



SIBERIAN SUBTYPE INFECTIONS OF TBE VIRUS IN LATVIA

Background:

Different subtypes of the tick-borne encephalitis virus (TBEV) are associated with distinct geographic distributions, clinical courses, and disease severities. Compared with the European subtype (TBEV-EU), the Siberian (TBEV-Sib) and Far Eastern (TBEV-FE) subtypes have been linked to higher rates of neurological complications and greater fatality. The Siberian subtype has also been reported to cause chronic or prolonged infections lasting for months or even years. The Far Eastern subtype is typically associated with a monophasic course and represents the most severe form of disease, with mortality rates historically reported up to ~35%, though recent data in some settings are lower.

The main vector for TBEV-EU is *Ixodes ricinus*, which is prevalent in Central and Northern Europe as well as in parts of Russia. By contrast, TBEV-Sib and TBEV-FE are mainly transmitted by *Ixodes persulcatus*, which is widespread in eastern Russia and Asia. *I. persulcatus* is now established in the Baltic countries and has expanded into Northern Europe (e.g., Sweden's Bothnian Bay), while *I. ricinus* dominates farther west (see, for example, [Snapshot Week 30/2025](#) and [Snapshot Week 7/2025](#)).

Standard serology (IgM/IgG ELISA) does not provide subtype-specific information; a newly established research-use NS1-IgG ELISA allows subtype differentiation and was used in this study (see [Snapshot Week 37/2024](#)).

To explore subtype-specific infections in Latvia, a cross-sectional descriptive study was conducted.

Results:

In 2020–2021, a total of 511 medically attended TBE cases were registered in Latvia. Of these, 123 patients with acute TBE consented to participate in the study. The median age of participants was 50 years. Meningitis was the most common clinical form among cases with

CNS involvement (90.5%), and the median duration of hospitalization was 11 days.

All 123 patients tested positive in a commercial TBEV IgG ELISA. Subtype differentiation using the NS1 ELISA was successful in 103 of 123 cases (83.7%), defined as cases where the optical density (OD) value for one subtype exceeded those of the other two. Among these, TBEV-EU was detected in 98 cases (95.1%), TBEV-Sib in 5 cases (4.9%), and TBEV-FE in none.

TBEV-EU infections were identified across the country, while TBEV-Sib cases were found in four of the five Latvian regions. Vaccination status revealed that 98% of TBEV-EU patients were unvaccinated. Two vaccine failures were documented among TBEV-EU patients and one in a TBEV-Sib patient.

The symptoms of TBEV-EU and TBEV-Sib infections were broadly similar, including general fatigue (99% vs. 100%), fever (95.9% vs. 100%), headache (91.8% vs. 100%), dizziness (74.5% vs. 60%), and myalgia (48% vs. 20%). Signs of central nervous system inflammation were present in 93.9% of TBEV-EU cases and 100% of TBEV-Sib cases. In both groups, meningitis was the predominant clinical manifestation. A biphasic disease course was observed in 64.9% of TBEV-EU patients and 40% of TBEV-Sib patients.

Discussion:

This study demonstrates that both European and Siberian subtypes of TBEV are circulating in Latvia. Although no TBEV-FE cases were detected, their presence cannot be excluded, given the relatively small sample size and the fact that *I. persulcatus* is present in Latvia and TBEV-FE has been isolated from local ticks and even reported historically in a Latvian patient.



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No significant differences were observed between TBEV-EU and TBEV-Sib patients regarding epidemiology, clinical presentation, or early neurological sequelae. All TBEV-Sib cases were classified as moderate in severity, and no clinical differences in disease severity between European and Siberian subtype infections were evident.

Further research is needed to clarify the clinical relevance of subtype differentiation. Future studies should determine whether TBEV-Sib infections are genuinely more severe, or whether previous reports simply reflect bias due to closer monitoring and testing of patients with more severe disease.

Literature:

Freimane et al.

Tick-borne encephalitis in Latvia: an epidemiological and clinical comparison of European and Siberian subtype infections. *Infection*. 2025. doi:10.1007/s15010-025-02616-7

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