



TBE INCIDENCE: VACCINATED VS UNVACCINATED POPULATIONS

Background:

Across the European Union, a total of 24,974 tick-borne encephalitis (TBE) cases were reported to the European Centre for Disease Prevention and Control (ECDC) between 2012 and 2020. The highest annual incidence per 100,000 population was observed in the Baltic countries—Lithuania, Latvia and Estonia. The ECDC dataset closely reflects national surveillance systems of EU/EEA Member States; however, data from non-EU countries (e.g., Switzerland) are not captured.

In countries with high TBE vaccine uptake, surveillance-reported incidence reflects the entire population, including vaccinated individuals in the denominator. This mathematically underestimates the true risk among nonvaccinated individuals. Austria is a well-known example: despite widespread vaccine use, the estimated incidence among unvaccinated individuals remains high (see Newsletter January 2025).

To better quantify this discrepancy, publicly available national surveillance data from 2020–2023 were analysed to estimate TBE incidence among nonvaccinated populations in Europe, and to interpret these findings considering national TBE vaccination recommendations.

Results:

Surveillance data for TBE infections or cases from 2020–2023 were identified for 34 of 44 European countries.

Five countries reported a general population incidence $\geq 5/100,000$ person-years (PPY):

- Lithuania (17.9)
- Latvia (10.6)
- Estonia (9.3)
- Czech Republic (6.2)
- Slovenia (5.2)
- Several sub-national regions in the Baltic countries exceeded 50/100,000 PPY.
- For 21 countries, TBE vaccine uptake data from IPSOS surveys enabled calculation of

estimated incidence in the nonvaccinated population.

Countries with highest vaccine uptake showed the largest divergence between incidence in the general population and the incidence among nonvaccinated individuals. In Austria, for example, the incidence among nonvaccinated persons was 268% higher than the general population incidence.

- Seven countries had an estimated nonvaccinated population incidence $\geq 5/100,000$ PPY (2020–2023):
- Lithuania (27.8)
- Latvia (22.2)
- Estonia (15.0)
- Czech Republic (8.9)
- Slovenia (7.7)
- Sweden (7.2)
- Austria (6.4)

Notably, Sweden and Austria had general population incidences below 5/100,000 PPY, demonstrating how population-level data obscure risk among the unvaccinated.

Vaccination recommendations were identified for 30 countries:

- 7 had national recommendations for the general population.
- 9 had sub-national recommendations for all individuals in specific high-risk areas.
- 3 recommended vaccinations only for those performing high-risk activities within risk areas.
- 13 recommended vaccinations for at-risk occupational groups.
- 26 had national recommendations for travelers.



SIBERIAN SUBTYPE INFECTIONS OF TBE VIRUS IN LATVIA

Of the seven countries with an estimated nonvaccinated incidence $\geq 5/100,000$ PPY, Sweden was the only one lacking a national recommendation; however, 17 of 21 Swedish regions have regional recommendations for defined risk groups.

Discussion :

The incidence of surveillance-reported TBE is substantially higher among nonvaccinated populations than in the general population. In 2023, an estimated 37 million people lived in European subnational regions where TBE incidence in the nonvaccinated population was highly endemic ($\geq 5/100,000$ PPY) 15 million more than estimated using general population incidence alone.

According to the World Health Organization, TBE vaccination should be offered to all residents of regions with a pre-vaccination TBE incidence $\geq 5/100,000$ PPY. Using a lower threshold of $1/100,000$ PPY—as applied in Germany—the number of people living in endemic subnational regions increases to 95 million.

Understanding the incidence in the nonvaccinated population is therefore essential for both individual risk assessment and public health decision-making. Reliance on general population incidence, which is depressed by vaccinated individuals in the denominator, may mislead clinicians, travelers, and residents regarding actual risk exposure.

Strengthening vaccination uptake in endemic regions—and ensuring that risk assessments are based on nonvaccinated incidence estimates—is crucial for preventing TBE. Public health messaging should explicitly distinguish between general population incidence and incidence among the unvaccinated, as these can differ by several hundred percent in countries with high vaccine coverage.

Literature:

Halsby D, et al. Incidence of tick-borne encephalitis in unvaccinated populations across Europe, 2020–2023. *Int J Infect Dis.* 2025;160:108052. doi:10.1016/j.ijid.2025.108052

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Compiled: November 2025
