Chapter 13

TBE in Kazakhstan

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E-CDC risk status: endemic *(last edited in June 2026, update for 2025: 41 reported cases)*

History and current situation

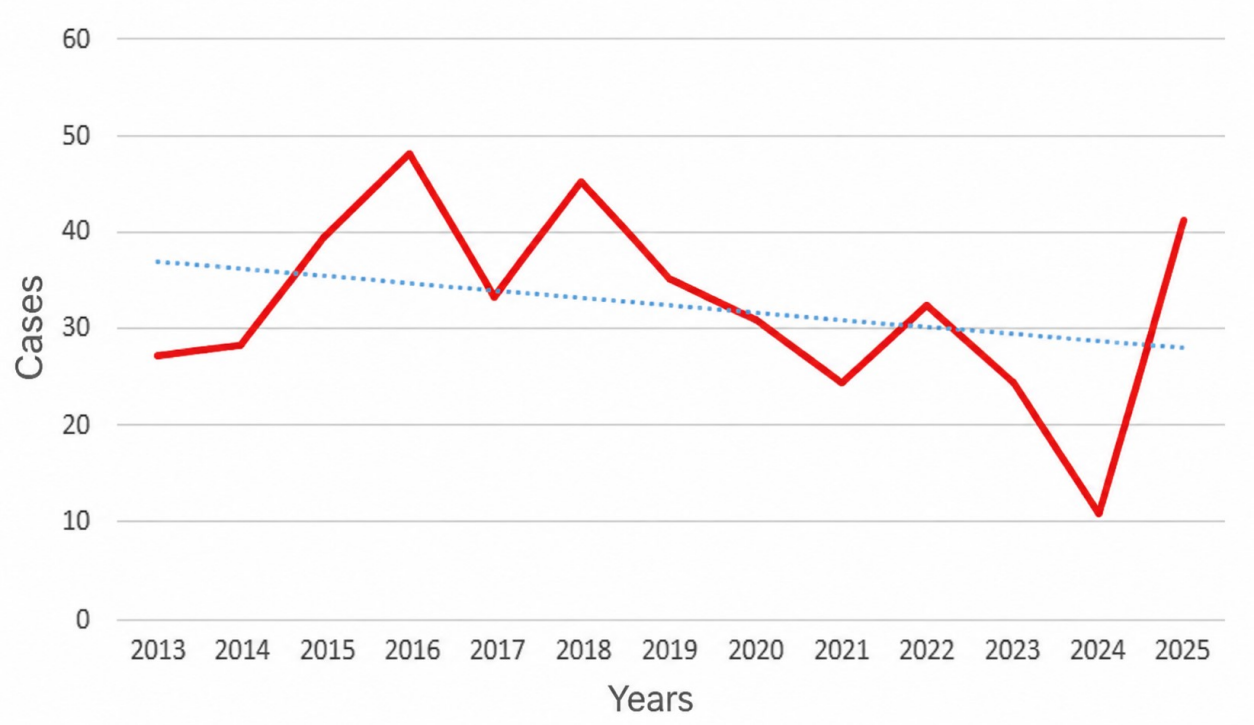
The first isolation of TBEV in Kazakhstan was in the Almaty region by M.P. Chumakov in 1941 (one strain from patient). This is proof that the clinically well-described "spring-summer encephalitis" in the Almaty region was in fact TBE. Later in 1943, 1944 and 1945 the TBEV was isolated from patients by local scientists from the Institute of Epidemiology and Microbiology (IEM), in Alma-Ata by E. I. Demikhovsky from CSF samples and brain tissue.[1] TBE clinical manifestations were first described by E.M. Steblov in the Almaty region, and the disease had been named "Almaty encephalitis". Moreover, Steblov described a chronic variant of TBE as "Kojevnikov's Epilepsy".[2] In 1954, the TBEV was isolated from Ixodes persulcatus ticks.[3] The endemic zone in Eastern Kazakhstan was first characterized by Zhumatov in 1957.[4] In 1959, a total of 5 TBEV strains were isolated from 315 Dermacentor reticulatus ticks (in 11 pools - minimal infection rate (MIR)- %14,3) in Zailiysky Alatau and 12 additional strains in Jungarsky Alatau (720 ticks – 12 pools – minimal infection rate (MIR) %13,9).[5] In the 1960s the Arbovirus Infections Laboratory of the Institute of Epidemiology, Microbiology and Hygiene (Alma-Ata) under the direction of Zhumatov conducted extensive work to study the natural foci of TBE in Kazakhstan. In particular, for several years, they examined birds for TBEV antibodies in Eastern Kazakhstan using a Hemagglutination Inhibition Assay). In 1961, during the examination of the sera of 46 birds, anti-TBEV antibodies were found in 4 local (non-migratory) species of birds (including jackdaw and starling). In 1962, 2 starlings out of 260 were also found with antibodies to the TBEV, whereas testing of 174 farm animal sera turned out to be negative. At the same time, studies of humans in Eastern Kazakhstan demonstrated seropositivity rates from 1.9% to 19.4%.[6] The study of human sera in different endemic regions showed that in mountain foci, where *I. persulcatus* is common, antibodies were detected in 12.0% of patients whereas in steppe foci it was 4.7%. Of persons between the ages of 11–15 years, antibodies were detected in 0.7%, between 16–25 years in 7.8%, between 26–35 years in 9.9% and over 35 years in 8.3%.

