

TBE in Finland

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E-CDC risk status: endemic (data as of beginning of 2023)

History and current situation

Finland is at the northernmost edge of the TBE endemic area in Europe. Here TBE is focally endemic. An aseptic encephalitis disease has been known in Kumlinge Island in Åland Islands since the 1940s.¹ TBE is also known in Finland by the name Kumlinge disease.

According to a legend, tick-borne encephalitis–like disease was known in the Åland Islands already in the 18th century. However, this is apparently a misunderstanding due to a doctoral thesis of archipelago fever in the Turku region published 1781, which describes malaria, not TBE.²

TBEV foci were determined in the 1960s by screening TBEV antibodies in cattle from all over the country.³ The endemic areas remained the same throughout decades until the 1990s, when Isoaari Island at the archipelago of Helsinki was found to be TBE endemic.⁵ Since then, sporadic human cases have appeared in new areas, like in Närpiö on the western coast and in eastern Finland in Varkaus, in the Kuopio region and in the Kotka archipelago.⁶ 2008 human cases were traced to Simo, the world’s northernmost TBE endemic foci in Finnish Lapland,⁷ which is nowadays a high endemic focus where residents are vaccinated against TBE in national immunization program.

Tick distribution in the country was studied in 1950s⁸ and 2015 using crowdsourcing.⁹ Compared with the nationwide distribution map drawn in 1960s, the distribution of ticks has extended up to 200 km northwards.⁹

The northernmost tick samples were from latitudes of 67°, but it is unclear whether ticks there are from stable populations or are stragglers transported there with animals. However, populations have established in new locations, i.e., the Bothnian Bay coast and the eastern part of central Finland. In addition, TBEV RNA has been detected or TBEV isolated from ticks in areas formerly unknown to be TBE endemic and areas where only sporadic TBE cases have been reported.⁹

Both TBEV vector tick species, *Ixodes ricinus* and *Ixodes persulcatus*, are distributed in Finland.^{4,10} *I. persulcatus* is more abundant than *I. ricinus* in certain areas, such as in northern Finland where it is the dominant tick species. Both species have been shown to transmit TBEV-Eur and TBEV-Sib in Finland.^{6,7}

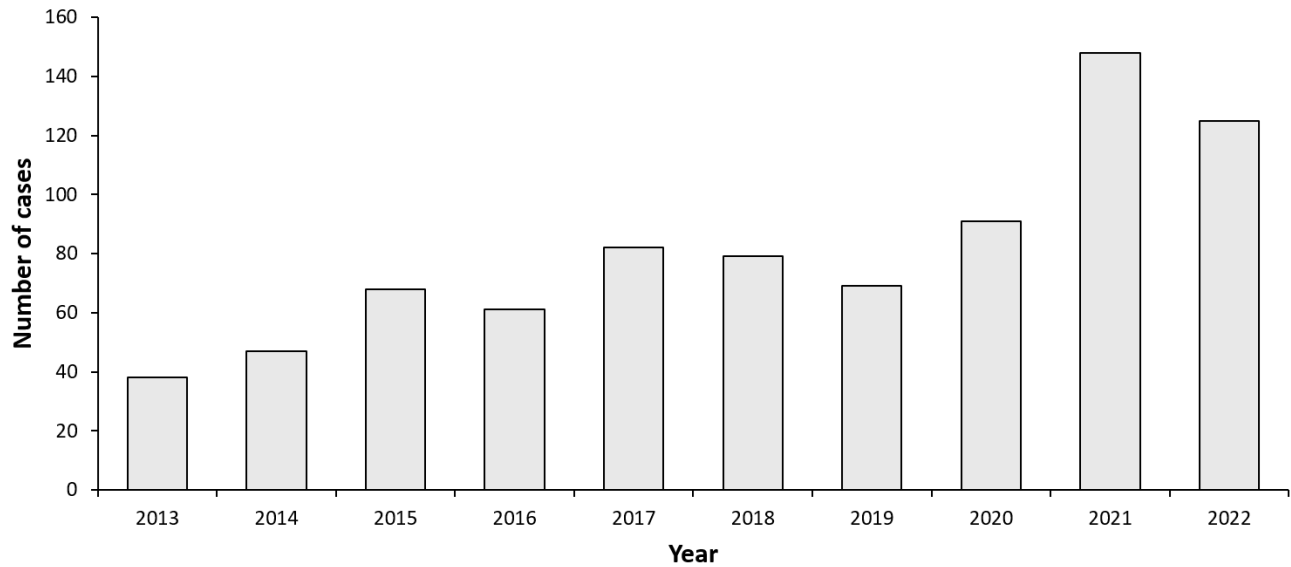
The overall prevalence of TBEV in ticks in Finland is reported to be 1.6%.⁹ TBEV prevalence was higher in *I. persulcatus* (3.0%) than in *I. ricinus* (0.2%) in 2015 based on ticks sampled by crowdsourcing⁹ but varies greatly within Finland.

