

# TBE in Lithuania

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**E-CDC risk status: endemic** (data as of end 2022)

## History and current situation

The first case of tick-borne encephalitis (TBE) in Lithuania, diagnosed by clinical and epidemiologic criteria only, was reported in 1953. A forest worker became ill with the disease in April after a tick bite, had a typical clinical presentation with shoulder girdle muscle paralysis and bulbar syndrome, and died after 12 days from the start of clinical symptoms. Autopsy data were compatible with viral encephalitis.<sup>1</sup> Serological diagnosis of TBE in Lithuania was started in 1970.<sup>2</sup>

In Lithuania, *Ixodes ricinus* is the main vector of tick-borne encephalitis virus (TBEV), which is spread throughout the entire country. In addition, *Dermacentor reticulatus* is also found in Lithuania.<sup>3,4,5</sup> In 1974, 142 of 13,726 field-collected ticks in two northeastern districts of Lithuania (Rokiškis and Biržai) located near the Latvian border were identified as *Ixodes persulcatus*.<sup>6</sup> The most recent entomological studies have also detected *I. persulcatus* in the Rokiškis district.<sup>7</sup> Sequence analysis of Lithuanian TBEV strains isolated from humans and field-collected ticks has shown that the virus belongs to the European TBEV subtype.<sup>4,8</sup> The minimum infection rate of *I. ricinus* ticks in Lithuania varies from 0.1% to 1.84%.<sup>4,9</sup>

TBEV is found from ticks collected in all administrative districts of Lithuania and in 3 urban parks in the country.<sup>3</sup> The density of *I. ricinus* ticks during the spring peak of activity increased three-fold from 1995 (19 ticks per 1 km) to 2008 (57 ticks per 1 km),<sup>3</sup> and this increase has been correlated to increased numbers of TBE cases in humans.

TBEV seroprevalence in non-vaccinated healthy permanent residents in Lithuania is 3%. TBEV antibodies have been more frequently found in people who regularly visit the countryside or who consume unpasteurized goat milk, and the risk for seropositivity increases with age.<sup>10</sup> Also, a general correlation has been noted between seropositivity among domestic animals, TBEV prevalence in ticks, and cases of TBE in humans in some regions of Lithuania.<sup>11</sup>

From 1998 to 2012, the highest annual incidence of TBE was recorded in the northern and central parts of the country, mainly in the municipalities of Kaunas, Panevėžys, and Šiauliai. Between 1998 and 2011, when the average incidence of TBE in Lithuania was 11.5 cases per 100,000 people, the average incidence rate in Panevėžys, Šiauliai

and Radviliškis districts was 52.1, 45.6, and 33.3, respectively (3–5 times higher than the average incidence in the country). In 2012, 4.1% of the Lithuanian population lived in these three districts (123,255 of 3,003,641 permanent inhabitants of Lithuania); however, the total number of TBE cases in these districts comprised 17% (1,230 of 7,409) of all TBE cases registered in Lithuania between 1993 and 2011.<sup>12</sup> Since 2013, a new trend in the epidemiology of TBE in Lithuania could be observed. While the incidence in the three aforementioned districts remains high, an increase in Vilnius, Alytus and Utena counties is gradually but steadily recorded up to 2018. During the last 3 years, the highest TBE incidence rate in Lithuania was observed in Utena county, in the northeastern part of Lithuania and on the border to Latvia (2016 – 42.8/100 000, 2017 – 40.3/100 000, 2018 – 27.3/100 000).<sup>13</sup>

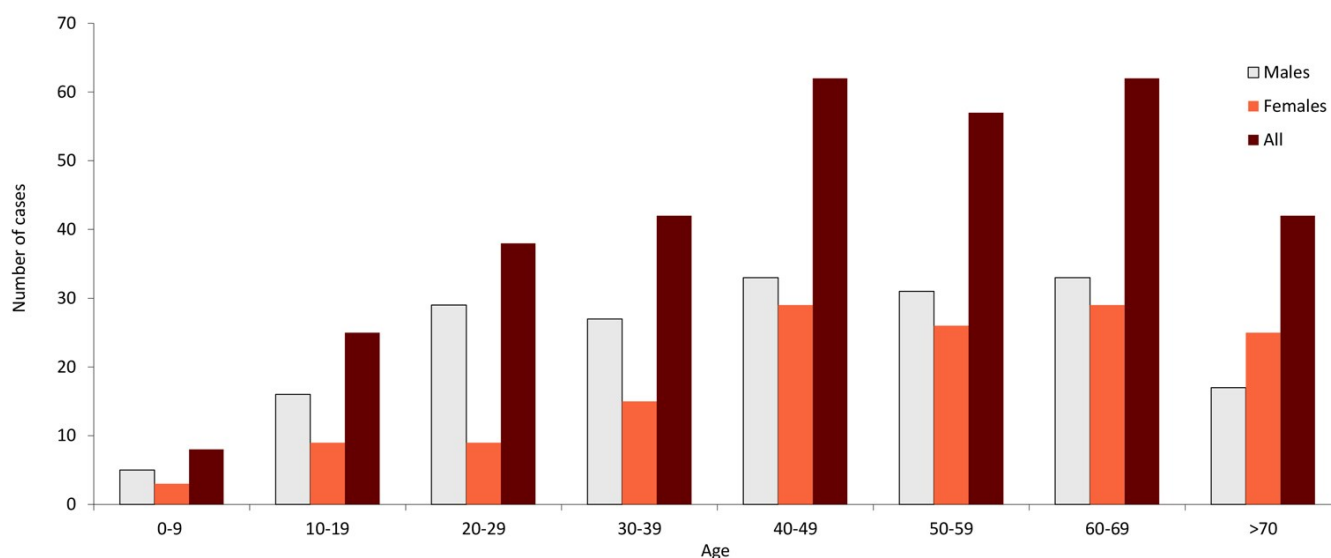
Presently, TBE is the most common viral infection of the CNS in Lithuania, with an average number of 395 cases per year; a total of 10,611 TBE cases was reported between 1990 and 2018.<sup>13</sup> Children (mainly school children and adolescents) comprise 8.7% of all TBE cases in the country. In the period from 1999 to 2018, children 0–3 years of age comprised 5.4% of all TBE cases in children (n=38), 4–6-year-old children comprised 11.2% (n=79), and 7–16 year-old children comprised 83.4% (n=589).<sup>13</sup> Retired and unemployed people are the major risk group for infection with TBEV in Lithuania; 56.4% of TBE patients are infected in the immediate areas surrounding their homes.<sup>14</sup>

