Chapter 13

# TBE in Lithuania

Auksė Mickienė

**E-CDC risk status: endemic** *(last edited in May 2025, update for 2024: 807 reported cases)*

## 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.[1] Serological diagnosis of TBE in Lithuania was started in 1970.[2]

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.[3,4,5] 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*.[6] The recent entomological studies have also detected *I. persulcatus* in the Rokiškis district.[7] TBEV is found from ticks collected in all administrative districts of Lithuania and in 3 urban parks in the country.[3] According to the recent nationwide study conducted in Lithuania in 2017 –2019, which investigated 7,170 *I. ricinus* and 1,676 *D. reticulatus* ticks (questing), collected from 81 locations in all ten counties, TBEV-infected ticks were found at 16 locations in seven counties, with minimum infection rate (MIR) ranging from 0.1% to 1.0%. The MIR of TBEV in the total sample of *I. ricinus* was 0.4 % and for *D. reticulatus* it was estimated to be 0.4 %.4 Sequence analysis of Lithuanian TBEV strains isolated from humans and field-collected ticks has shown that the virus belongs to the European TBEV subtype.[8,9] TBEV seroprevalence in non-vaccinated healthy permanent residents in Lithuania is 3%.[10]

Since 1990, the highest TBE incidence in Lithuania was recorded in 2003 (21.95 per 100 000; 763 cases), 2016 (22.1 per 100 000; 633 cases), and 2019 (25.5 per 100 000; 711 cases).[11] 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).[12] 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. During the last 5 years, the highest TBE incidence rate in Lithuania was observed in Utena county (the northeastern part of Lithuania on the border to Latvia): 2019 – 59.5/100 000, 2020 – 66/100 000, 2021 – 31.6/100 000, 2022 – 33.5/100 000, 2023 – 40.5/100 000.[11]

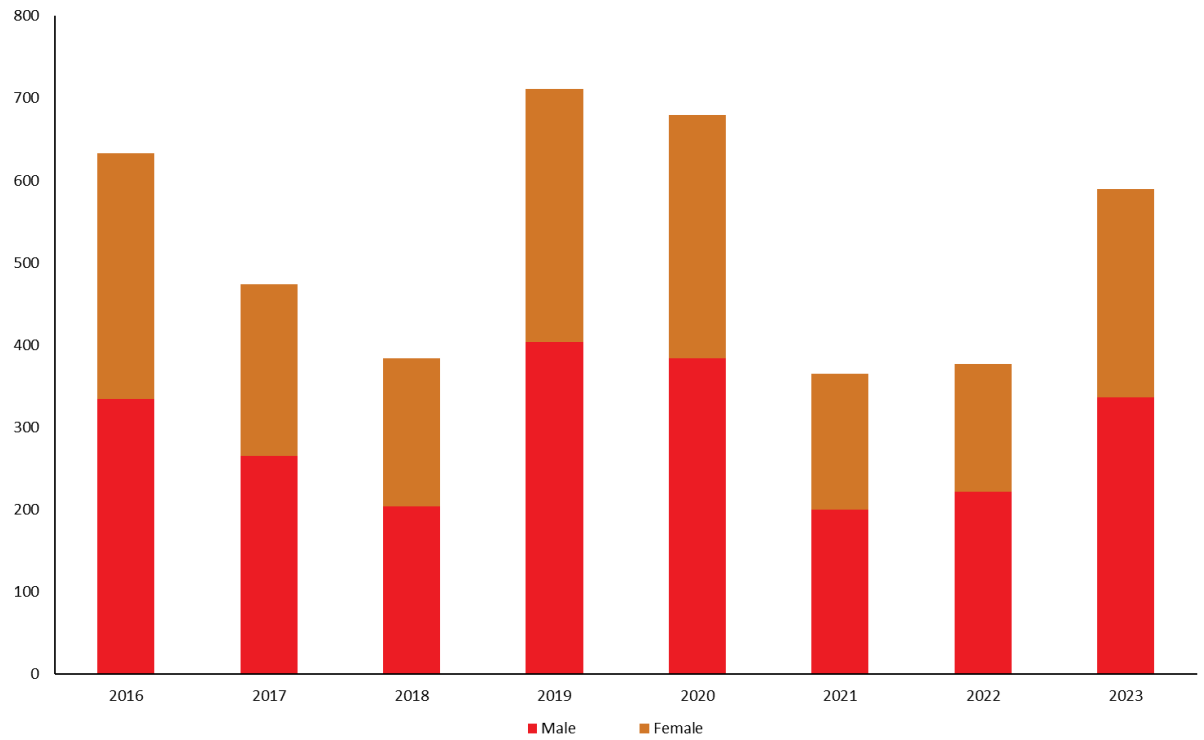
Presently, TBE is the most common viral infection of the CNS in Lithuania[12], with a total of 13,332 TBE cases reported between 1990 and 2023, and 22 lethal TBE cases registered during the last ten years (2013-2023).[11] Children (mainly school children and adolescents) comprise 8.7% of all TBE cases in the country[12]. During the last 5 years (2019-2023), preschool children comprised 0.8% - 2% out of all TBE cases in the Lithuania.[11] Retired and unemployed people are the major risk group for infection with TBEV in Lithuania; 42.4%-56.4% of TBE patients are infected in the immediate areas surrounding their homes.[13,14] 7.8% of TBE cases in Lithuania are milk-borne.[14]

