

TBE in the Czech Republic

Petr Pazdiora

E-CDC risk status: endemic (*last edited in May 2025, update for 2024: 680 reported cases*)

History and current situation

The TBE virus (TBEV) was first isolated in the Czech Republic by a Czech scientist in 1948-1949 from both a patient and also from *Ixodes ricinus* ticks¹. However, even before 1948, etiologically unclear summer cases of viral meningoencephalitis had been reported, and likely, at least in part, they are attributable to the TBEV. These cases were reported mostly from patients in the districts of Beroun (Central Bohemia), Hradec Králové (East Bohemia), Vyškov (South Moravia), and occasionally from the neighborhood of Prague. The official reports of these probable cases of “tick-borne encephalitis” were registered in the database of the National Institute of Public Health in Prague since 1945.

The first TBEV isolation was accomplished from blood and cerebrospinal fluid of a patient with meningoencephalitis. Other successful isolations were from subjects with a history of a tick bite. The first successful attempt of isolation of the TBEV from different developmental stages of *I. ricinus* ticks collected in forests of the district Beroun was in 1949. The analysis of an outbreak of meningoencephalitis in Rožňava in south-eastern Slovakia in 1951 from Czech and Slovak specialists ended with the discovery of the alimentary transmission of the TBEV.

The definition of TBE for reporting changed in the following decades. Following a ministerial decree from 1970, only clinically-manifested, laboratory-confirmed cases of TBE were to be reported to the central surveillance center. The number of case characteristics collected from TBE patients has gradually increased ever since 1982. Since 1993, the national reporting system (EPIDAT) has been computerized. TBE surveillance was established by Regulation No. 275/2010, Annex No. 28.

The Czech Republic is a highly TBE endemic country. Many cases are associated with outdoor activities (camping, living in secondary residences in the countryside, hiking, hunting, fishing, mushrooming), while the incidence of possible occupational transmission has decreased over the last years (in 2007-2023 289 cases, i.e. 2.7% among foresters, and farmers mostly). Numbers of imported cases from abroad are very low with only 5 cases (0.7%) in 2022, and 12 cases (2.3%) in 2023. The geographical distribution of TBE is changing. The gradual spread of TBE into formerly unaffected districts, namely into the border districts of the

country at higher altitudes is highlighted. Long-term observations confirm a shift of age-specific incidence rates to older age groups. The period of the transmission of TBE is changing, too. The “TBE-season” with detection of cases is longer than 30-50 years ago and lasts from March to December. These changes of basic epidemiological characteristics may be due to climatic changes, changes of environmental and/or other factors. These factors are affecting the different interactions between TBEV, its vectors and vertebrate hosts, too.

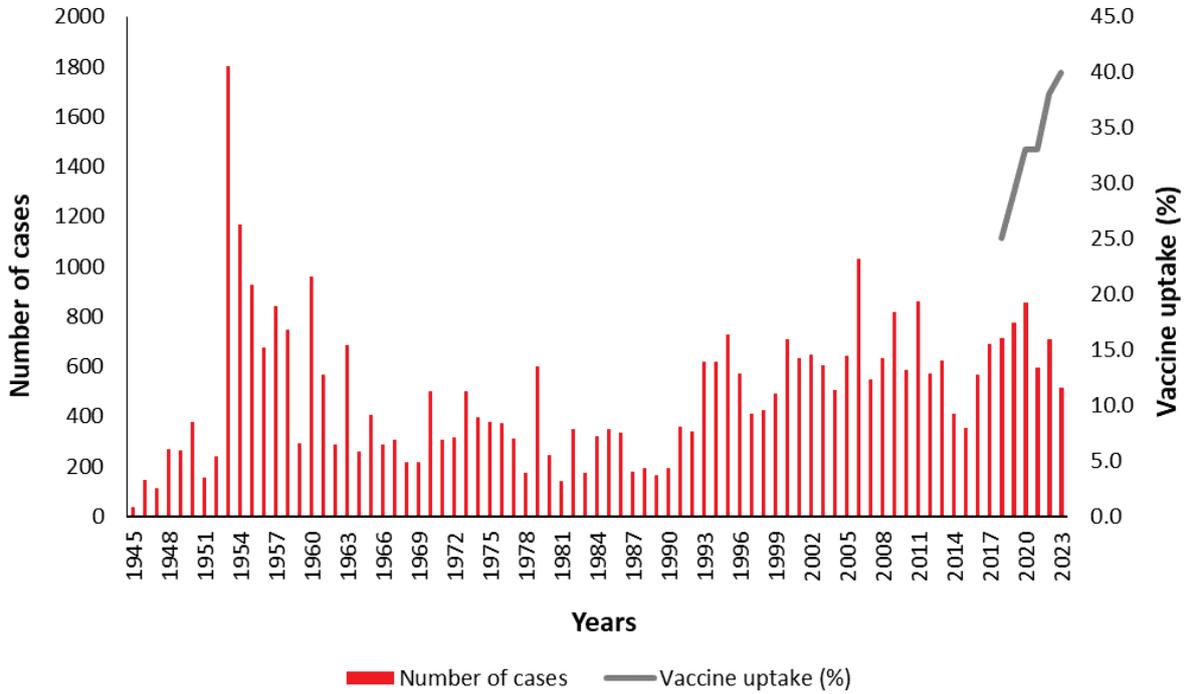
Vaccine uptake is very low, the highest rate is reached in the age group of 18-24 year-olds, the lowest among children younger than 4 years, however there is no central vaccination registry. Data from 8 international telephone surveys in 2009, 2013, 2015, 2018, 2019, 2020, 2021, 2022, and 2023 which covered the whole Czech population and defined a “vaccinated person” as someone having received ≥ 1 dose vaccine uptake, was estimated to be 16, 23, 24, 25, 29, 33, 33, 38 and 40%, respectively. Substantial regional differences in uptake were observed in the Czech Republic (Prague Region 51%, Pardubice Region 32%). Similar differences in uptake were observed in individual age-groups (18-24 years 64.7%, 0-3 years 18.6%). Unpublished data from some Czech regions indicate that vaccine uptake with ≥ 3 dose is even lower.

