

TBE in the Czech Republic

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

History and current situation

The TBE virus (TBEV) was first isolated in the Czech Republic by Czech scientists in 1948–1949 from both a patient and also from *Ixodes ricinus* ticks.¹ 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 TBE virus. 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 TBE virus 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 TBE virus.

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 occupational transmission has decreased over the last years (in 2022: 20 cases, i.e., 2.8% among foresters and farmers). Numbers of imported cases from abroad are very low with only 1 case (0.2%) in 2021 and 5 cases (0.7%) in 2022. 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.

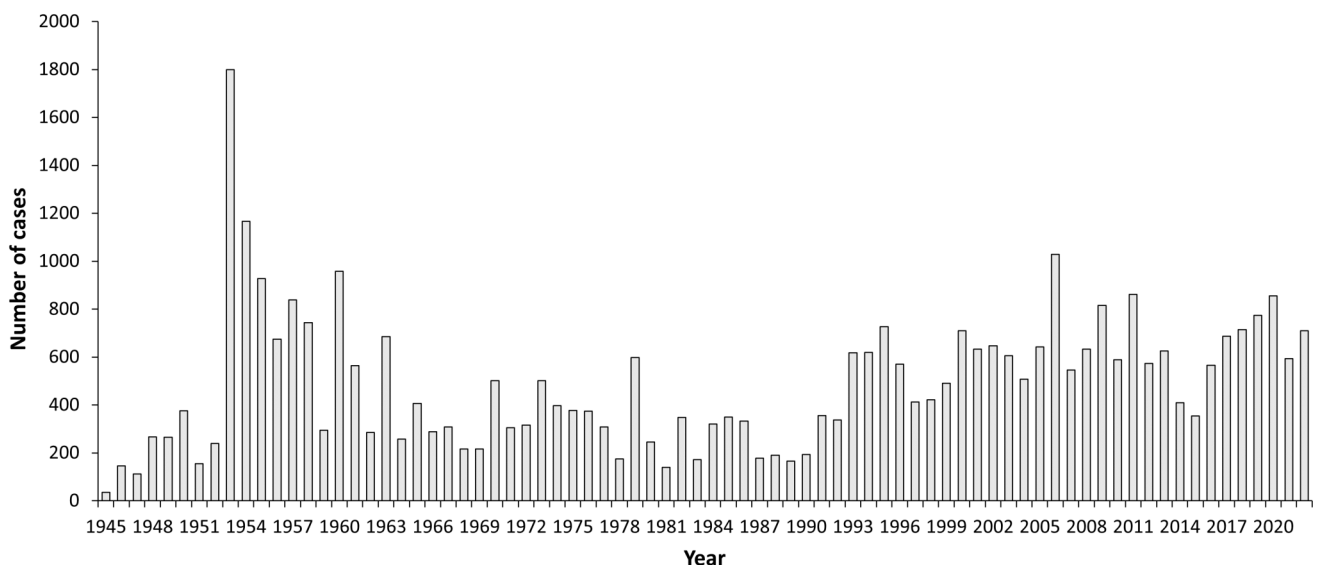
Vaccine uptake is very low, the highest rate is reached in the age group of 18–24-year-olds, the lowest among children younger than 4 years; however, there is no central vaccination registry. Data from 8 international telephone surveys in 2009, 2013, 2015, 2018, 2019, 2020, 2021, and 2022 which covered 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 and 38%, respectively. Unpublished data from some Czech regions indicate that vaccine uptake with ≥3 doses is even lower.

Table 1: Virus, vector, transmission of TBE in the Czech Republic

Viral subtypes, distribution	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
Indicator animals	<i>Capreolus capreolus</i> , <i>Cervus elaphus</i> , <i>Sus scrofa</i> , <i>Canis lupus</i> , <i>Oeservis ammon</i> , <i>Bos taurus</i> , <i>Capra aegagrus hircus</i> ¹⁵
Infected tick species (%)	1970–2022: 156/127,579 (0.122%) ¹⁶
Dairy product transmission	Rare: 1997–2008: 0.9% ¹¹ ; 1993–2019: 3.4% ¹⁸ ; 2022: 0.4% ¹⁴ Children and adolescents (1993–2019): 6.8% ¹⁷