## Overview of TBE in Lithuania

| Table 1: Virus, vector, transmission of TBE in Lithuania | |
|---|---|
| **Viral subtypes, distribution** | European TBEV subtype[8,9] |
| **Reservoir animals** | Main reservoir animals – *Apodemus agrarius, Apodemus flavicollis, Myodes glareolus*[15] |
| **Infected tick species (%)** | *I. ricinus* (0.1%–1.84%), *D. reticulatus* (0.58%)[4] |
| **Dairy product transmission** | 7.8%[14] |

| Table 2: TBE reporting and vaccine prevention in Lithuania | |
|---|---|
| **Mandatory TBE reporting** | All patients with CNS form of TBEV infection confirmed by serological methods (TBEV IgM ± IgG) are reported to the National Public Health Centre under the Ministry of Health[11] |
| **Other TBE surveillance** | N/A |
| **Special clinical features** | Biphasic disease in 58%- 72.2%[13,14]<br>Risk groups: retired people, unemployed people, and permanent inhabitants of highly endemic areas[11,13,14,]<br>Moderate and severe sequelae in 30.8%. Mortality 0.75%[13] |
| **Available vaccines** | Encepur, Ticovac.[11] |
| **Vaccination recommendations and reimbursement** | Vaccination of adults: the recommendations by Lithuanian Society for Infectious Diseases (2022; no reimbursement). Reimbursed for military recruits and forestry workers.[11] Since 2024 – reimbursement for all adults above 50 years of age (starting with cohort of 50-55 years of age in September 2024).[17] |
| **Vaccine uptake by age group/risk group/general population** | Vaccine uptake (at least one dose of TBE vaccine) in 2020: 37%[18]<br>Total number of consumed TBE vaccine doses:<br>2021: 334,664[19]<br>2022: 327,867[20]<br>2023: 381,698 (Razmuviene, D. National Public Health Centre under the Ministry of Health. Personal communication) |
| **Name, address/website of TBE NRC** | National Public Health Centre under the Ministry of Health[11] |