Overview of TBE in Czech Republic

Table 1: TBE in Czech Republic

Virus subtypes isolated	European subtype - no other information available
Reservoir animals	<i>Apodemus sylvaticus</i> , <i>Apodemus flavicollis</i> , <i>Myodes glareolus</i> , <i>Microtus agrestis</i> , <i>Sciurus vulgaris</i> , <i>Erinaceus roumanicus</i> , <i>Sorex araneus</i> , <i>Talpa europaea</i> ¹⁵
Percentage infected ticks	1970–2023: 157/128,005 (0.123%) ¹⁸
Dairy product transmission	Rare: 1997-2008: 0.9% ¹³ ; 1993-2019: 3.4% ²⁰ ; 2007-2023: 0.5% ¹⁶ Children and adolescents (1993-2019): 6.8% ¹⁹
Case definition used by authorities	Based on ECDC
Completeness of case detection and reporting	There is not enough valid data to estimate the % of undetected cases
Type of reporting	Mandatory, only confirmed cases on the basis of clinical and lab criteria are reported ¹
Other TBE surveillance	Detection in ticks (National Reference Laboratory for arboviruses)
Special clinical features	Biphasic disease: 1994-1997: 80% ¹⁷ Children and adolescents (1993-2012): 58% ¹² Risk groups: No information available % with sequelae: children and adolescents (1993-2012): 3% ¹² Mortality: case fatality rate (1960-2019): 0.79% ¹⁹ ; (1970-2008): 0.55% ¹⁴ ; (2018-2023): 0.5% ¹⁶ Children and adolescents (1960-2019): 0.2% ¹⁹
Licensed vaccines	FSME-IMMUN since 1990, Encepur since 1996
Vaccination recommendations	General, first recommendation 1990, last recommendation February 8, 2016 Partial reimbursement from health insurances started in 1993, different strategies of different health insurances in individual years Total reimbursement from health insurances for people 50 years old and over started in 2022
Vaccine uptake	Vaccine uptake in the general population of 16, 23, 24, 25, 29, 33, 33, and 38% (years 2009, 2013, 2015, 2018, 2019, 2020, 2021, 2022 and 2023) ^{3,4,5,6,7,8,9,10,11}
National Reference center for TBE	National Reference Laboratory for arboviruses, Public Health Institute of Ostrava, Partyzánské nám. 7, 702 00 Ostrava https://www.zuova.cz/Home/Page/NRL-arboviry ¹⁸

Figure 1: TBE case numbers over time according to vaccination status
 (last edited in May 2025, update for 2024: 158 reported cases)



Source Data: Appendix—Figure 1

Figure 2: Age and gender distribution of TBE in the Czech Republic (2023)

