

TBE in Switzerland and Liechtenstein

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E-CDC risk status: endemic (data as of end 2022)

History and current situation

The first serological reports of tick-borne encephalitis (TBE) in Switzerland date back to the early 1970s [T. Krech. Dissertation, University of Berne, 1980]. Surveillance started in 1984, and TBE became a notifiable disease in 1988. Most cases are reported between April and October following tick bite exposures below an altitude of 1500–2000 meters.^{1,2}

Tick-borne encephalitis virus (TBEV) has been identified in ticks from almost all regions of Switzerland and in Liechtenstein. Accordingly, human cases are found in almost all regions. Most cases occur in the north-eastern, central, and midwestern regions of the country, but in recent years, new endemic regions have been detected in western, and southern Switzerland. TBE has thus become endemic in almost the entire country.

In 2013, a procedure allowing the identification of regions which qualify for a local TBE vaccination recommendation was adopted for Switzerland and Liechtenstein.³ Data from cases notified over the previous 10 years (“high risk areas”, Fig. 3a) were combined with data from the historical map of Swiss endemic regions and “natural clusters”. The resulting Swiss map was used until 2018 for the definition of regions where TBE vaccination is recommended for exposed people (Fig. 3b).

However, in view of the increasing numbers of reported TBE cases in recent years, Swiss and Liechtenstein health authorities decided in 2019 to consider their entire countries – except for the cantons of Geneva and Ticino – as an at-risk area in which TBE vaccination is recommended for all individuals with possible exposure (both as residents or as visitors),² see Fig. 3c.

Currently, vaccination is recommended and reimbursed by health insurance for individuals older than 6 years of age living in or visiting endemic regions. In children aged 1–5 years, the indication shall be based on individual considerations. Unlike in other countries and in contrast to the label, a booster dose is recommended only every 10 years.³

As elsewhere in Europe, the proportion of “mild cases” is lower and the number of more serious cases increases with age. However, more serious disease patterns like meningoencephalitis have also been reported in children below the age of 6 years over the later years (E. Altpeter, FOPH, personal communication). Less than half (45%) of symptomatic patients reported a tick bite within 4 weeks of disease onset.⁵ Less than 2% of cases experienced relevant tick bites outside of Switzerland.

Approximately 80% of all symptomatic patients are hospitalized.¹ The mean duration for hospitalization was 9 days (interquartile range 5–11 days), and duration increased linearly with age (5 days in children less than 14 years old to 14.6 days for patients older than 70 years).⁵