**Figure 2: Gender distribution of TBE cases in Lithuania, 2016-2023**




*Source Data: Appendix—Figure 2*

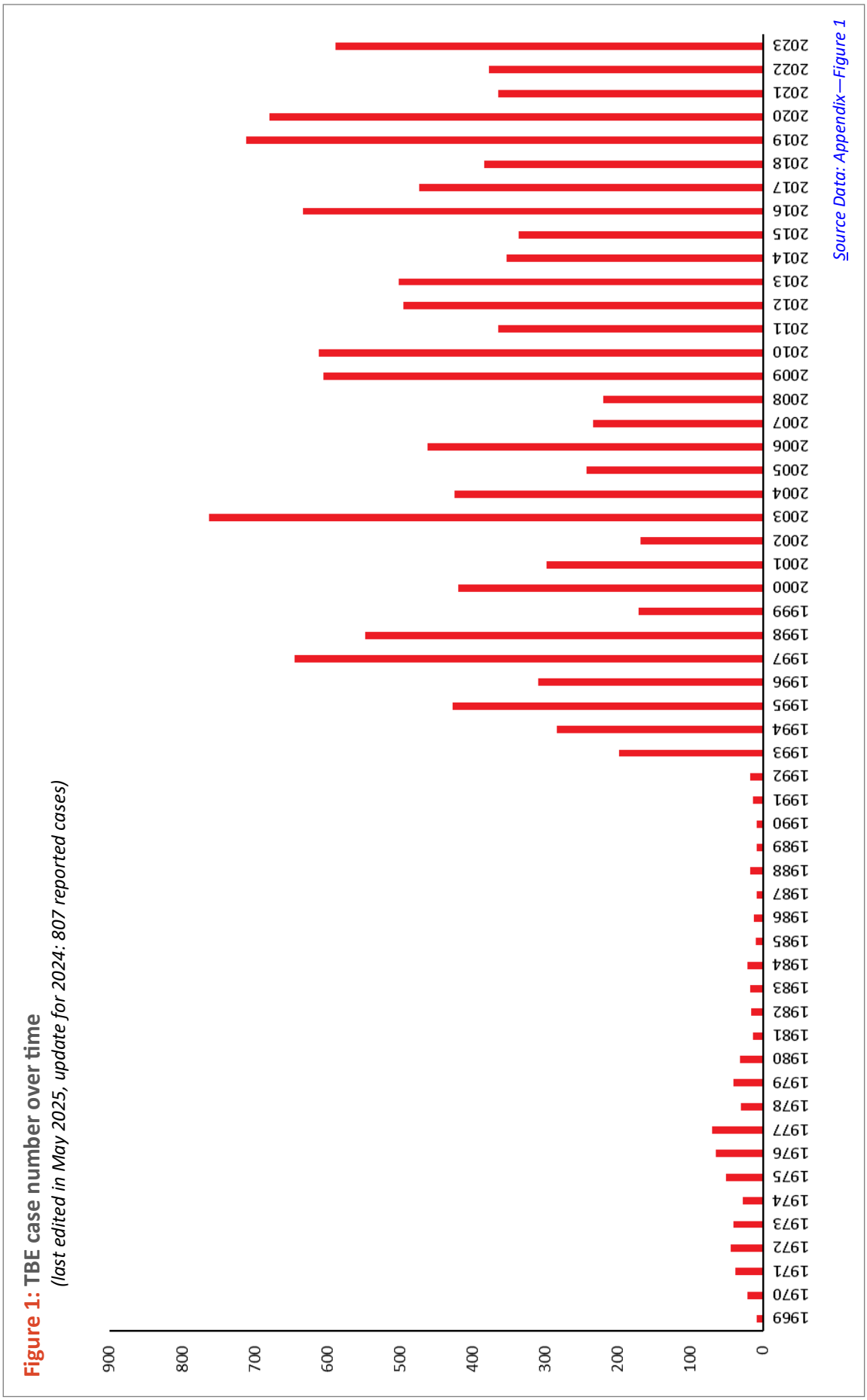
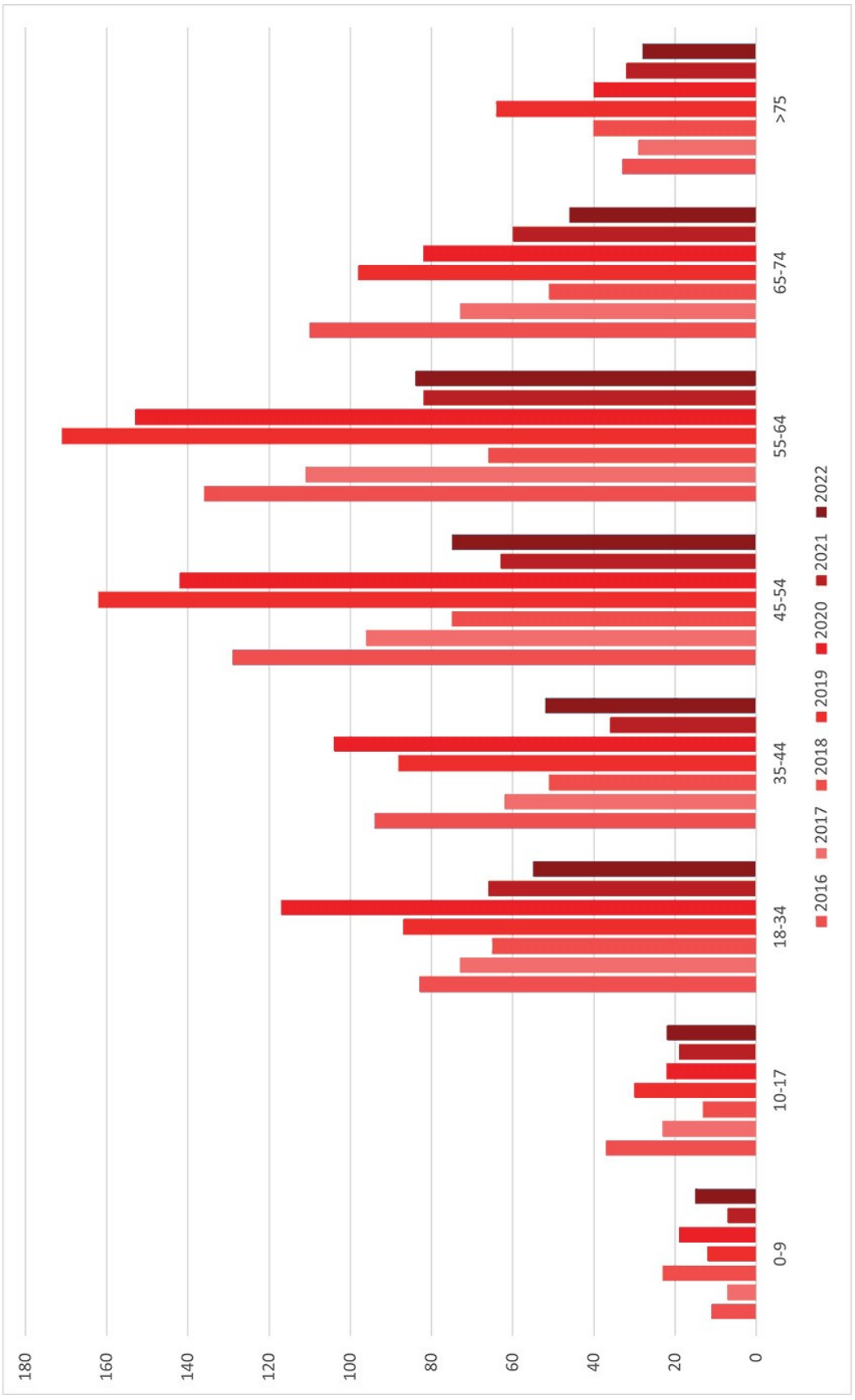



