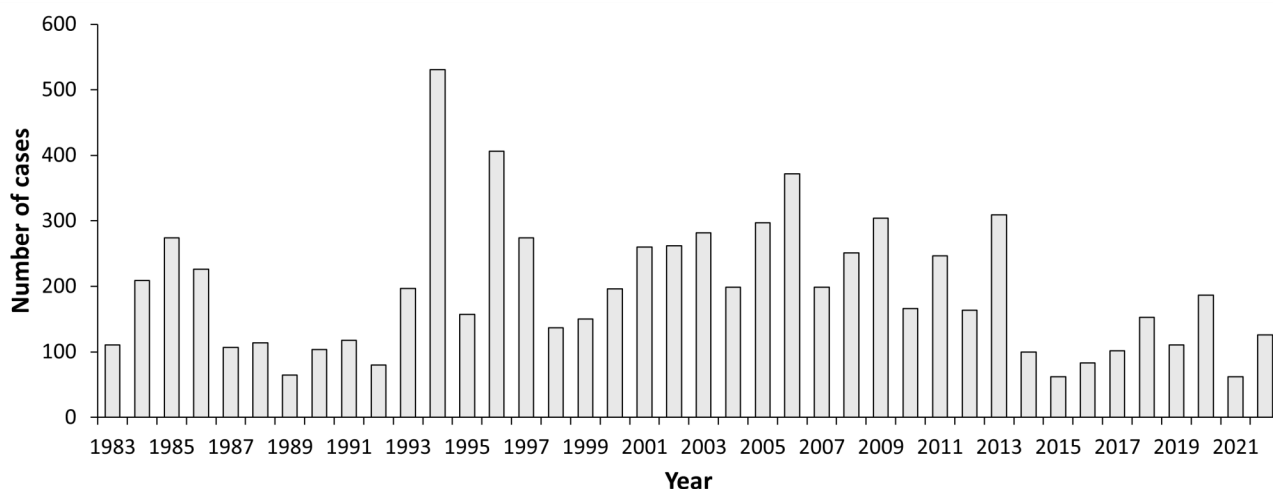
## Overview of TBE in Slovenia

**Table 1: Virus, vector, transmission of TBE in Slovenia**

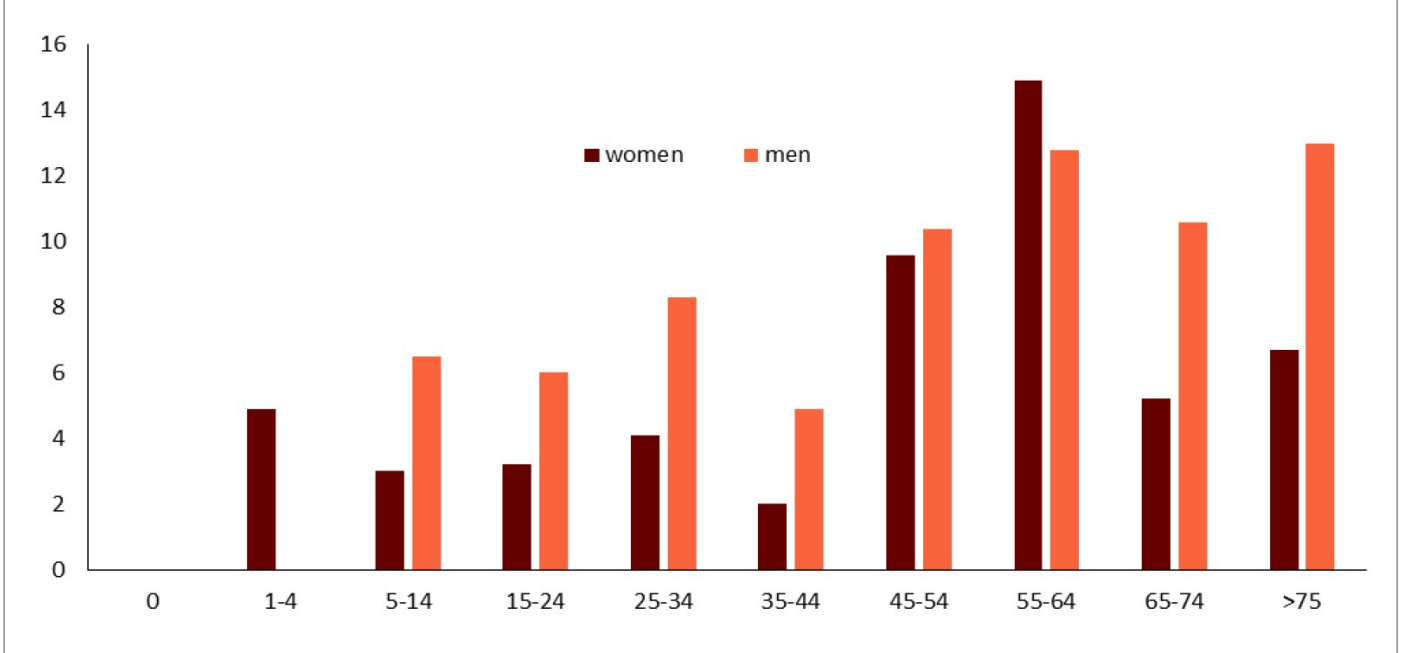
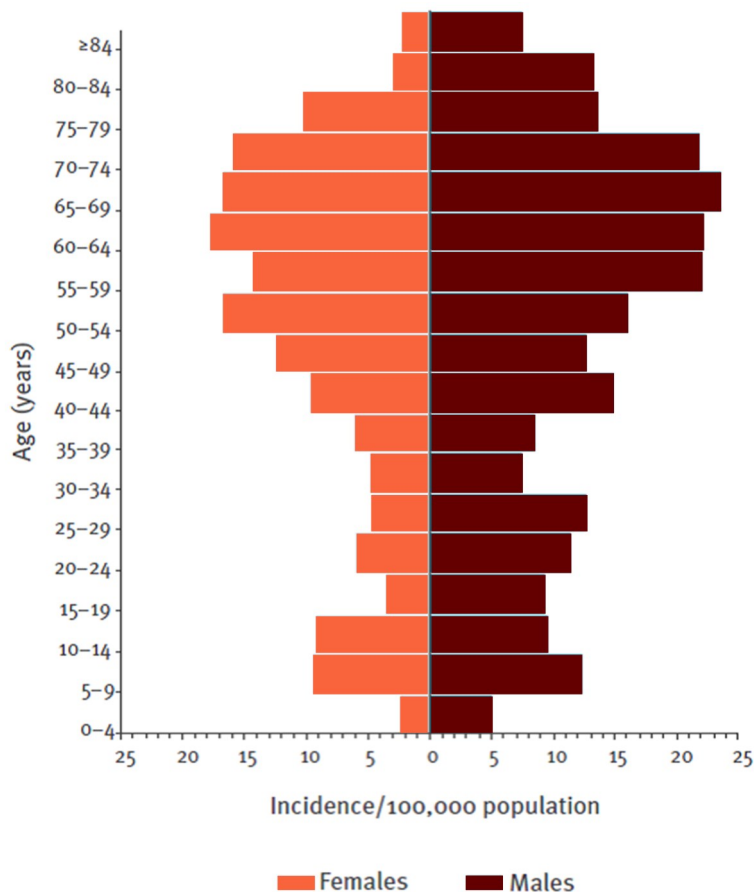
<b>Viral subtypes, distribution</b>	European subtype (TBEV-EU); great heterogeneity of the viruses with geographical clustering seen for viruses with the same genetic characteristics. <sup>9</sup>
<b>Reservoir animals</b>	Rodents; TBE virus antibodies were detected in 5.9% of rodent sera. Bank voles had higher rate of infection than mice. <sup>10</sup>
<b>Infected tick species (%)</b>	In Slovenia, the main vector is <i>Ixodes ricinus</i> , and the prevalence of TBE ticks infection is 0.47%. <sup>11</sup>
<b>Dairy product transmission</b>	Cases of alimentary TBE 2012–2014: 6 (4 in small outbreak in 2012). <sup>12</sup>

