Chapter 13

TBE in China

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E-CDC risk status: endemic in Northern China *(last edited in May 2025, update for 2024: no data)*

History and current situation

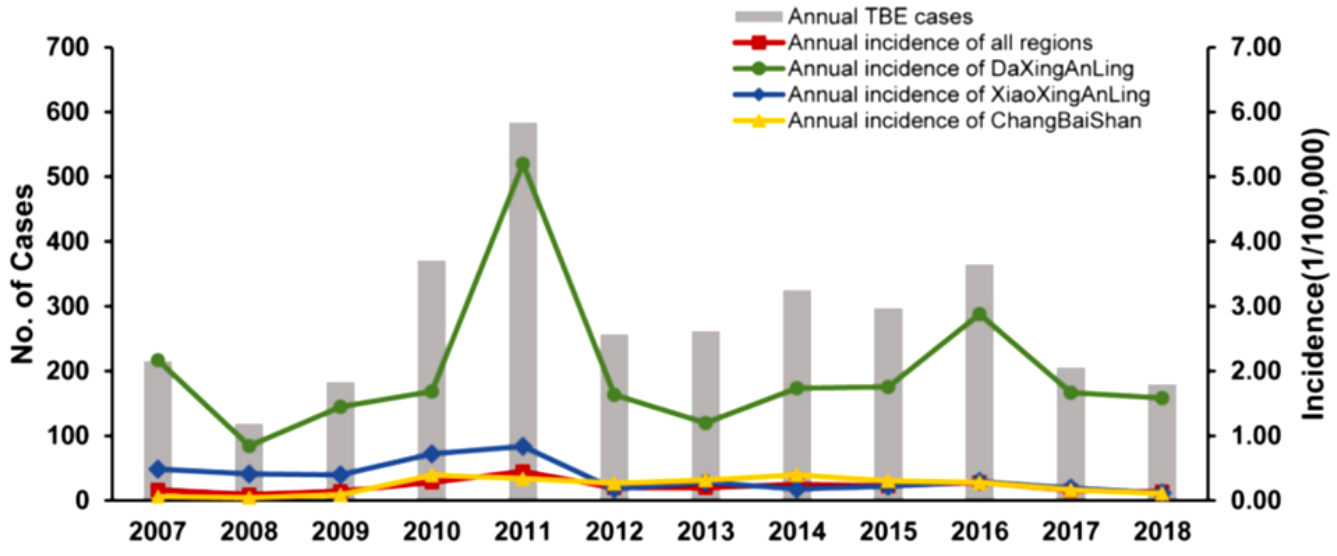
Tick-borne encephalitis (TBE) is an endemic disease in some regions of northern China. The first TBE patients were reported in 1943 and TBE virus (TBEV) was isolated from brain tissues of two patients in 1944 by Japanese military scientists[1] as well as from patients and ticks (*I. persulcatus* and *Haemaphysalis concinna*) in 1952 by Chinese researchers[2].

In China, the Far Eastern (TBEV-FE) subtype is the endemic subtype which has been isolated from the 3 major endemic regions (northeastern China, western China and south-western China). It is mainly transmitted by *Ixodes persulcatus*[3]. No European (TBEV-Eu), and Siberian (TBEV-Sib) subtypes were isolated to date according to our knowledge. Recently, Himalayan (Him-TBEV) subtype has been identified in wild rodents in Qinghai-Tibet Plateao in China[4].

TBE patients are mainly reported from the epicenter: northeastern China, including Inner Mongolia Autonomous Region (Daxing'an Mountains), Heilongjiang Province (Xiaoxing'an Mountains) and Jilin Province (Changbai Mountains). Patients are also reported from another important epidemic area, the Tianshan Mountains and the Altai Mountains of the Xinjiang Autonomous Region[5] as well as from other areas which were not considered to be endemic in the past (see map, Figure 3). Cases may be missed as TBE is not a notifiable disease in China, especially in regions with lower TBE incidences, due to a lack of awareness among both physicians and the population and also due to a local lack of availability of serological testing.