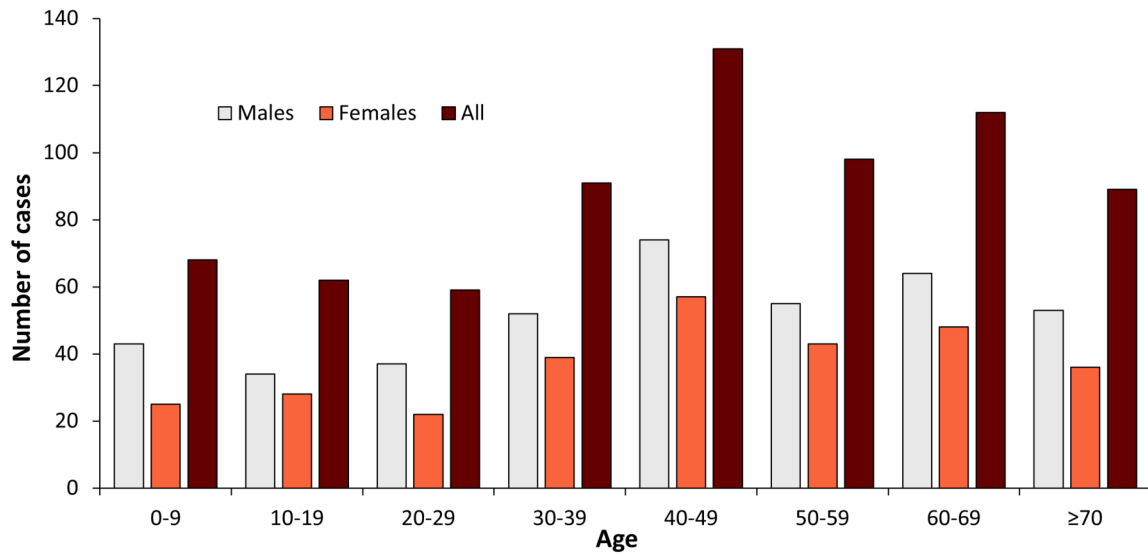
Table 2: TBE reporting and vaccine prevention in the Czech Republic

Mandatory TBE reporting	Each case of TBE is reported by the diagnosing physicians to the respective public health authorities after obtaining positive findings from biological specimens. Only confirmed cases on the basis of clinical and lab criteria are reported. ¹
Other TBE surveillance	No information available
Special clinical features	Biphasic disease: 1994–1997: 80% ¹⁵ Children and adolescents (1993–2012): 58% ¹⁰ Risk groups: no information available % with sequelae: children and adolescents (1993–2012): 3% ¹⁰ Mortality: case fatality rate (1960–2019): 0.79% ¹⁷ ; (1970–2008): 0.55% ¹² ; (2018–2022): 0.55% ¹⁴ Children and adolescents (1960–2019): 0.2% ¹⁷
Available vaccines	FSME-IMMUN (Baxter, Pfizer) since 1990. Encepur (Bavarian Nordic) since 1996. Doses sold: No information available
Vaccination recommendations and reimbursement	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 by age group/risk group/ general population	No valid nationwide information available, results from telephone surveys in 2009, 2013, 2015 2018, 2019, 2020, 2021 and 2022 indicate a vaccine uptake in the general population of 16, 23, 24, 25, 29, 33, 33 and 38% ²⁻⁹
Name, address/website of TBE National Reference Center	National Reference Laboratory for arboviruses, Public Health Institute of Ostrava, Partyzánské nám. 7, 702 00 Ostrava https://zuova.cz/Home/Page/NRL-arboviry ¹⁶