When studying human TBEV infection by different genera of ticks in different endemic territories of Kazakhstan, researchers concluded that in those places with no *I. persulcatus* ticks patients were infected by *Dermacentor reticulatus* or *Dermacentor marginatus* and such infections did not result in any symptoms of TBE.[7] All this work resulted in the creation of an epidemiological surveillance network for TBE, including the annual collection and study of ticks for infection rate, tick treatment of farm and domestic animals, as well as in areas where humans are concentrated, and in addition vaccination of the population in endemic areas. Local medical organizations are officially advised to conduct timely identification, recording and reporting of cases, including all individuals affected by tick bites, and this documentation includes diagnostic measures taken, hospitalization, medical examination and treatment of patients with TBE. Clinical supervision for patients who recovered from TBE must be conducted by a neurologist for a two-year period or longer, depending on the patient's health status. Routine immunization against tick-borne encephalitis must be carried out by medical organizations and must be provided for individuals whose activities are connected with being in a natural focus of TBE.[16] The Kazakh Institute of Epidemiology, Microbiology and Hygiene Research defines TBE-endemic areas in the 27 districts and 6 regions of Kazakhstan (Almaty, Eastern Kazakhstan, Akmola, Kostanai, Karaganda and Northern Kazakhstan).[13] In 2016, new cases appeared in "old" endemic zones in the Akmola region, in 2020, cases appeared in Northern Kazakhstan region, and in 2022 – in Zhambyl region.[17-20] In 2023, the number of confirmed TBE cases had decreased to 24 (32 in 2022), half of cases were registered in Eastern Kazakhstan Region (12). The incidence was still registered in the "new" endemic regions – Akmola - 4 cases and in the Northern Kazakhstan Region - 3 cases. Thus, the data of the former Kazakh Institute of Epidemiology and Microbiology on the wider endemicity of TBE, in addition to the Almaty and East Kazakhstan regions, are confirmed. In this regard, the Ministry of Health of the Republic of Kazakhstan transferred two more regions - Akmola (1 district) and North Kazakhstan (1 district) to the status of endemic regions.[21]