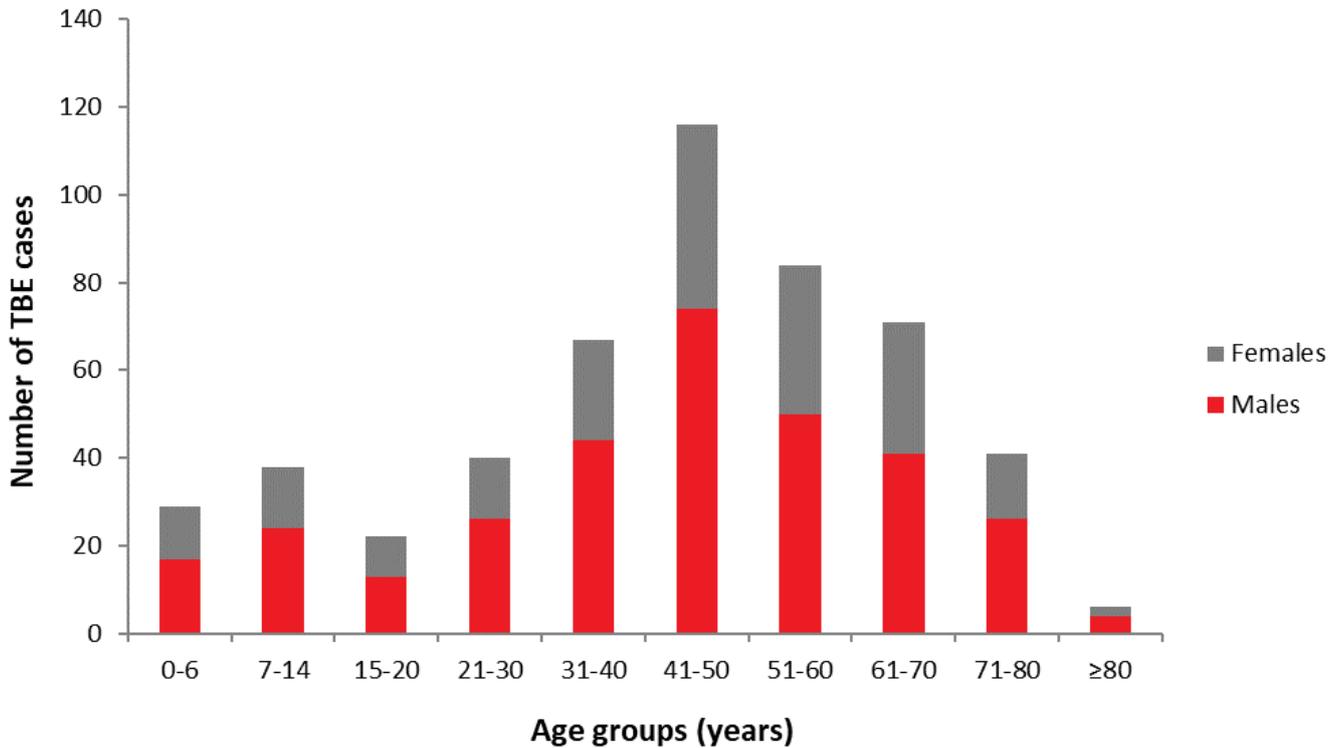
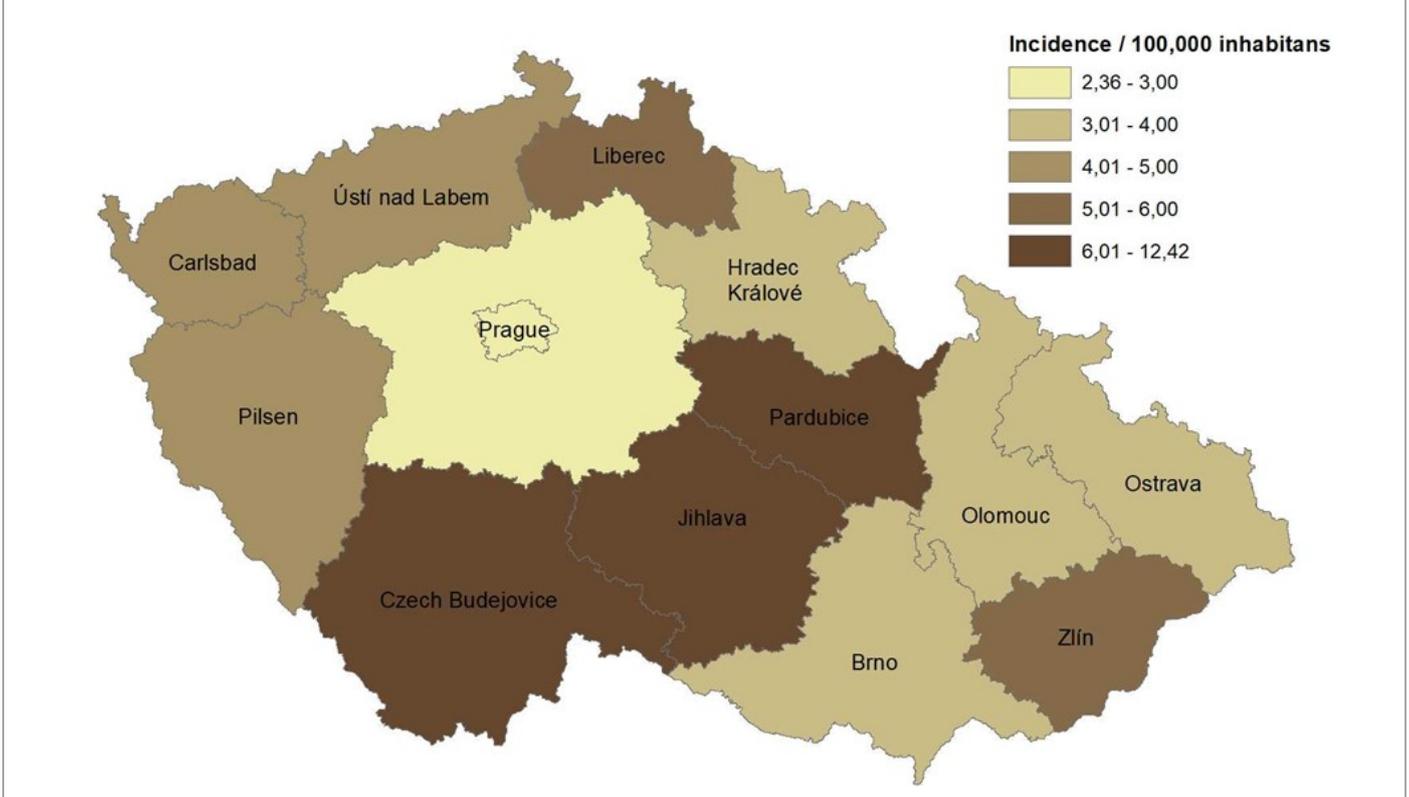