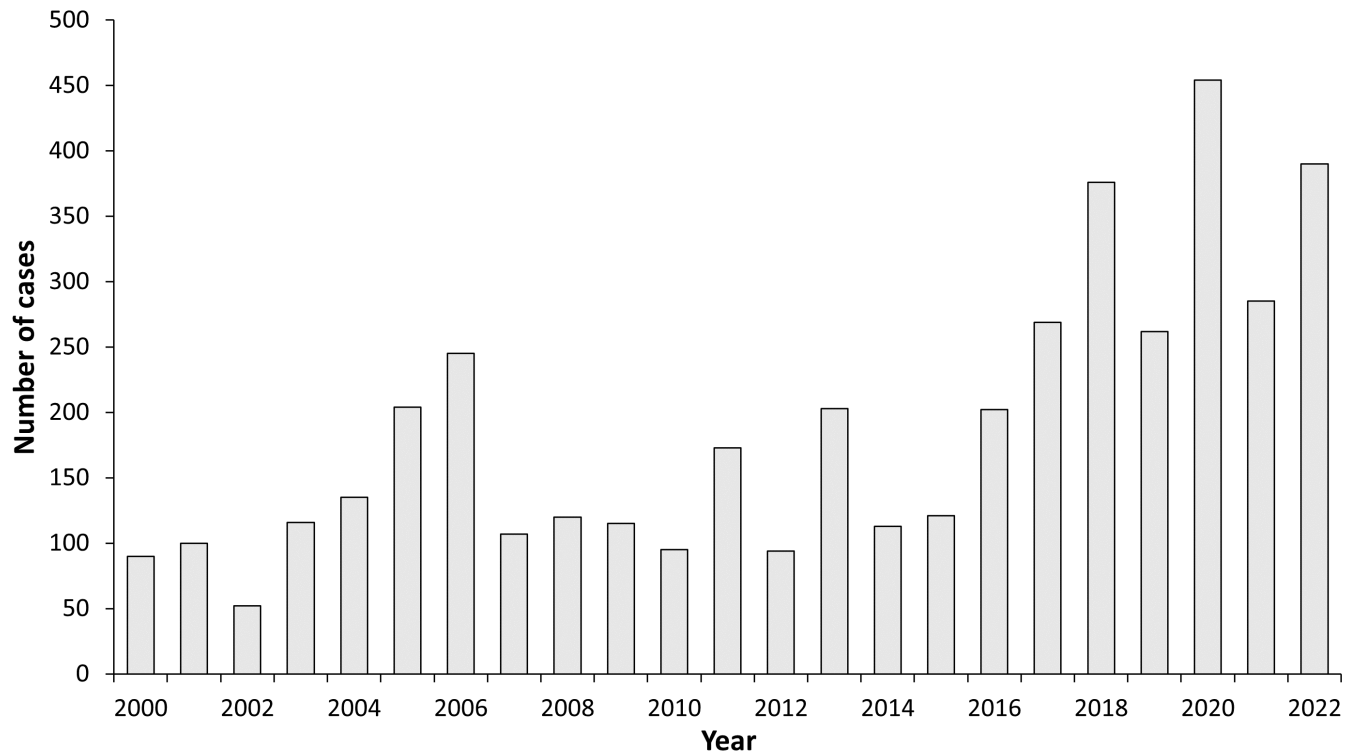
Overview of TBE in Switzerland

Table 1: Virus, vector, transmission of TBE in Switzerland

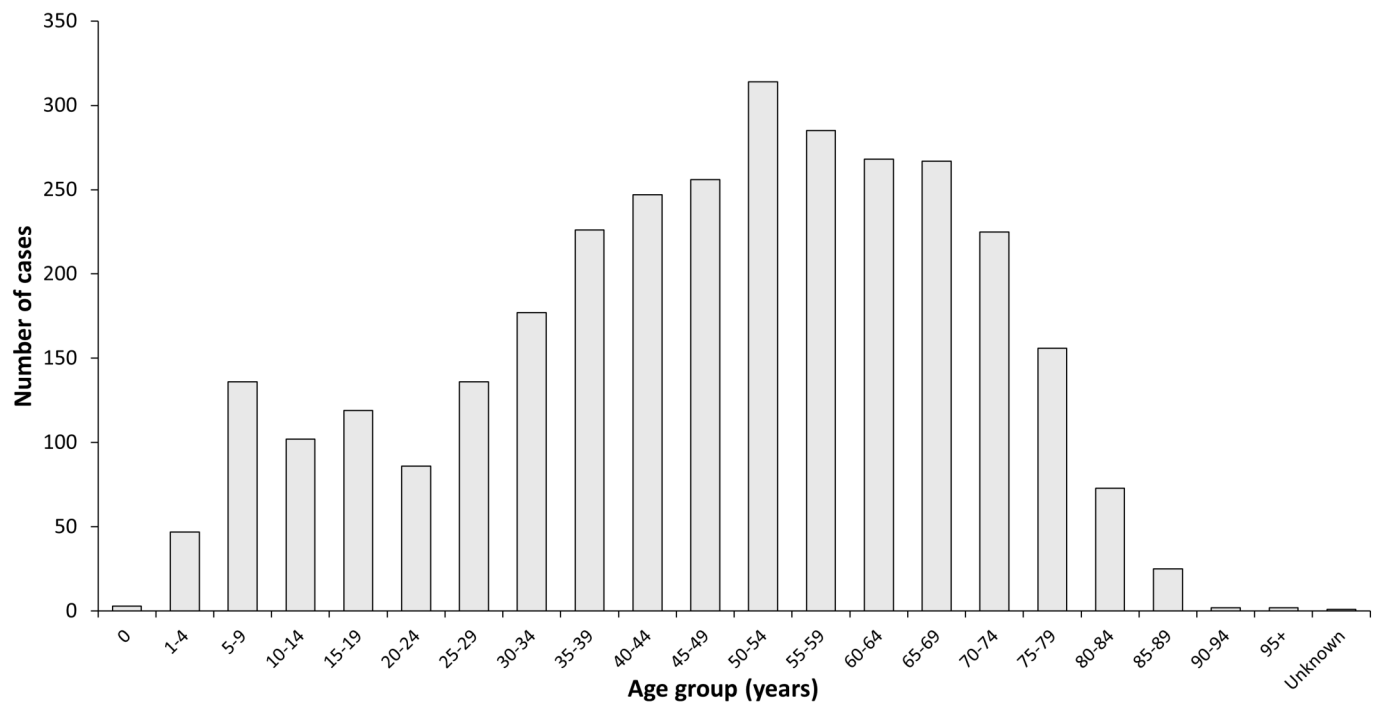
Viral subtypes, distribution	European subtype; 97%–98.4% similar to the reference Neudoerfl strain, strain Genbank = U27495; mostly: strain NETBE7, HQ883372 & NETBE8 (HM450136, HM450137, HM450138, HM450140, HM450141) ^{6,7}
Reservoir animals	Small mammals such as rodents, birds ^{6,7}
Infected tick species (%)	<i>I. ricinus</i> . 1.6%–9.9% in areas <2000 meters altitude ^{6,8}
Dairy product transmission	Not documented