Overview of TBE in Kazakhstan

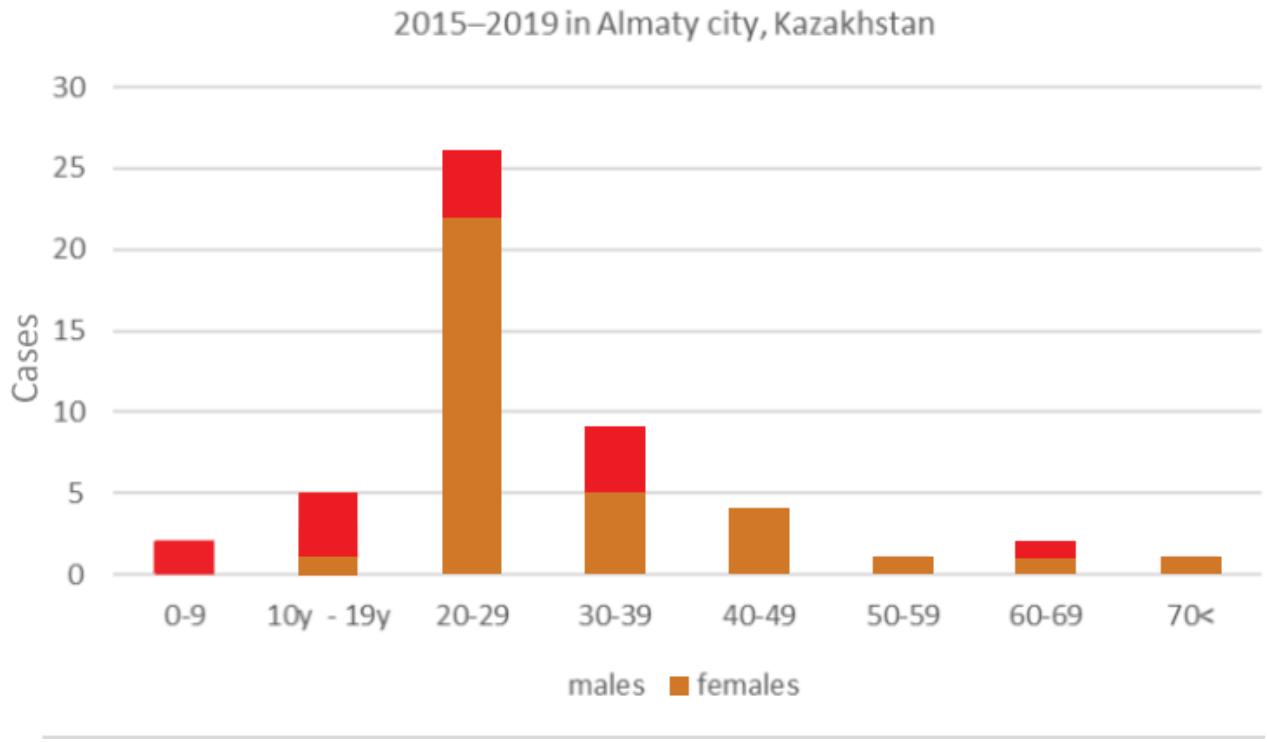
Table 1: TBE in Kazakhstan	
Viral subtypes isolated	Siberian subtype, Almaty region[12,13]
Reservoir animals	*No information available*
Percentage infected ticks	The tick infection rate of long-term data (1970)[14] • *I. persulcatus* – 31.3% positive pools • *D. reticulatus* — 29.2% positive pools • *D. marginatus* –15/5 – 33.3% positive pools By ELISA on TBEV Ag in Almaty region (2014–2015):[15] *I. persulcatus* 18.6%–21.8% positive pools *D. marginatus* 32.1%–74.2% positive pools *D. reticulatus* 33.3%–33.3% positive pools *D. niveus* 34.8%–45.4% positive pools *H. punctata* 33.3%–47.0% positive pools *R. turanicus* 14.8%–15.7% positive pools By PCR in Almaty region (2014–2016)[16] *I. persulcatus* - 15.4%-29.4% pools pos.; *D. marginatus* 8.3%; *Haemophysalis punctata* - 1.0%[19]
Dairy product transmission	Not documented—rare—frequent
Case definition used by authorities	Original
Completeness of case detection and reporting	The study of human sera in different endemic regions showed that in mountain foci where *I. persulcatus* is common, antibodies were detected in 12.0% of unvaccinated people whereas in steppe foci it was 4.7%.[6]
Type of reporting	Mandatory
Other TBE surveillance	Detection in ticks in ELISA and PCR
Special clinical features	Monophasic. Risk groups - the local population in endemic regions and those who visit them Clinical manifestation (%) - no information available
Licensed vaccines	Tikovak, Baxter AG, Austria, Pfizer Manufacturing Belgium N.V. EnceVir, Microgen, Russia
Vaccine recommendations	Local population in endemic regions, and the people working in this area
Vaccine uptake	No information available
National Reference center for TBE	There is no TBE Reference center in Kazakhstan

Figure 1: **TBE case numbers over time against the background of vaccination.**
(last edited in May 2026, update for 2025: 41, 2024: 11 reported cases)



