



## TBE SEROPREVALENCE STUDY IN WESTERN AUSTRIA

### Background:

In recent years, reported case numbers of TBE increased in Central European countries like Germany, Switzerland, Czech Republic and Austria. In Austria, there appears to be a shift of reported TBE cases towards the West to Tyrol (about 776,000 inhabitants) and to Vorarlberg (about 410,000 inhabitants). Between 2014 and 2024, a total of 304 TBE cases were reported in Tyrol and 60 TBE cases in Vorarlberg. As reported cases may not adequately reflect the true case numbers and do not include non-CNS, mild or even asymptomatic cases, TBE-seroprevalence data can fill the gap.

A cross-sectional seroprevalence study was carried in Western Austria between December 2023 and February 2024 including serum samples from healthy blood donors aged between 18 and 70 years in 62 distinct locations in Tyrol and Vorarlberg.

### Results:

A total of 4619 blood samples from individual donors were collected, 2473 from Vorarlberg and 2146 from Tyrol. Of the 4619 donors, 80.1% were found to be seropositive for TBE virus IgG antibodies (80.5% in Tyrol and 79.8% in Vorarlberg). Between the districts, seroprevalence varied between 74.4% and 87.6%. The majority of seropositive donors had vaccination-induced (glycoprotein E) antibodies (77.4%), while 125 blood donors (2.7%) of the study cohort were seropositive for TBE virus nonstructural protein 1 (NS1) antibodies, signifying a preceding TBE virus infection. Vaccination does not induce NS1 antibodies and thus, the rate of TBE virus infection could be determined in the non-vaccinated population. Overall, 12.0% of non-vaccinated donors in Western Austria were found to have had a TBE virus. The percentage of subjects with NS1 antibodies varied between different local districts between 7.4% to 31.3%.

Between 2014 and 2023, the yearly notified incidence of TBE in Western Austria was 2.69 per 100,000 inhabitants, while the average estimated yearly incidence per 100,000 inhabitants based on NS1 IgG measurement amounted to 136.2, and excluding blood donors who had received TBE vaccine, the value reached 610.1.

A TBE-manifestation index (MI) was calculated by dividing the yearly average incidence of notified TBE cases by the average yearly NS1 IgG based incidence per 100,000 inhabitants and multiplied by 100. The Western Austria MI for the whole cohort was 1.9%.

1423 of 4619 donor sera tested positive for West Nile virus, of whom 1421 had cross-reacting antibodies following TBE vaccination (n=1420) or TBE virus infection (n=1). One donor had antibodies due to a WNV infection, one to a Dengue-2 infection, but none to other flaviviruses (Usutu, Zika, Japan Encephalitis).

### Discussion:

The difference between the notified incidence rate per year per 100,000 inhabitants in Western Austria compared to the NS1 IgG based incidence rate disclosed a substantial number of unreported TBE virus infections. While the overall vaccination rate was high and reduced the overall number of TBE cases, the estimated infection rate in non-vaccinated donors was substantially higher. These results emphasize the need for public information and targeted vaccination regimes.

The authors concluded that the high rate of non-diagnosed TBE virus infections based on NS1 antibody detection compared to the number of reported TBE cases suggest that classification of (high) risk TBE areas should be based on NS1 seroprevalence rates rather than notified TBE cases.



## TBE SEROPREVALENCE STUDY IN WESTERN AUSTRIA

In contrast to TBE virus, the risk to acquire another flavivirus infection, e.g. Usutu and WNV is low in Western Austria.

### Literature:

Siller et al.  
Tick-borne encephalitis virus surveillance –  
vaccination- and infection-induced seroprevalence  
in Western Austria 2024 J. Med. Virol. 2024;  
96:e70109, doi.org/10.1002/jmv.70109

**Author:** Dr. Michael Bröker

**Compiled:** January 2025

---