Table 2: TBE reporting and vaccine prevention in Switzerland

Mandatory TBE reporting	Notifiable disease since 1988 Tick bites and Lyme borreliosis have been reported via a sentinel group (general practitioners and pediatricians in the entire country) since 2008 ^{5,9}		
Categorization ⁵	Case classification	Laboratory criteria	Clinical criteria
	Not a case	Positive IgM serology	No ILI & no neurological symptoms
	Possible case	a) Positive IgM serology	ILI or non-specific neurological signs & symptoms
		b) Positive IgM + positive IgG serology*	Any
	Probable case	a) Positive IgM serology	Meningitis, meningoencephalitis, encephalomyelitis or pareses
		b) Positive IgM + positive IgG serology*	ILI or non-specific neurological signs or symptoms
	Confirmed case	a) Positive IgM + positive IgG serology*	Meningitis, meningoencephalitis, encephalomyelitis, or pareses
		b) TBE-RNA detection by PCR	Meningitis, meningoencephalitis, encephalomyelitis, or pareses
IgG, immunoglobulin; ILI, influenza-like illness; PCR, polymerase chain reaction *Or anti-TBE IgG serum antibody seroconversion or ≥4-fold rise in anti-TBE IgG serum antibodies			
Special clinical features	No Swiss data		
	% with sequelae: 25%; mortality: 1%		
Available vaccines ¹⁰	Encepur N [®] (Bavarian Nordic); FSME-Immun [®] (Baxter/Pfizer). Number of doses sold: not available		
Vaccination recommendations and reimbursement ¹⁰	Recommendations and reimbursement for vaccination in 2006		
Vaccine uptake by age group/risk group/general population ¹¹	Average national vaccination uptake (3 doses), 2014–2016: 8 years old: 22%–31% 16 years old: 33%–45% High-risk area (canton of Thurgau): 8 years old: 40%–53% 16 years old: 64%–75%		
Name, address/ website of TBE National Reference Center	National Reference Center for Tick-borne Diseases, SPIEZ LABORATORY is a division of the Federal Office for Civil Protection LABOR SPIEZ Austrasse 3700 SPIEZ - Switzerland https://www.labor-spiez.ch/de/die/bio/dediebionrz.htm nrzk@babs.admin.ch		

Figure 1: Burden of TBE in Switzerland 2000–2022^{2,4}

Source Data: Appendix—Figure 1

Figure 2: Age distribution of TBE in Switzerland 2009–2022⁴

Source Data: Appendix—Figure 2

Figure 3a: High risk areas³

(local clusters of TBE notifications over the last 10 years, as per March 2022)