Figure 3: Incidence of TBE in individual regions in the Czech Republic, 2023

Authors and affiliations

Petr Pazdiora

Department of Epidemiology, Medical Faculty of Charles University Pilsen, Czech Republic

Contact: pazdiora@fnplzen.cz

Citation:

Pazdiora P. TBE in Czech Republic. Chapter 13. In: Dobler G, Erber W, Bröker M, Chitimia-Dobler L, Schmitt HJS, eds. *The TBE Book*. 7th ed. Singapore: Global Health Press; 2024. doi:10.33442/26613980_13-8-7

Appendix

Source data: Figure 1

Year	Number of cases	Incidence/ 10 ⁵	Year	Number of cases	Incidence/ 10 ⁵	Year	Number of cases	Incidence/ 10 ⁵
1945	35	0.33	1960	958	9.92	1975	378	3.76
1946	146	1.53	1961	564	5.88	1976	374	3.69
1947	112	1.28	1962	285	2.96	1977	309	3.03
1948	267	3	1963	685	7.08	1978	175	1.71
1949	265	2.98	1964	258	2.65	1979	598	5.81
1950	375	4.2	1965	407	4.16	1980	246	2.38
1951	155	1.72	1966	289	2.94	1981	139	1.35
1952	240	2.65	1967	308	3.13	1982	348	3.37
1953	1800	19.69	1968	216	2.19	1983	172	1.63
1954	1167	12.68	1969	217	2.19	1984	320	3.16
1955	927	10	1970	502	5.12	1985	350	3.44
1956	675	7.23	1971	305	3.1	1986	333	3.22
1957	839	8.93	1972	316	3.2	1987	178	4.81
1958	744	7.89	1973	502	5.06	1988	191	1.84
1959	294	3.11	1974	397	3.97	1989	166	1.6

Year	Number of cases	Incidence/ 10 ⁵
1990	193	1.86
1991	356	3.45
1992	337	3.28
1993	618	6.09
1994	619	5.99
1995	727	7.19
1996	571	5.54
1997	412	4.03
1998	422	4.1
1999	490	4.77
2000	709	7
2001	633	6.19