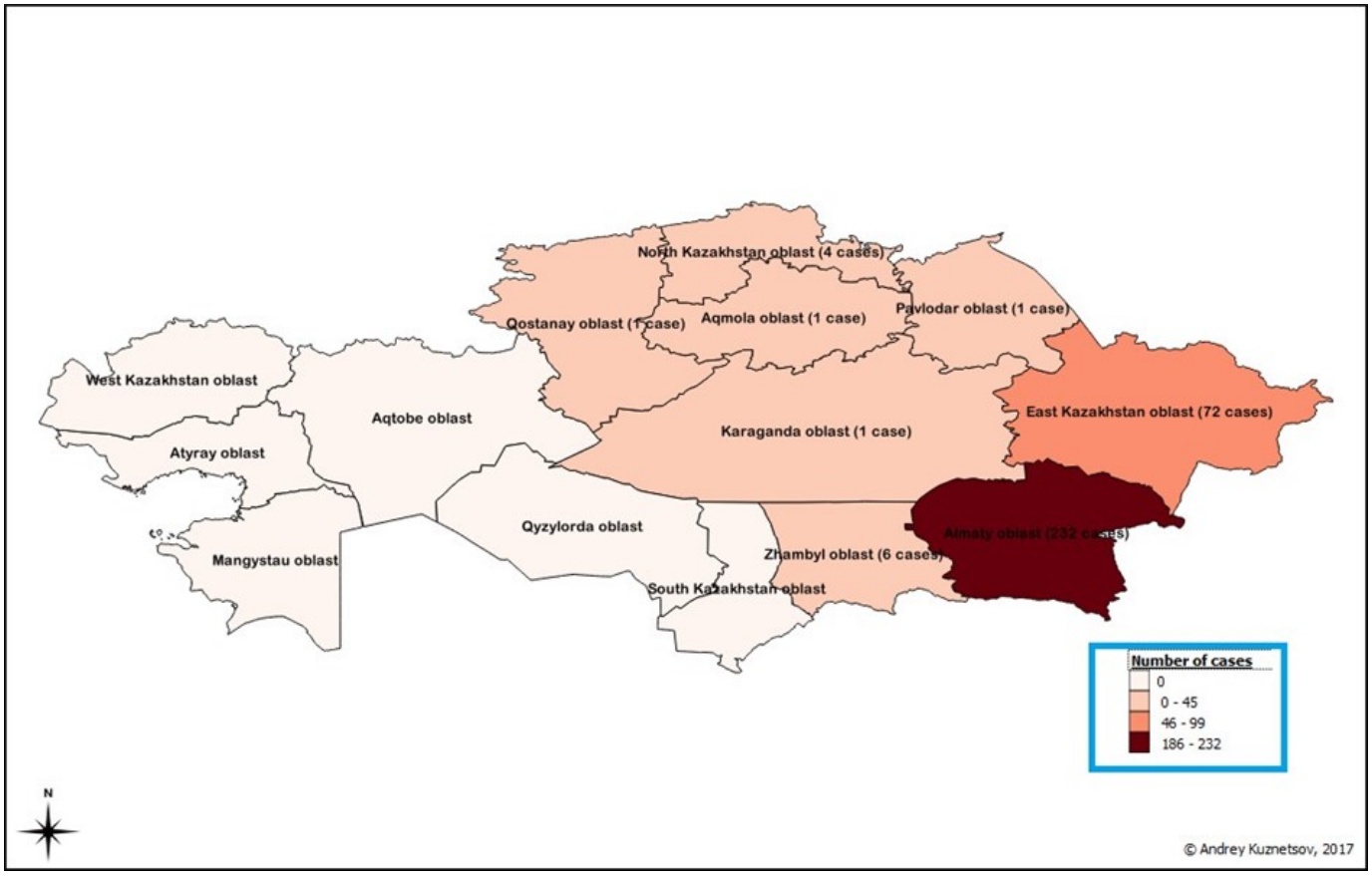
Source Data: Appendix Figure 1

Figure 2: **Age and Gender distribution of TBE in Almaty city of Kazakhstan, 2015 - 2019**



Source Data: Appendix Figure 2

Figure 3: TBEV-isolation and TBE cases in Kazakhstan



Maps were created in open source GIS, QGIS ver. 2.8.6 (Wien).

Appendix

Source data: Figure 2

Age group (years)	Males	Females	All
0–9	0	2	2
10–19	1	4	5
20–29	22	4	26
30–39	3	4	9
40–49	4	0	4
50–59	1	0	1
60–69	1	1	2
>70	1	0	1

Data for 2015–2019 in Almaty city

Source data: Figure 1

Year	Number of TBE cases	TBE incidence /10^5
1970	17	0.1
1971	12	0.09
1972	26	0.15
1973		
1974		
1975		
1976	22	0.13
1977	11	0.07
1978	11	0.07
1979	21	0.14
1980	7	0.04
1981	7	0.04
1982	8	0.05
1983	14	0.09
1984	18	0.11
1985	12	0.08
1986	11	0.07
1987	11	0.07
1988	14	0.08
1989	25	0.2
1990	14	0.08
1991	20	0.12
1992	19	0.13
1993	12	0.08
1994	17	0.12
1995	22	0.15
1996	30	0.20
1997	43	0.29
1998	38	0.26
1999	60	0.41
2000	44	0.30
2001	35	0.23
2002	55	0.38
2003	30	0.20
2004	50	0.33
2005	49	0.32
2006	33	0.20
2007	32	0.21
2008	34	0.22
2009	49	0.31
2010	30	0.20
2011	40	0.26
2012	33	0.20
2013	27	0.18
2014	28	0.18
2015	49	0.32
2016	48	0.31
2017	34	0.22
2018	46	0.30
2019	35	0.19
2020	31	0.17
2021	24	0.13
2022	32	0.17
2023		
2024	41	0.20
2025	11	0.05

Acknowledgments

TBE surveillance was supported by the Science practical Center for sanitary and epidemiological monitoring and expertise.

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Citation:
Dmitrovskiy A. TBE in Kazakhstan. Chapter 12b. In: Dobler G, Erber W, Bröker M, Chitimia-Dobler L, Schmitt HJ, eds. *The TBE Book*. 9th ed. Singapore: Global Health Press; 2026. doi: 10.33442/26613980_13-17-9

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