Overview of TBE in Finland

Viral subtypes, distribution	European and Siberian subtypes ^{4,9}
Reservoir animals	<i>Microtus agrestis</i> , <i>Myodes glareolus</i> ¹⁰
Infected tick species (%)	<i>I. ricinus</i> , <i>I. persulcatus</i> . In average 1.6%; <i>I. ricinus</i> 0.2%, <i>I. persulcatus</i> 3.0% ⁹ In (suspected) endemic foci, TBEV RNA prevalence in field-collected ticks has been reported to be about 0.1%–3.0% ^{4,10,11}

Table 2: TBE reporting and vaccine prevention in Finland

Mandatory TBE reporting	All patients with TBEV IgM antibodies are reported to National Infectious Diseases Register at National Institute for Health and Welfare; a group of experts interviews the patients and/or reviews the reports to confirm the place of acquisition and that the cases are true TBE cases by definition
Other TBE surveillance	Sentinel animals not systematically screened
Special clinical features	Biphasic disease reported in about 30% ¹²
Available vaccines	Encepur, Encepur Lapset (Bavarian Nordic), TicoVac and TicoVac Junior (Pfizer)
Vaccination recommendations and reimbursement¹³	<p>Eligible for the TBE vaccines as part of the national program are persons aged 3 years and over who are domiciled in Finland and who live permanently in the following regions:</p> <ul style="list-style-type: none"> • Åland • The southern districts of Kemi • Simo • Kotka archipelago • Sammonlahti district of Lappeenranta • Off the coast of Raase on the island of Preiskari • Parainen • Lohjanjärvi archipelago and the postal code areas of Ojamo (08200), Kirkniemi (08800), Lylyinen/Hormajärvi (08450) and Vohloinen/Virkkala (08700) • Kustavi • Kirkkonummi in the postal code areas of Luoma (02440) and Masala (02430) • Parts of the Sipoo archipelago <p>Persons staying for long periods of time in holiday homes in these risk areas are also entitled to free vaccination. The vaccine is necessary only for persons who are active in nature for at least 4 weeks during the snow-free season.</p> <p>A previously unvaccinated person will receive three free doses of the vaccine. A person who has not completed the basic series will also receive remaining doses of primary series free of charge as part of the vaccination program. Booster vaccinations for those who have received a three-dose vaccination series are currently not included in the vaccination program.</p> <p>TBE vaccination recommendations for other risk areas are based on incidence and case-by-case consideration. The vaccine is paid for by the vaccinee. In some situations, the employer is responsible for protecting the worker, in which case the need for vaccination is assessed by the occupational health service.</p>
Vaccine uptake by age group/risk group/general population	21% ¹⁴
Name, address/website of TBE NRC	National Institute for Health and Welfare, THL, Mannerheimintie 166, 00300 Helsinki https://www.thl.fi

Figure 1: Burden of TBE in Finland 2013–2022 (Reference: National Registry of Infectious Diseases)¹⁴

Please note that TBE is not evenly distributed throughout Finland.
The incidence rates vary from 0 to >15/100,000.