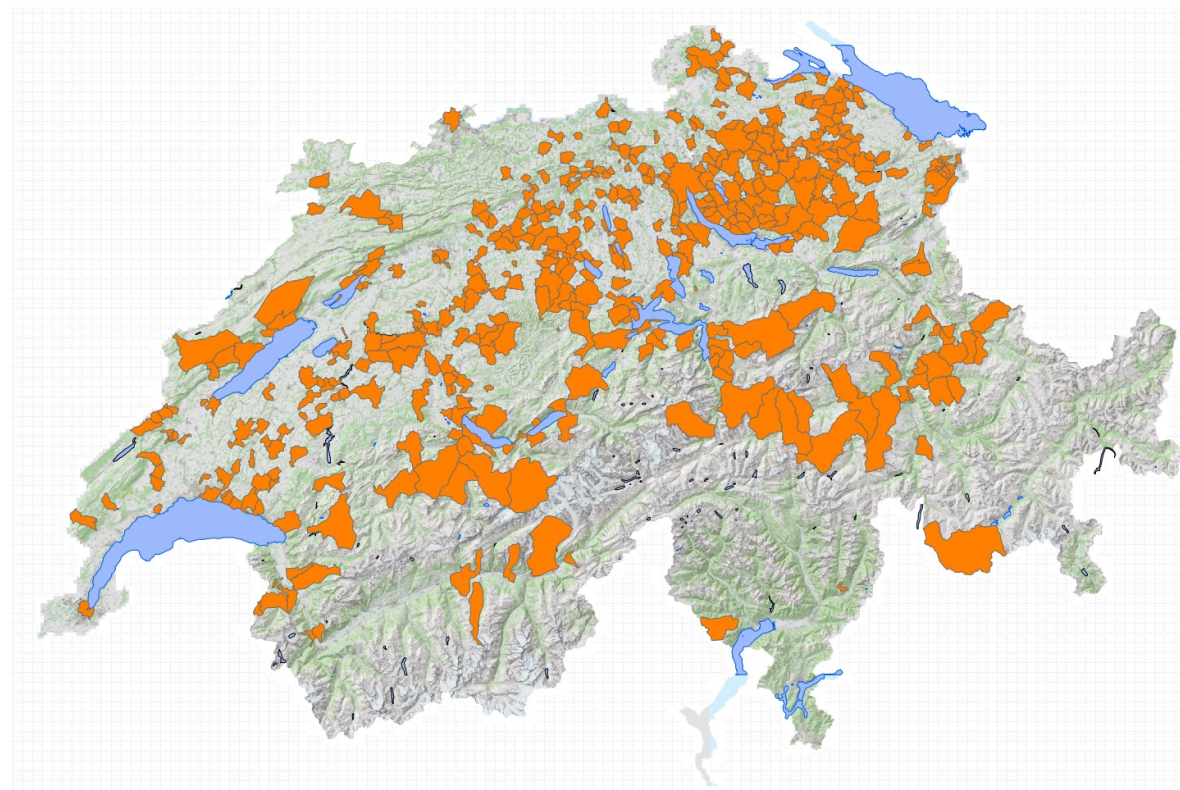
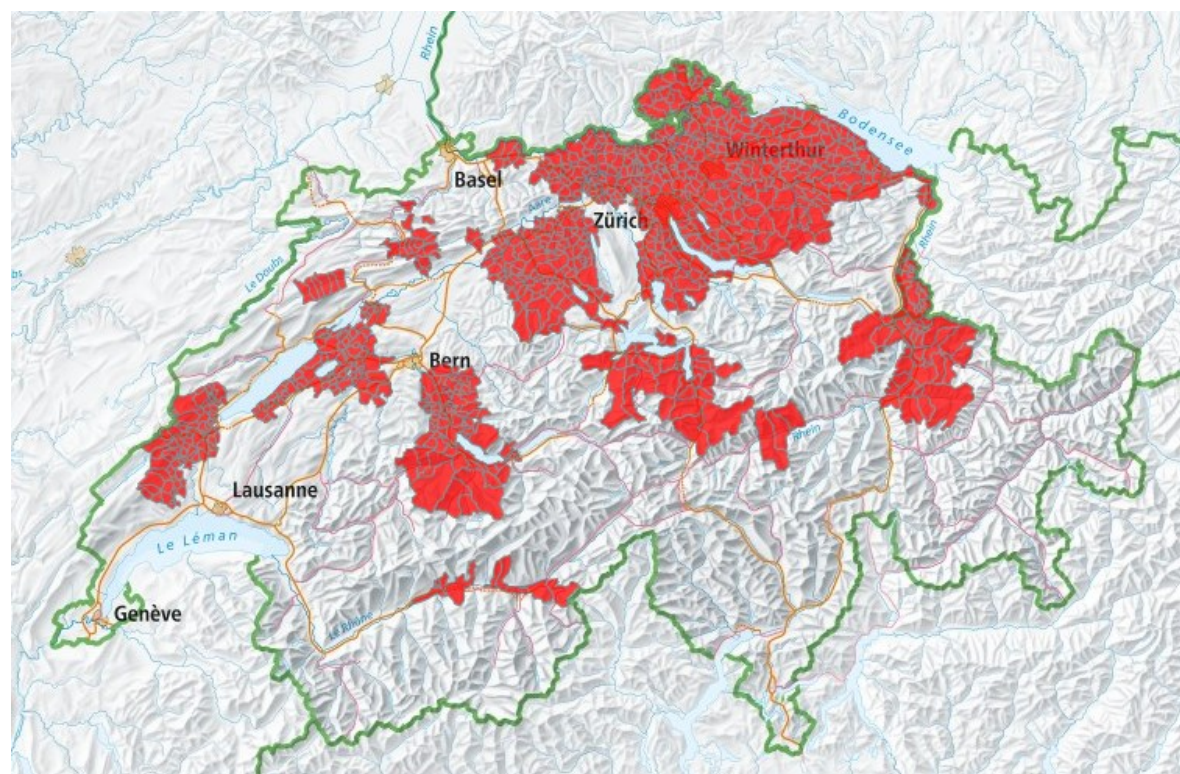
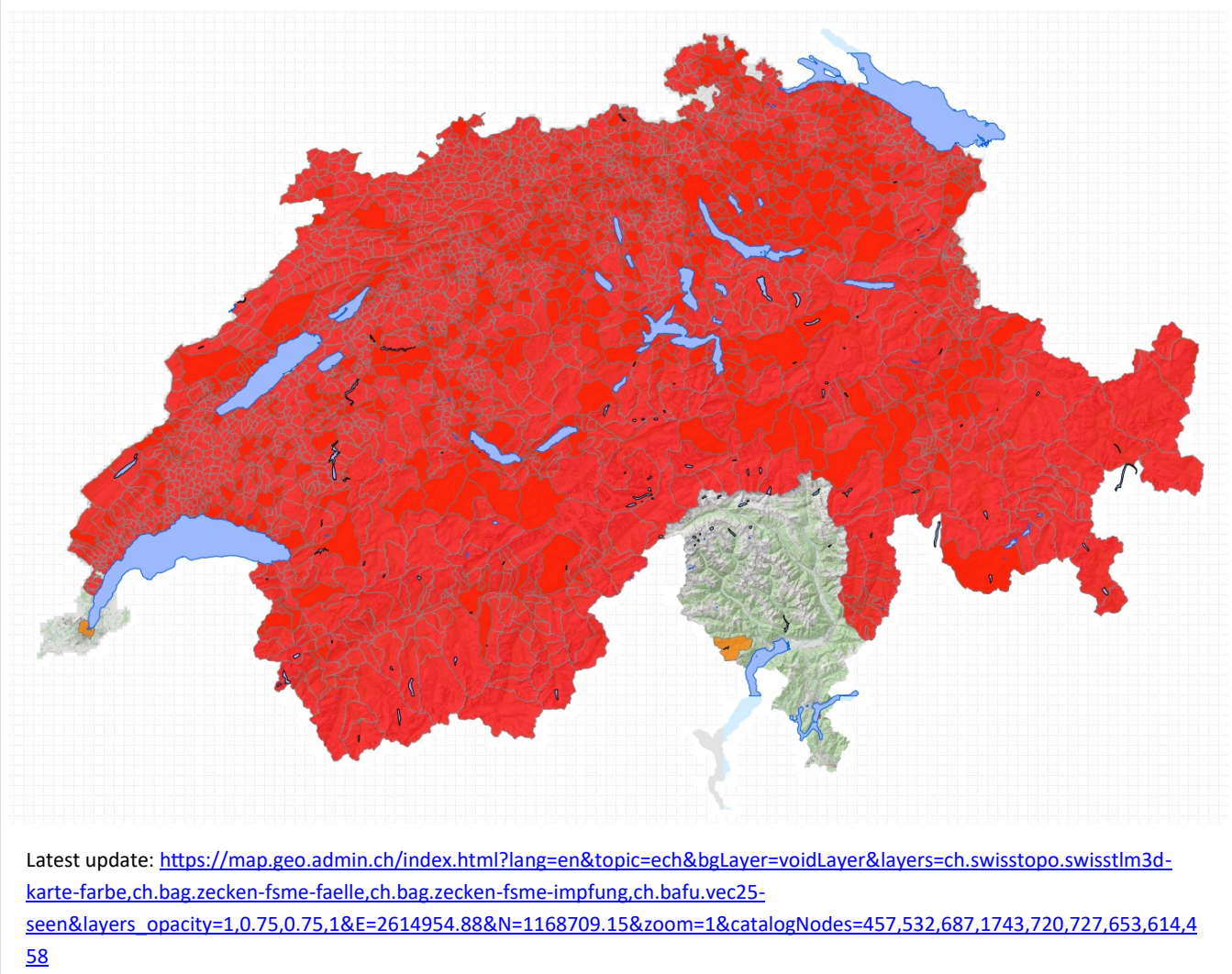
**Figure 3b: Defined risk areas in Switzerland,³ where vaccination was recommended for exposed people until end of 2018.**

