TBE NEWS

TBE VIRUS INFECTION BURDEN, SWITZERLAND

Background:

In Switzerland, the reported incidence of TBE has increased substantially despite national vaccination recommendations. Although TBE is a mandatory notifiable disease in Switzerland, reported case numbers and incidence do not fully reflect the overall burden of TBE virus infections because asymptomatic, mild, and subclinical infections are not included. This results in an underestimation of the risk of acquiring TBEV infection among unvaccinated individuals. In Switzerland, approximately 34% of adults are fully vaccinated, resulting in 95% vaccine effectiveness (VE), and approximately 10% are partially vaccinated, yielding approximately 77% VE.

Seroprevalence data based on standard IgG ELISA assays cannot distinguish between infection-induced and vaccination-induced antibodies directed against envelope glycoprotein E. In contrast, assays detecting antibodies to nonstructural protein 1 (NS1) identify only individuals who have been infected with the virus because NS1 is not present in inactivated whole-virus TBE vaccines. NS1 antibodies are produced only following viral infection.

A study was conducted in which reported TBE case data, vaccination coverage, VE estimates, seroprevalence data, and estimated seroreversion rates were combined for the period from 2017 to 2021 to estimate TBE incidence in the unvaccinated population.

Results:

Between 2017 and 2021, an average of 268 TBE cases per year among individuals aged 18–79 years were reported across Switzerland, resulting in a mean annual incidence of 4.06 per 100,000 population. After adjustment for vaccination coverage and VE, the estimated incidence among unvaccinated individuals (IUV) was markedly higher, at 6.56 per 100,000, ranging from 0.21 in the canton of Geneva to 54.04 in the canton of Uri. In 17 of 26 cantons, IUV values exceeded 5.0 per 100,000, indicating that overall incidence underestimates TBE risk among unvaccinated adults in the absence of adjustment for vaccination.

The IgG seroprevalence rate among unvaccinated adults was 9.9%, ranging from 3.7% in the canton of Bern to 17.7% in the canton of Thurgau.

Longitudinal samples from nine individuals following subclinical infection, with a dominant virus-neutralization (NT) pattern over 18 person-years of follow-up, yielded an annual seroreversion rate (SRR) of 11.1% and a corresponding mean antibody persistence duration of approximately 8.5 years. After pooling these data with previously published data, the primary annual SRR was 23.5%, equivalent to a mean antibody persistence duration of approximately 3.7 years.

The infection hazard represents the estimated annual rate of TBE virus infections, including both subclinical infections and infections leading to clinically reported disease, whereas the clinical fraction represents the proportion of infections captured by surveillance as reported TBE cases. To estimate the infection hazard and clinical fraction, the authors combined IUV with seroprevalence and pooled SRR. The pooled infection hazard was 1.6% per year, corresponding to an annual infection risk of approximately 1 in 60 unvaccinated adults, ranging from 0.91% in the canton of Bern to 3.36% in the canton of Fribourg. The pooled clinical fraction was 0.50%, indicating that approximately 1 in 200 infections is captured as a reported case.

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Discussion:

In this nationwide analysis, the authors found that reported TBE incidence underestimates both disease risk among unvaccinated adults and the total burden of TBE virus infection in Switzerland. Population-level incidence can mask risk among susceptible individuals in settings with substantial vaccination coverage. Vaccination reduces observed incidence at the population level but does not reduce the risk among unvaccinated individuals.

Through surveillance, only 0.5% of infections were captured, corresponding to approximately 200 TBE virus infections per reported case. These findings therefore indicate that the burden of TBE virus infection in Switzerland is substantially higher than suggested by reported incidence alone. The findings and conclusions of this article are consistent with studies from other European countries; see, for example, data from Austria in the March 2026 newsletter.

Subclinical infections may contribute to immune priming or boosting, but their duration and protective significance remain unclear.

Taken together, these findings imply that reported incidence should henceforth be interpreted in the context of vaccination coverage, vaccine effectiveness, and antibody seroreversion, as these factors together provide a more comprehensive basis for interpreting TBE risk and infection burden.

Literature:

Zens et al.
Estimating tick-borne encephalitis risk among unvaccinated adults and total infection burden in Switzerland, 2017–2026 Lancet, preprint, posted July 24, 2026, available at SSRN

Author: Dr. Michael Bröker

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