The incidence of TBE decreased in China during the 1980s. However, it has been rising since 2008, as noted by disease control and prevention sectors and local hospitals[5]. Case numbers remained stable in recent years[6]. TBE patients before the 1980s were mainly forest workers, however, it has been reported that changes in the occupation / type of "exposure risk" occurred among TBE patients ever since and in particular since the late 1990s with 70%-95% of the most recent patients being non-forest working farmers, housewives, domestic workers, students, or anyone with any occupation who entered the endemic forest areas[7]. Cases among tourists may be underreported, considering that the Chinese "TBE-epicenters" are also tourist resorts, and probably fewer protection measures are applied by tourists.

Figure 1: TBE case numbers and incidence in China, 2007 to 2018.[6] As opportunities for TBE-diagnostics (serology) are limited, and as there is no mandatory reporting of TBE in China, the approximate 300 - 400 documented cases in China each year since 2007 are probably just the tip of the iceberg. Update for 2024: no data



Overview of TBE in China

Table 1: TBE in Northern China	
Viral subtypes, distribution	Far Eastern TBEV subtype[1]
Reservoir animals	Mice and insectivorous animals; migratory birds; lagomorphs, goats[8]
Percentage infected ticks	*I. persulcatus*, however TBEV has also been isolated from *H. concinna*, *H. japonica*, *Dermacentor silvarum*, and *I. ovatus*[7]
Dairy product transmission	Not known
Case definition used by authorities	Clinical case: symptoms (such as acute fever, headache, vomiting and/or typical central nervous system symptoms) + exposure in forests during spring or summer, or a tick bite history; Laboratory-confirmed case: clinical case + confirmed by laboratory serological tests (increased anti-TBEV IgG and IgM or ≥4-fold increase in specific antibody to TBEV between acute and convalescent serum samples) or PCR test positive for TBEV RNA if necessary[9]
Completeness of case detection and reporting	NA
Type of reporting	Mandatory in Heilongjiang Province. Clinical TBE cases have been reported to the Chinese Information System for Diseases Control and Prevention (CISDCP) by the majority of provinces since 2002, such as Heilongjiang, Inner Mongolia Autonomous Region, Jilin, and Liaoning. No data publicly available[5]
Other TBE Surveillance	Detection of TBE virus in ticks have been conducted in endemic areas sporadically[10,11]
Special clinical features	Biphasic disease not reported from China. Different symptoms among patients with different disease severities; in the early 1950s, CFR of TBE in the northeastern forest areas was over 25%, but since the 1980s it has decreased to around 8%. Long-lasting sequelae of TBE are common, almost one-third of the patients in the 1952 outbreak had paralysis in the neck muscles or the shoulder muscles. Recently the complications of TBE over a ten-year period was reported to be 16.6% (90/542)[12-15]
Licensed vaccines	TaiSenBao produced in China with Sen-Zhang strain as seed strain in PHK cell (Changchun Institute of Bio-product)[16]
Vaccine recommendations	Residence in endemic areas, travelers to endemic areas, with no reimbursement[17]
Vaccine uptake	NA
National Reference center for TBE	Chinese Center for Disease Prevention and Control http://ivdc.chinacdc.cn/
Additional relevant information	Seropositivity in the population: 19.7% in southwestern China; 35.4% in northwestern China; 0-10.9%, 0-9.8% and 7.6% in northeastern China[8]

Figure 2: Age and gender distribution of TBE in China, 2007-2018[6]