## Overview of TBE in Lithuania

Table 1: Virus, vector, transmission of TBE in Lithuania	
<b>Viral subtypes, distribution</b>	European TBEV subtype <sup>4,8</sup>
<b>Reservoir animals</b>	Main reservoir animals – <i>Apodemus agrarius</i> , <i>Apodemus flavicollis</i> , <i>Myodes glareolus</i> <sup>15</sup>
<b>Infected tick species (%)</b>	<i>I. ricinus</i> (0.1%–1.84%), <i>D. reticulatus</i> (0.58%) <sup>4,9</sup>
<b>Dairy product transmission</b>	Rare <sup>13</sup>

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

<b>Mandatory TBE reporting</b>	All hospitalized patients with CNS form of TBEV infection confirmed by serological methods (TBEV IgM ± IgG) are reported to the Lithuanian Center for Communicable Diseases and AIDS <sup>13</sup>
<b>Other TBE surveillance</b>	N/A
<b>Special clinical features</b>	Biphasic disease in 72.2% Risk groups: retired people, unemployed people, and permanent inhabitants of highly endemic areas <sup>14</sup> Moderate and severe sequelae in 30.8%. Mortality 0.75% <sup>14</sup>
<b>Available vaccines</b>	Encepur, Ticovac. <sup>13</sup> Total number of doses sold 2010–2015: 308,969
<b>Vaccination recommendations and reimbursement</b>	Vaccination of adults: the joint recommendations by Lithuanian Societies for Infectious Diseases, Internal and Family Medicine (2013; no reimbursement). Reimbursed for military recruits and forestry workers*
<b>Vaccine uptake by age group/risk group/general population</b>	Total number of doses sold 2010–2015: <sup>13</sup> Children (0–17 years) – 101,651 Adults (>18 years) – 207,318
<b>Name, address/website of TBE NRC</b>	The Lithuanian Center for Communicable Diseases and AIDS <sup>13</sup>