Year	Number of cases	Incidence/ 10 ⁵
2002	647	6.34
2003	606	5.94
2004	507	4.97
2005	642	6.28
2006	1028	10.02
2007	546	5.29
2008	631	6.05
2009	816	7.78
2010	589	5.6
2011	861	8.2
2012	573	5.45
2013	625	5.94

Year	Number of cases	Incidence/ 10 ⁵
2014	410	3.9
2015	355	3.4
2016	565	5.3
2017	687	6.5
2018	715	6.7
2019	774	7.3
2020	855	8
2021	594	5.6
2022	710	6.8
2023		

Source data: Figure 2

Age group (years)	Males	Females	All
0-9	43	25	68
10-19	34	28	62
20-29	37	22	59
30-39	52	39	91
40-49	74	57	131
50-59	55	43	98
60-69	64	48	112
≥70	53	36	89
Total	412	298	710

References

- Daniel M, Benes C, Danielová V, Kríz B. Sixty years of research of tick-borne encephalitis—a basis of the current knowledge of the epidemiological situation in Central Europe. *Epidemiol Mikrobiol Imunol.* 2011;60(4):135-155.
- Daniel M, Brabec M, Malý M, Danielová V, Vráblík T. The influence of meteorological factors on the risk of tick-borne encephalitis infection. Vliv meteorologických faktorů na riziko infekce klíšťovou encefalitidou. *Epidemiol Mikrobiol Imunol.* 2023;72(2):67-77.
- Fessel – GfK. Tick-borne encephalitis, a study sponsored by Baxter. 2009.
- Fessel – GfK. Tick-borne encephalitis, a study sponsored by Baxter. 2013.
- Fessel – GfK. Tick-borne encephalitis, a study sponsored by Pfizer. 2016.
- Fessel – GfK. Tick-borne encephalitis, a study sponsored by Pfizer. 2018.
- Ipsos: TBE Awareness Coverage and Compliance Research 2019.
- Ipsos: TBE Awareness Coverage and Compliance Research 2020.
- Ipsos: TBE Awareness Coverage and Compliance Research 2021.
- Ipsos: TBE Awareness Coverage and Compliance Research 2022.
- Ipsos:TBE Awareness Coverage and Compliance Research 2023.
- Krbkova L, Stroblova H., Bednarova J. Clinical course and sequelae for tick-borne encephalitis among children in South Moravia (Czech Republic). *Eur J Pediatr.* 2015; 174(4):449-458.
- Kriz B, Benes C, Daniel M. Alimentary transmission of tick-borne encephalitis in the Czech Republic (1997-2008). *Epidemiol Mikrobiol Imunol.* 2009; 58(2):98-103.
- Kriz B, Maly M, Benes C, Daniel M. Epidemiology of tick-borne encephalitis in the Czech Republic 1970-2008. *Vector Borne Zoonotic Dis.* 2012; 12(11):994-999. doi:10.1089/vbz.2011.0900
- Pazdiora P, Struncova V, Svecova M. Tick-borne encephalitis in children and adolescents in the Czech Republic between 1960 and 2007. *World J Pediatr.* 2012; 8(4):363-366. doi:10.1007/s12519-012-0383-z
- Pazdiora P, Gasperek M, Sebestova H, Lenz P, Vlckova I. The analysis of the register of compulsorily notifiable diseases (EPIDAT 1993-2017; ISIN 2018-2023) – data published on local, regional seminars, conferences, congresses.
- Ruzek D, Danielova V, Daniel M, Chmelik V, Chrdle A, Pazdiora P, et al. Klíšťová encefalitida. 1st ed. Praha; 2015.
- Zelena H. Průkaz viru KE v klíšťatech, Česká republika 1970-2022; 2023. Accessed 29 March, 2024. <https://www.zuova.cz/Home/Page/NRL-arboviry>.
- Pazdiora P, Prokopova M, Svecova M, Tomaskova H. Tick-borne Encephalitis in Children and Adolescents in the West Bohemian Region (Czech Republic) between 1960 and 2019. The 29th Meeting of the Czech Society for Epidemiology and Microbiology, PED 2020, in Pilsen, the Czech Republic, from 15 -17 September, 2020.
- Pazdiora P, Prokopova M, Kudova J, Tomaskova H. Tick-borne Encephalitis in the West Bohemian Region (Czech Republic) between 1960 and 2021. The Meeting of the Czech Society for Epidemiology and Microbiology, Prague, 1st March 2022.