Figure 1: Burden of TBE in the Czech Republic over time¹⁴

Source Data: Appendix—Figure 1

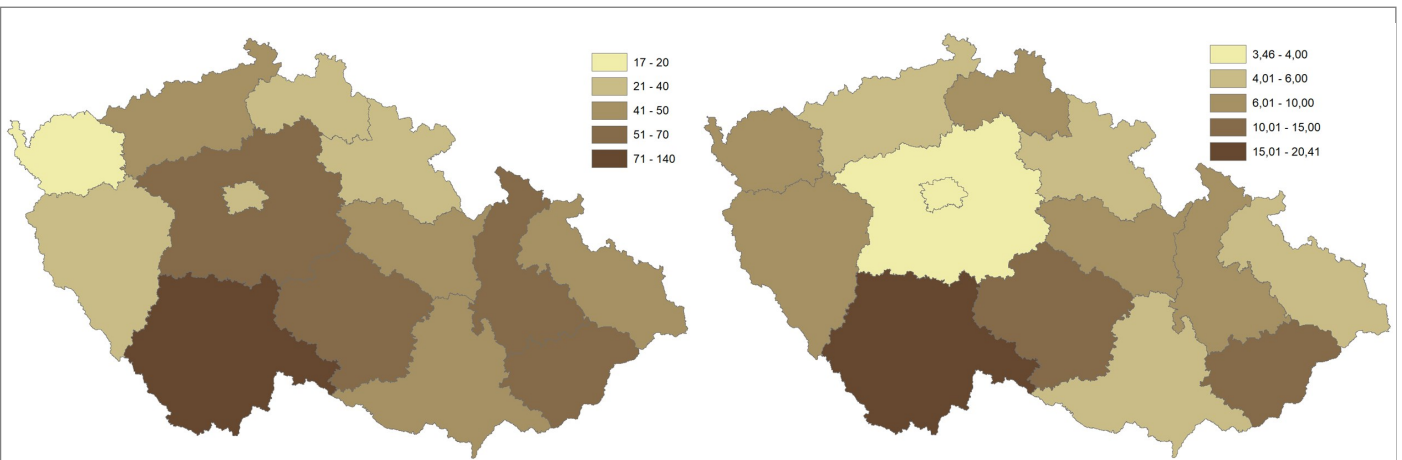
Figure 2: Age and gender distribution of TBE in the Czech Republic (2022)¹⁴



Source Data: Appendix—Figure 2

Figure 3a: Probable TBE cases transmitted in individual regions of the Czech Republic (2022)

Figure 3b: Incidences (per 100,000) of TBE in the individual regions of the Czech Republic (2022)



Regional data according to cases and viral isolation from ticks are not available. The first map shows the numbers of probable TBE cases and the second the incidences of TBE by region.

Note: Readers may also wish to review the accompanying chapter for Slovakia, given the geographic proximity and national history of these countries. Author’s note: Evidence of reported cases in Czechoslovakia cover the period 1945–1992; cases have been tracked independently in Slovakia since 1993.

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Appendix

Source data: Figure 1

Year	Number of cases	Incidence/10 ⁵	Year	Number of cases	Incidence/10 ⁵
1945	35	0.33	1984	320	3.16
1946	146	1.53	1985	350	3.44
1947	112	1.28	1986	333	3.22
1948	267	3	1987	178	4.81
1949	265	2.98	1988	191	1.84
1950	375	4.2	1989	166	1.6
1951	155	1.72	1990	193	1.86
1952	240	2.65	1991	356	3.45
1953	1800	19.69	1992	337	3.28
1954	1167	12.68	1993	618	6.09
1955	927	10	1994	619	5.99
1956	675	7.23	1995	727	7.19
1957	839	8.93	1996	571	5.54
1958	744	7.89	1997	412	4.03
1959	294	3.11	1998	422	4.1
1960	958	9.92	1999	490	4.77
1961	564	5.88	2000	709	7
1962	285	2.96	2001	633	6.19
1963	685	7.08	2002	647	6.34
1964	258	2.65	2003	606	5.94
1965	407	4.16	2004	507	4.97
1966	289	2.94	2005	642	6.28
1967	308	3.13	2006	1028	10.02
1968	216	2.19	2007	546	5.29
1969	217	2.19	2008	631	6.05
1970	502	5.12	2009	816	7.78
1971	305	3.1	2010	589	5.6
1972	316	3.2	2011	861	8.2
1973	502	5.06	2012	573	5.45
1974	397	3.97	2013	625	5.94
1975	378	3.76	2014	410	3.9
1976	374	3.69	2015	355	3.4
1977	309	3.03	2016	565	5.3
1978	175	1.71	2017	687	6.5
1979	598	5.81	2018	715	6.7
1980	246	2.38	2019	774	7.3
1981	139	1.35	2020	855	8
1982	348	3.37	2021	594	5.6
1983	172	1.63	2022	710	6.8

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

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