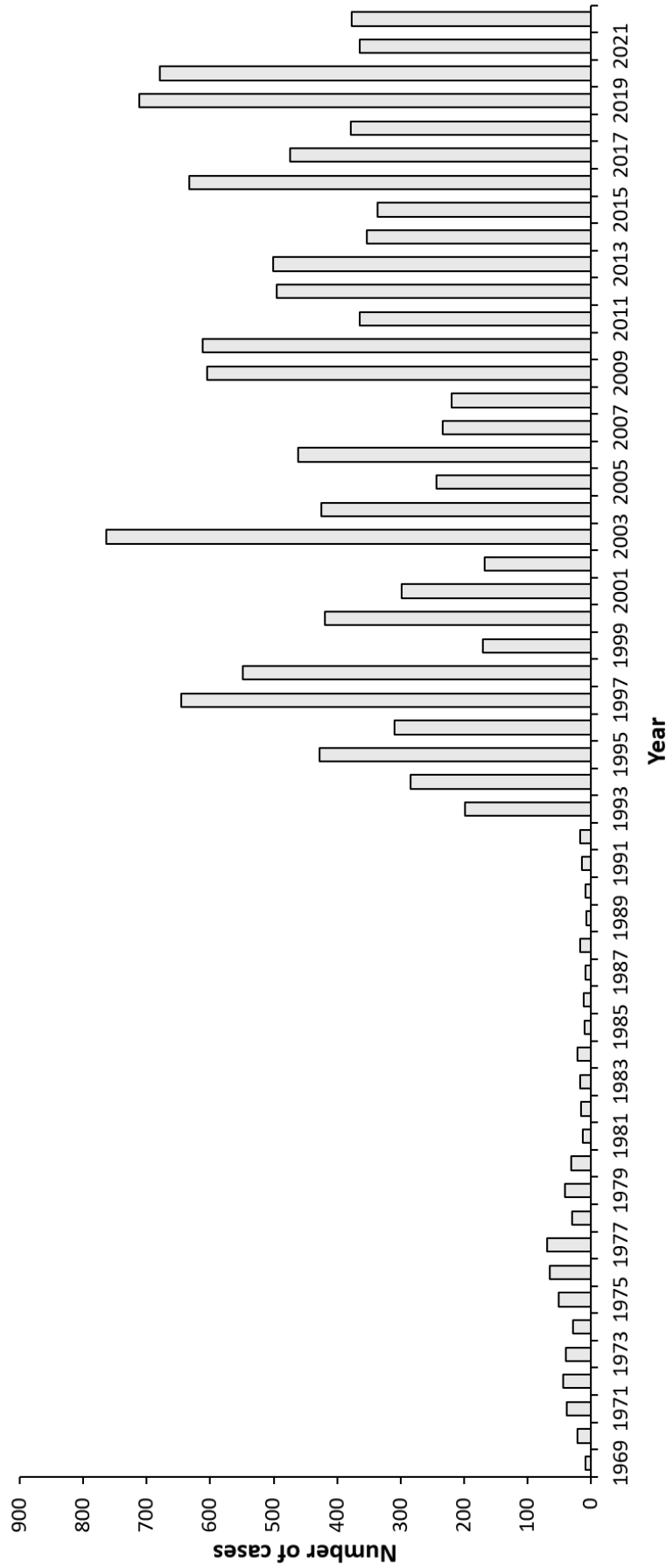
**Figure 2: Age and gender distribution of TBE in Lithuania, 2010–2015**

Source Data: Appendix—Figure 2

**TBEV-isolation and TBE cases in Lithuania:**

no information available

**Figure 1:** Burden of TBE in Lithuania



Source Data: Appendix—Figure 1

## Appendix

Source data: Figure 1

Year	Number of cases	Incidence / 10 <sup>5</sup>
1969	9	0.3
1970	21	0.7
1971	38	1.12
1972	44	1.14
1973	40	1.12
1974	28	0.8
1975	51	1.5
1976	65	1.9
1977	70	2.1
1978	30	0.9
1979	41	1.1
1980	32	0.9
1981	13	0.3
1982	16	0.4
1983	18	0.5
1984	21	0.6
1985	10	0.2
1986	12	0.3

Year	Number of cases	Incidence / 10 <sup>5</sup>
1987	9	0.2
1988	17	0.5
1989	8	0.2
1990	9	0.2
1991	14	0.4
1992	17	0.4
1993	198	5.3
1994	284	7.6
1995	427	11.5
1996	310	8.4
1997	645	17.4
1998	548	14.8
1999	171	4.6
2000	419	11.3
2001	298	8.5
2002	168	4.8
2003	763	22
2004	425	12.2

Year	Number of cases	Incidence / 10 <sup>5</sup>
2005	243	7.1
2006	462	13.5
2007	234	6.9
2008	220	6.5
2009	605	17.9
2010	612	18.3
2011	365	11.1
2012	495	16.5
2013	501	16.9
2014	353	12
2015	336	11.5
2016	633	22.1
2017	474	16.8
2018	384	13.7
2019	711	25.8
2020	679	24.3
2021	365	12.8
2022	377	13.4

Source data: Figure 2

2010			
Age group (years)	Males	Females	All
0-9	17	7	24
10-19	30	20	50
20-29	43	19	62
30-39	34	31	65
40-49	59	59	118
50-59	71	56	127
60-69	41	57	98
>70	38	30	68

2012			
Age group (years)	Males	Females	All
0-9	9	5	14
10-19	21	13	34
20-29	37	21	58
30-39	34	17	51
40-49	52	33	85
50-59	59	43	102
60-69	42	37	79
>70	30	42	72

2014			
Age group (years)	Males	Females	All
0-9	4	2	6
10-19	17	12	29
20-29	25	14	39
30-39	19	13	32
40-49	27	22	49
50-59	53	39	92
60-69	26	30	56
>70	16	34	50

2011			
Age group (years)	Males	Females	All
0-9	7	1	8
10-19	20	12	32
20-29	20	17	37
30-39	29	24	53
40-49	35	33	68
50-59	34	31	65
60-69	30	39	69
>70	14	19	33

2013			
Age group (years)	Males	Females	All
0-9	4	8	12
10-19	16	10	26
20-29	36	16	52
30-39	39	21	60
40-49	53	35	88
50-59	67	53	120
60-69	36	43	79
>70	24	40	64

2015			
Age group (years)	Males	Females	All
0-9	5	3	8
10-19	16	9	25
20-29	29	9	38
30-39	27	15	42
40-49	33	29	62
50-59	31	26	57
60-69	33	29	62
>70	17	25	42

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