Figure 3c: Extended risk areas with recommended TBE vaccination for all exposed individuals (residents and visitors) as per March 2022²



Acknowledgments

Unpublished data and advice on data interpretation were kindly provided by Dr Ekkehardt Altpeter, Federal Department of Home Affairs FDHA, Federal Office of Public Health FOPH, Division of Communicable Diseases, Bern, Switzerland.

Updates for 2022 cases provided by Dr Kyra Zens, University of Zurich, Institute for Experimental Immunology, Switzerland.

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Citation:

Desgrandchamps D, Posfay-Barbe MK. TBE in Switzerland and Liechtenstein. Chapter 12b. In: Dobler G, Erber W, Bröker M, Schmitt HJ, eds. *The TBE Book*. 6th ed. Singapore: Global Health Press; 2023. doi:10.33442/26613980_12b33-6

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Appendix

Source data: Figure 1^{2,4}

Year	Number of cases	Incidence/10 ⁵
2000	90	1.24
2001	100	1.37
2002	52	0.70
2003	116	1.56
2004	135	1.81
2005	204	2.72
2006	245	3.24
2007	107	1.40
2008	120	1.55
2009	115	1.44
2010	95	1.20
2011	173	2.17
2012	94	1.16
2013	203	2.48
2014	113	1.37
2015	121	1.42
2016	202	2.39
2017	269	3.16
2018	376	4.38
2019	262	3.03
2020	454	5.11
2021	285	3.25
2022	391	4.45

Source data: Figure 2⁴

Age group (years)	Number of cases	Incidence/10 ⁵
0	3	0.25
1–4	47	0.96
5–9	136	2.28
10–14	102	1.73
15–19	119	1.95
20–24	86	1.26
25–29	136	1.74
30–34	177	2.09
35–39	226	2.68
40–44	247	2.90
45–49	256	2.88
50–54	314	3.45
55–59	285	3.38
60–64	268	3.77
65–69	267	4.39
70–74	225	4.19
75–79	156	3.60
80–84	73	2.38
85–89	25	1.31
90–94	2	0.21
95+	2	0.83
Unknown	1	N/A

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