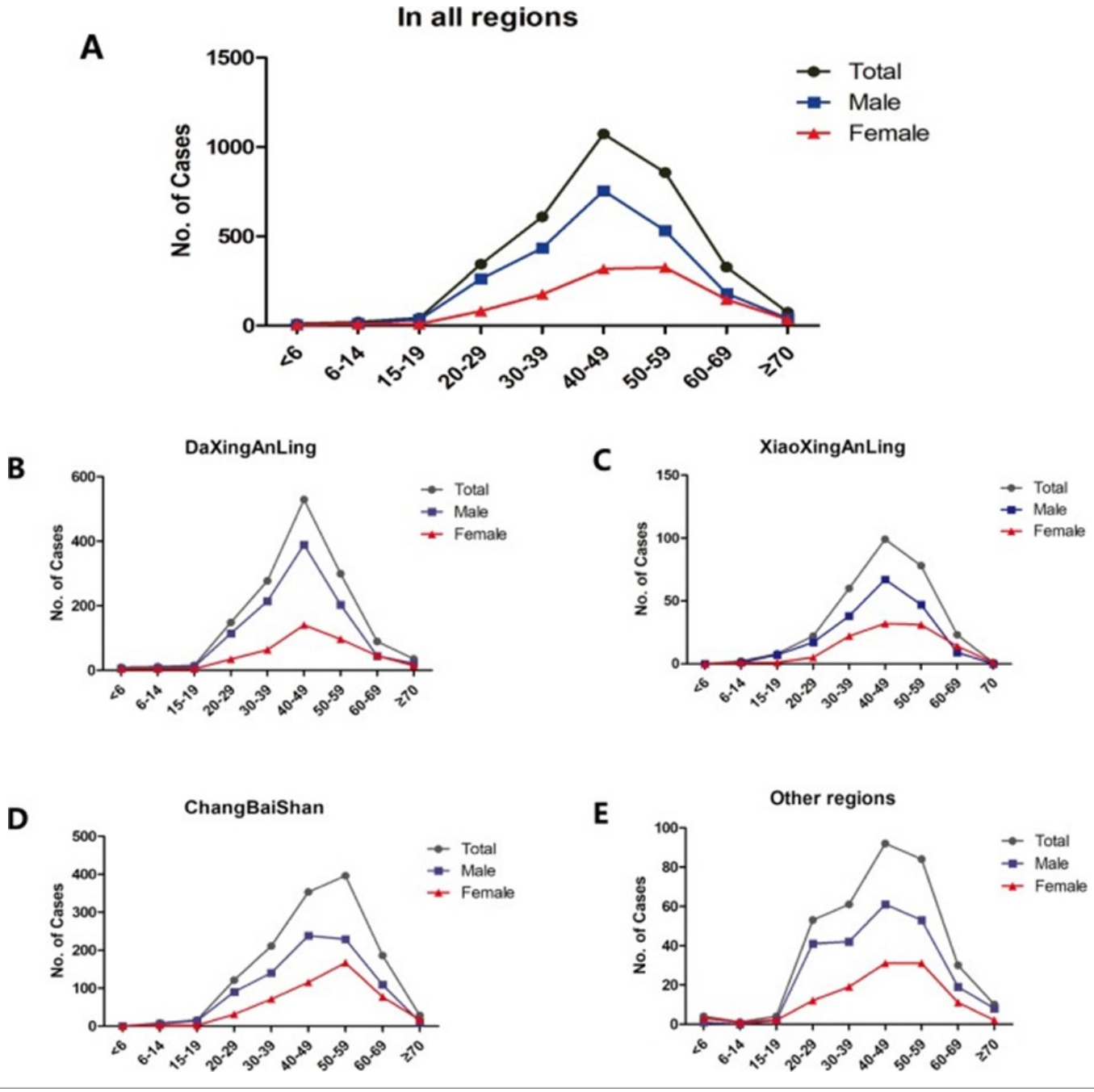
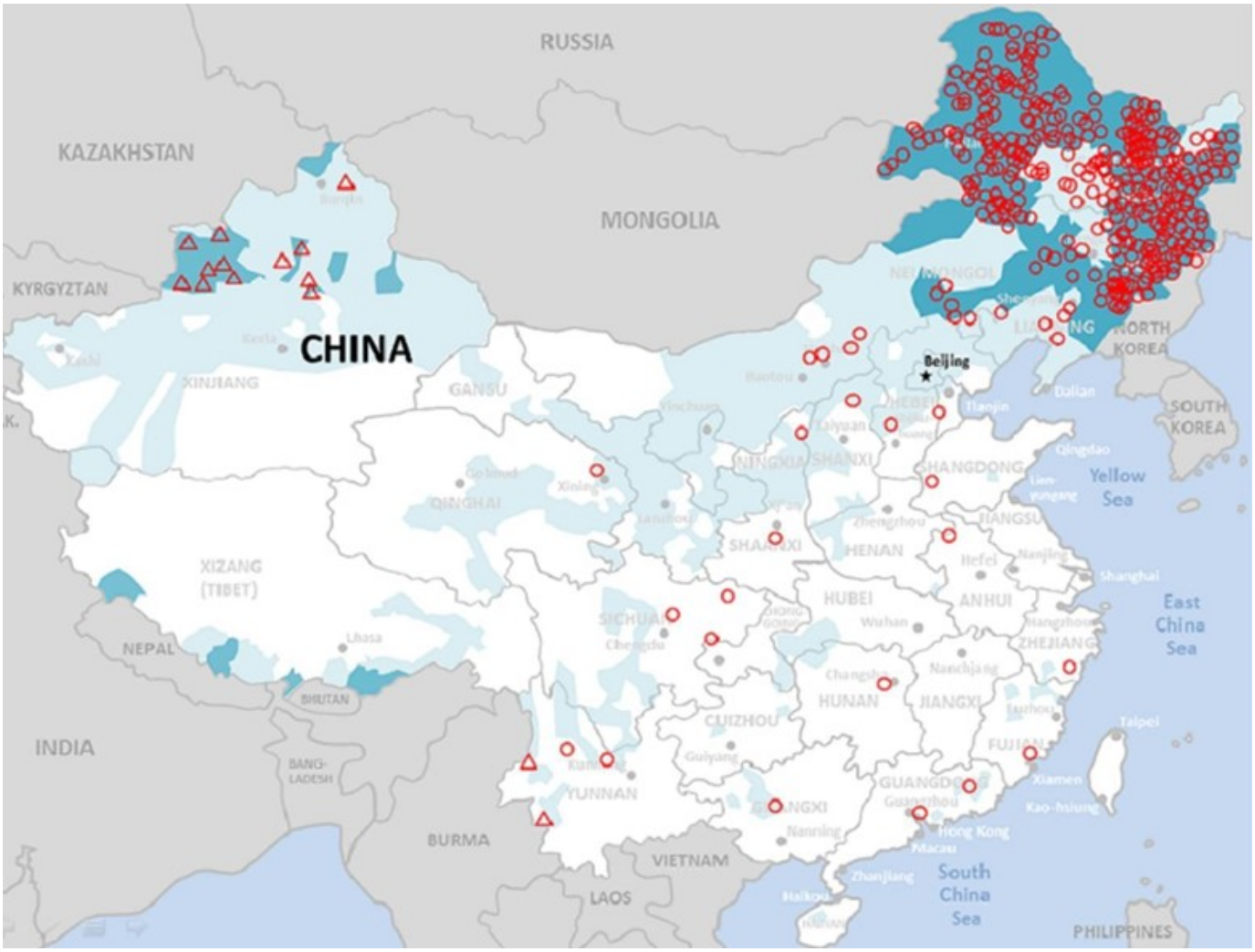


Figure 3. Sites of confirmed and predisposed TBEV infection in China since 2006[5,6]



○ *Reported TBE cases 2006–2013*
△ *Confirmed TBEV foci in Xinjiang and Yunnan*

***Intensity of blue color**: Reflects the probability of an area to be endemic for TBEV, dark blue = 100%, light blue, lower probabilities based on various environmental and climate criteria as published by Sun et al. 2017*

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