**Figure 1: TBE case number over time**
*(last edited in May 2025, update for 2024: 807 reported cases)*

*Source Data: Appendix—Figure 1*

**Figure 3:** Age and gender distribution of TBE cases in Lithuania, 2016-2022



# Appendix

*Source data: Figure 1*

| Year | Number of cases | Incidence / $10^5$ |
|---|---|---|
| 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 |
| 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 |
| 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 |
| 2023 | 589 | 20.8 |

*Source data: Figure 2*

| Year | Male | Female |
|---|---|---|
| 2016 | 334 | 299 |
| 2017 | 265 | 209 |
| 2018 | 204 | 180 |
| 2019 | 404 | 307 |
| 2020 | 384 | 295 |
| 2021 | 200 | 165 |
| 2022 | 222 | 155 |
| 2023 | 336 | 253 |

**Contact:** amickiene@gmail.com

**Citation:**
Mickiene A. TBE in Lithuania. Chapter 13. In: Dobler G, Erber W, Bröker M, Chitimia-Dobler L, Schmitt HJ, eds. *The TBE Book*. 7th ed. Singapore: Global Health Press; 2024. doi:10.33442/26613980_13-20-7

# References

1. Motiejunas L, Regaliene G. [The outbreak of cow milk origin tick-borne encephalitis]. *Sveikatos apsauga*. 1982;10:28-31.
2. Motiejunas L, Sapranauskaite D, Regaliene G. [Concerning the causes of a different morbidity of tick-borne encephalitis and the quality of patient's laboratory testing in the cities and districts of Lithuanian SSR]. *Sveikatos apsauga*. 1978;10:20-3.
3. Zygutiene M. [Tick-borne pathogens and spread of Ixodes ricinus in Lithuania]. *EpiNorth*. 2009;10:63-71
4. Sidorenko M, Radzijevskaja J, Mickevičius S, Bratčikovienė N, Paulauskas A. Prevalence of tick-borne encephalitis virus in questing Dermacentor reticulatus and Ixodes ricinus ticks in Lithuania. Ticks *Tick Borne Dis*. 2021;12(1):101594. doi:10.1016/j.ttbdis.2020.101594
5. Katargina O, Russakova S, Geller J, et al. Detection and characterization of tick-borne encephalitis virus in

Baltic countries and eastern Poland. *PLoS One*.2013;8 (5):e61374. doi:10.1371/journal.pone.0061374.