Source Data: Appendix—Figure 1

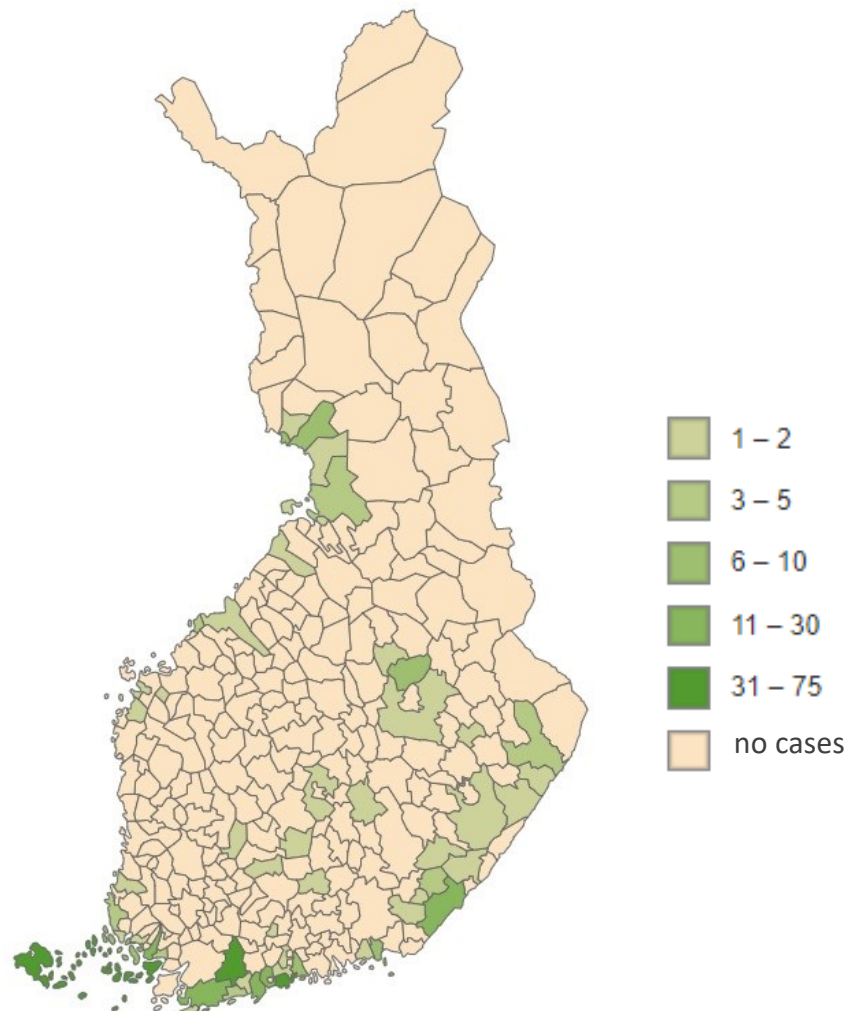
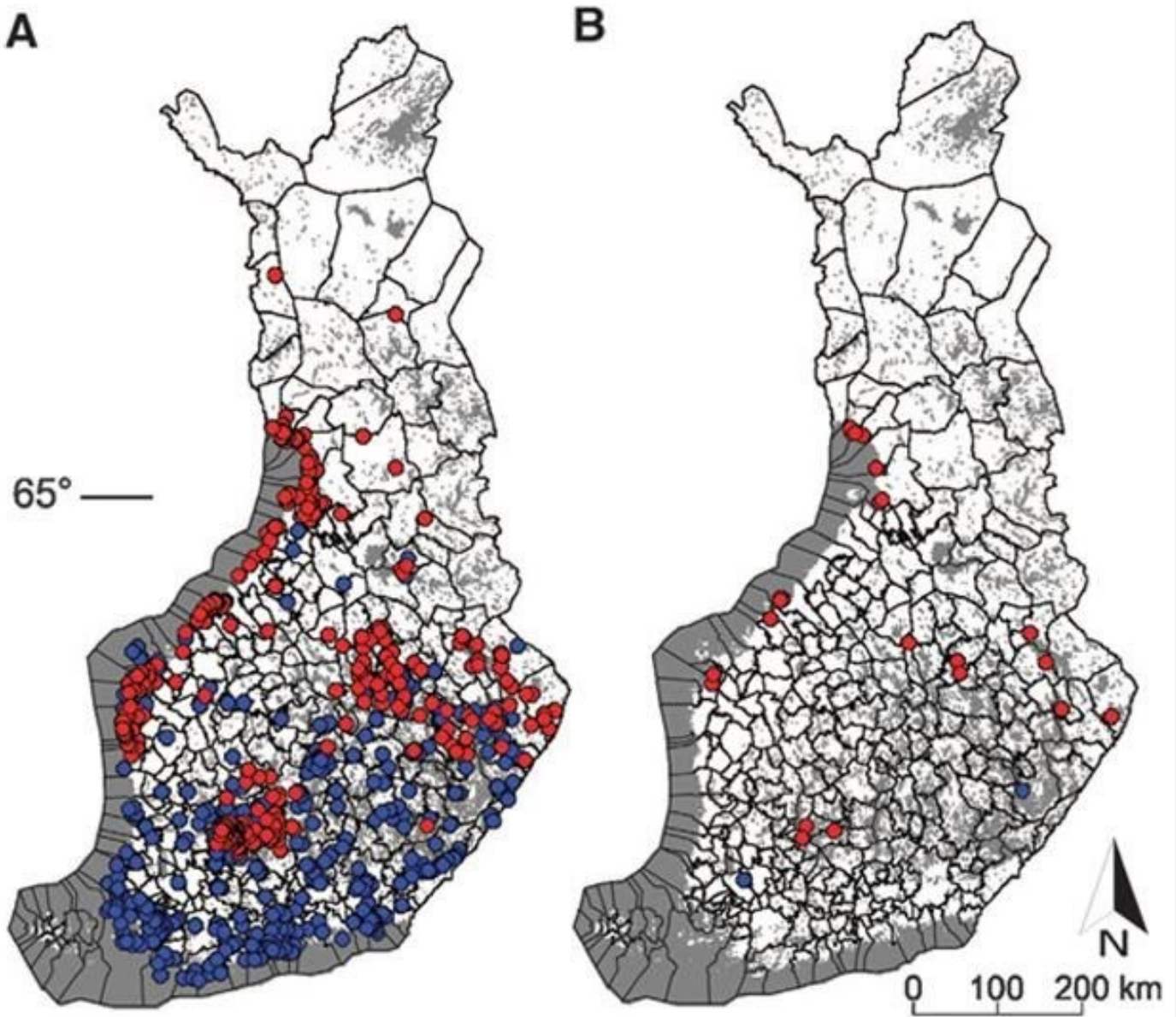
Figure 2: Number of TBE cases during 2017–2021¹⁶

Figure 3:



(A) Distribution of samples (n=2038) screened for pathogens. Blue dots indicate collection points for *I. ricinus* samples (n=1044) and red dots indicate collection points for *I. persulcatus*.

(B) Distribution of the samples that were positive for TBEV (n=32). Adapted from Laaksonen M, et al. 2007.¹⁰

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Appendix

Source data: Figure 1

Year	Number of cases	Incidence / 10 ⁵
1995	5	0.0
1996	8	0.16
1997	19	0.38
1998	16	0.31
1999	12	0.23
2000	42	0.81
2001	33	0.64
2002	38	0.73
2003	16	0.31
2004	29	0.56
2005	16	0.31
2006	18	0.34
2007	20	0.38
2008	23	0.43

Year	Number of cases	Incidence / 10 ⁵
2009	25	0.47
2010	38	0.71
2011	43	0.80
2012	39	0.72
2013	38	0.71
2014	47	0.86
2015	68	1.25
2016	61	1.11
2017	82	1.49
2018	79	1.43
2019	69	1.25
2020	91	1.64
2021	148	2.67
2022	124	2.23

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