**Table 2: TBE reporting and vaccine prevention in Slovenia**

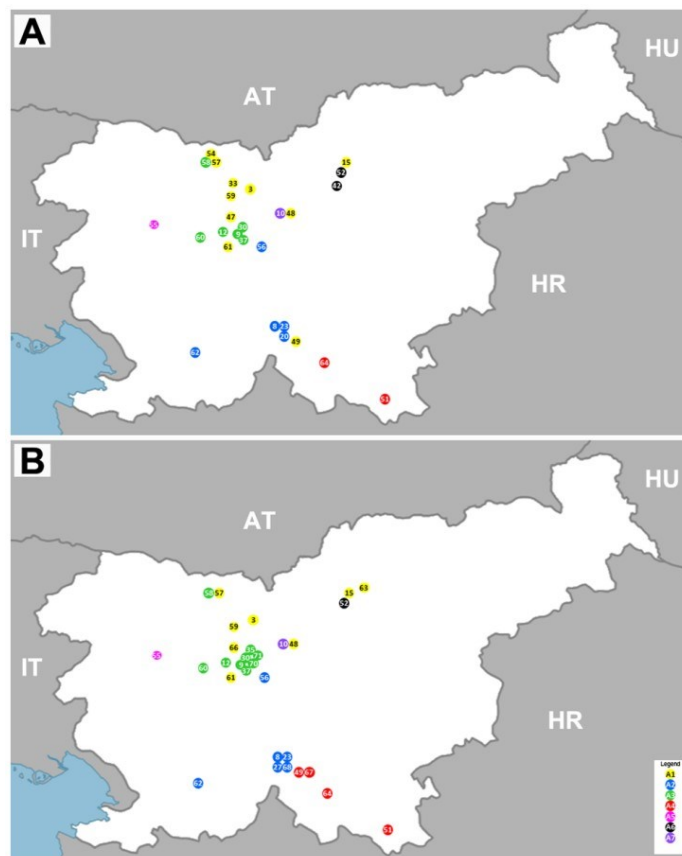
<b>Mandatory TBE reporting</b> <sup>13,14</sup>	<p>Reporting is mandatory. Only confirmed cases are reported formally to clinicians. Clinically diagnosed CNS infection of TBE must be confirmed by at least one of the following:</p> <p>Case definition: laboratory-confirmed patient</p> <ul style="list-style-type: none"> <li>• The presence of specific serum IgM and IgG antibodies</li> <li>• The presence of specific IgM antibodies in cerebrospinal fluid (CSF)</li> <li>• IgG seroconversion to TBEV</li> <li>• The presence of the TBEV genome in the clinical specimen</li> <li>• Isolation of TBEV from the clinical specimen.</li> </ul>
<b>Other TBE surveillance</b>	Information not available
<b>Special clinical features</b>	Information not available
<b>Available vaccines</b>	FSME-Immun and Encepur <sup>15</sup>
<b>Vaccination recommendations and reimbursement</b> <sup>16-20</sup>	<p>TBE vaccination was introduced in 1986. A national TBE vaccination policy and recommendation has been implemented only for high-risk groups:</p> <ul style="list-style-type: none"> <li>• Since 1986, mandatory for high-risk workers (e.g., foresters, hunters, farmers, gardeners, soldiers, laboratory workers) – reimbursed by employers</li> <li>• Since 1990, mandatory for students at high risk (e.g., forestry, wood processing) – reimbursed within compulsory national health insurance</li> <li>• Since 1991, recommended for all individuals living in or travelling to endemic areas including children from 1 year of age – paid by vaccinated individuals themselves.</li> </ul> <p>In 2019, the vaccination against TBE, funded by the Health Insurance Institute of Slovenia, is available to children born in 2016 and adults born in 1970. Vaccination is performed by selected personal physicians or pediatricians.</p> <p>Persons from these age groups who have already been vaccinated against tick-borne meningoencephalitis are eligible for the next three doses of the TBE vaccine (primary vaccination or booster).</p> <p>Previously unvaccinated adults 49 years old and children 3 years old, will be included in the vaccination program every year; thus, gradually increasing the protection of the Slovenian population against TBE.</p>
<b>Vaccine uptake by age group/ risk group/ general population</b>	<p>In 2007, the estimated proportion of the general population age 15 years and older who reported to have ever been vaccinated against TBE was 12.4%. In 2014, according to official data from National Institute of Public Health of Slovenia the number have increased to 16%. No further estimates of vaccine coverage have been performed.<sup>18</sup></p>
<b>Name, address/website of TBE National Reference Center</b>	National Institute of Public Health of Slovenia <a href="http://www.nijz.si/en">http://www.nijz.si/en</a>

**Figure 3: Burden of TBE in Slovenia over time**<sup>3,4</sup>

Source Data: Appendix—Figure 3

**Figure 4: Age and gender specific incidence rates of TBE in Slovenia in year 2018<sup>3</sup>****Figure 5: Mean annual incidence per 100,000 of tick-borne encephalitis, by age and gender, Slovenia, 2009–2013<sup>8</sup>**

**Figure 6:** Geographical distribution of TBE virus isolation from rodents only, 2005–2008  
TBEV-isolation in Slovenia<sup>10</sup>



**Figure 7:** Map of municipalities in Slovenia, showing sites where tick-borne encephalitis virus (TBEV) was detected in rodents (represented in dots) and municipalities (gray colored) where rodents were captured (2000–2008).



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**Citation:**

Simonović Z, Vuković-Janković T. TBE in Slovenia. Chapter 12b. In: Dobler G, Erber W, Bröker M, Schmitt HJ, eds. *The TBE Book*. 6th ed. Singapore: Global Health Press;2023. doi:10.33442/26613980\_12b30-6

## Appendix

Source data: Figure 3

Year	Number of cases	Incidence / 10 <sup>5</sup>
1983	111	5.56
1984	209	10.47
1985	274	13.72
1986	226	11.32
1987	107	5.36
1988	114	5.71
1989	65	3.26
1990	104	5.21
1991	118	5.91
1992	80	4.01
1993	197	9.87
1994	531	26.59
1995	157	7.86
1996	406	20.33
1997	274	13.72
1998	137	6.86
1999	150	7.51
2000	196	20.33
2001	260	13.02
2002	262	13.12
2003	282	14.12
2004	199	9.97
2005	297	14.90
2006	372	18.63
2007	199	9.90
2008	251	12.40
2009	304	14.90
2010	166	8.10
2011	247	12.00
2012	164	8.00
2013	309	15.00
2014	100	4.85
2015	62	3.00
2016	83	4.00
2017	102	4.94
2018	153	7.60
2019	111	4.21
2020	187	9.35
2021	62	2.94
2022	126	5.97

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