6. Motiejunas L , Podenaite B. [Tick species and abundance of ticks in forest landscape in Lithuanian SSR]. *Medical Parasitology and Parasitic Diseases*.1972;41(2):235-7.
7. Paulauskas A, Radzijevskaja J, Mardosaitė-Busaitienė D, Aleksandravičienė A, Galdikas M, Krikštolaitis R. New localities of Dermacentor reticulatus ticks in the Baltic countries. *Ticks Tick Borne Dis*. 2015;6(5):630-635.
8. Sidorenko M, Radzijevskaja J, Mickevičius S, et al. Phylogenetic characterisation of tick-borne encephalitis virus from Lithuania. *PLoS One*. 2024;19 (2):e0296472. Published 2024 Feb 7. doi:10.1371/ journal.pone.0296472
9. Mickiene A, Vene S, Golovljova I, et al. [Tick-borne encephalitis virus in Lithuania]. *Eur J Clin Microbiol Infect Dis*. 2001;20:886-8.
10. Juceviciene A, Vapalahti O, Laiskonis A, Ceplikiene J, Leinikki P. [Prevalence of tick-borne-encephalitis virus antibodies in Lithuania]. *J Clin Virol*. 2002;25(1):23-7.
11. National Public Health Centre under the Ministry of Health. Accessed March 27, 2024. https://nvsc.lrv.lt/ uploads/nvsc/documents/files/EPL%20apzvalga%20 (002).pdf
12. Mickiene A. Tick-Borne Encephalitis – Clinical and Pathogenetic Aspects. University dissertation from Stockholm: Karolinska Institutet, Department of Medicine at Huddinge University Hospital. 2015.

    Accessed March 27,2024. https:// openarchive.ki.se/ xmlui/bitstream/handle/10616/44938/ Thesis_Aukse_Mickiene.pdf?sequence=1&isAllowed=y
13. Mickienė A, Laiškonis A, Günther G, Vene S, Lundkvist Ă, Lindquist L. Tickborne Encephalitis in an Area of High Endemicity in Lithuania: Disease Severity and Long-Term Prognosis. *Clin Infect Dis*. 2002;35(6):650-8.
14. Radzišauskienė D, Žagminas K, Ašoklienė L, et al. Epidemiological patterns of tick-borne encephalitis in Lithuania and clinical features in adults in the light of the high incidence in recent years: a retrospective study. *Eur J Neurol*. 2018;25(2):268-274. doi:10.1111/ ene.13486
15. Paulauskas A, Radzijevskaja J, Turcinaviciene J, Ambrasiene D, Galdikaite E. Data on some ixodid tick species (Acari, Ixodidae) in the Baltic countries. *New and Rare For Lithuania Insect Species*. 2010:22.
16. Lietuvos Infektologu Draugija. [Immunoprophylaxis of adults: recommendations of the Lithuanian Society for Infectious Diseases, 2022].
    Accessed March 27, 2024. https://lid.lt/ storage/2023/01/A5-Suaugusiuju-skiepijimo-Lietuvoje-rekomendacijos_2022.pdf
17. Minister of Health of the Republic of Lithuania. National immunization programme for 2024-2028. Accessed March 27, 2024. https://e-seimas.lrs.lt/ portal/legalAct/lt/TAD/ f827fd31c9e811ee9269b566387cfecb?jfwid=-yvz4v411b
18. Pilz A, Erber W, Schmitt HJ. Vaccine uptake in 20 countries in Europe 2020: Focus on tick-borne encephalitis (TBE). *Ticks Tick Borne Dis*. 2023;14 (1):102059. doi:10.1016/j.ttbdis.2022.102059.
19. National Public Health Centre under the Ministry of Health. Annual report for 2021. Accessed March 27, 2024. https://nvsc.lrv.lt/uploads/nvsc/documents/ files/2022%2B%2BEPL%2Bapzvalga%2Btinklalapis.pdf
20. National Public Health Centre under the Ministry of Health. Annual report for 2022. Accessed March 27, 2024. https://nvsc.lrv.lt/uploads/nvsc/documents/ files/EPL%20apzvalga%20(002).pdf