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Research Letter

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Tick-borne encephalitis cases recorded in Ukraine over 1990–2018

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Tick-borne encephalitis (TBE) remains the most important tick-borne viral infection of the central nervous system despite the availability of efficacious vaccines.[1–4] In contrast to the European Union, information on TBE epidemiology for non-European Union countries is lacking. As an example, despite being heavily impacted by TBE, peer-reviewed publications on TBE cases in Ukraine are not available. Therefore, the objective of this research letter is to provide with the most updated information on TBE cases in Ukraine. The data presented herein are official and were obtained from the Public Health Center of the Ministry of Health of Ukraine. Unfortunately, additional pertinent information (e.g. incidence, patients' age and sex) was unavailable.

A total of 459 TBE cases were recorded from 1990 to 2018. In contrast to sporadic TBE cases annually reported over this time period, noticeably increased numbers of cases were observed from 1995 to 2000 and in 2003 (26–58 annual cases; Table 1), which may be partly due to activation of natural foci in the northwestern Ukraine, specifically, Volyn region. Of note, the follow-up vaccination campaign, which was carried out in this region in fall 2003, successfully reduced the number of TBE cases for the years to follow. Unfortunately, because no other TBE vaccination campaign has been conducted in Ukraine since then, TBE outbreaks are expected to reoccur any time during the next activation cycle. Interestingly, since 2004, annual numbers of TBE cases in Ukraine have not exceeded >10 cases. In contrast, tens and even hundreds of TBE cases have been recorded each year in Hungary, Poland and Slovakia, the neighbouring countries, where population is (much) smaller and tick-borne encephalitis virus vaccination campaigns are well established.[1,3,5] Such a dramatic difference may be accounted for by various natural (e.g. biotic, climatic and geographical differences), anthropogenic (e.g. human activity, adequacy of epidemiological surveillance) and other factors (e.g. adherence to notification), which itself warrants future investigation.

Over the 29-year period, 21 (9.5%) cases of TBE detected in Ukraine were travel related. The annual number of imported TBE cases varied from 0 to 5, and these cases were detected in almost half of the administrative regions (oblasts) of Ukraine (12 out of 25 regions). Most travel-related TBE cases ($n = 15$) were imported from Russia and the others originated from Belarus ($n = 2$), Estonia ($n = 1$), the Czech Republic ($n = 1$) and Poland ($n = 1$) (Table 1). The highest number of travel-related TBE cases ($n = 5$) was recorded in 1991 and all the five cases were traced back to western (Chelyabinsk, Novosibirsk, Sverdlovsk and Tyumen regions) and eastern (Chita region) Siberia, the highly endemic area, where the morbidity may be as high as 40 cases per 100 000 population.[6] In comparison, only 65 (2.2%) out of 2907 confirmed TBE cases reported by nine European countries were travel associated.[4] In Europe, the calculated incidence of travel-related TBE cases was shown to vary greatly from being 7.5 (Germany) and 13.2 (Austria) to as high as 45.0 (Switzerland) and 321.0 (Sweden) cases per 100 000 travel-years.[7] It was also

Table 1. Tick-borne encephalitis (TBE) cases reported in Ukraine over 1990–2018

Year	Total number of TBE cases reported	Number of travel-related TBE cases	Locations where travel-related TBE cases were recorded (number of travel-related cases for each region when available)	Countries and regions where travel-related TBE cases originated
1990	15	3	Dnipropetrovs'k region (1) Crimea (2)	Russia Chelyabinsk region[a] Sverdlovsk region[a]
1991	15	5	Dnipropetrovs'k region[a] Donets'k region[a] Kharkiv region[a] Kirovohrad region[a]	Russia Chelyabinsk region Chita region Novosibirsk region Sverdlovsk region Tyumen region
1992	16	1	Ivano-Frankivs'k region (1)	Russia Udmurt
1993	14	1	Dnipropetrovs'k region (1)	Estonia Narva
1994	5	0	n/k[b]	n/k
1995	58	0	n/k	n/k
1996	47	2	Dnipropetrovs'k region (1) Kyiv region (1)	n/k
1997	34	3	Ivano-Frankivs'k region (2) Lviv region (1)	Czech Republic Poland Russia
1998	26	0	n/k	n/k
1999	47	0	n/k	n/k
2000	45	2	Donets'k region (1) Luhans'k region (1)	Russia Kemerovo Murmansk
2001	15	0	n/k	n/k
2002	12	0	n/k	n/k
2003	28	0	n/k	n/k
2004	3	0	n/k	n/k
2005	8	1	Luhans'k region (1)	n/k
2006	7	1	Ivano-Frankivs'k region (1)	Belarus
2007	4	0	n/k	n/k
2008	7	0	n/k	n/k
2009	8	0	n/k	n/k
2010	3	0	n/k	n/k
2011	10	2	Kharkiv region (1) Sevastopol, Crimea (1)	Russia Surgut (Khanty-Mansi Autonomous Okrug) Tyumen Russian Federation Gornoaltaisk (Altai Krai)
2012	3	0	n/k	n/k
2013	3	0	n/k	n/k
2014	6	0	n/k	n/k
2015	3	1	Volyn region	Belarus Sushytnytsya village (Malorytsky raion, Brest region)
2016	6	1	Kharkiv region	Russia Teletskoye Lake (Turochak raion, Altai Krai)
2017	4	0	Khmelnytsky region	n/k
2018	7	0	n/k	n/k
Total	459	23	n/k	n/k

[a]Number of TBE cases per location is not known.
[b]n/k denotes not known.

estimated that the attack rate for the exposed at-risk population in endemic areas of Western and Central Europe was 0.5–1.3 per 100 000.[8]

Given the high number of travel-related cases in Ukraine, it is recommended that travellers obtain information on the endemicity status of their destination from public health professionals before arranging trips. If the destination area is TBE-endemic and outdoor activities are planned, TBE vaccination is highly recommended.[8] For physicians, it is important to realize that travellers often do not perceive risks associated with TBE and hence refuse TBE vaccination.[9] Moreover, TBE should always be part of the differential diagnosis for neurological cases even when the history of tick bite is missing.[10]

In summary, the present report is the first to have presented the data on the TBE cases registered in Ukraine over 1990–2018. A total of 459 TBE cases were recorded during this 29-year period, including 21 travel-related cases. When the origin was determined, the majority of travel-related TBE cases was imported from Russia.

Author Contributions

O.Y. collected, analyzed and interpreted the data and wrote the manuscript draft. D.D. was involved in data interpretation and critical review of the manuscript. N.V. was involved in data analysis and critical review of the manuscript. A.R. designed the study, analyzed and interpreted the data and wrote the manuscript. All the authors have approved the final draft of the manuscript.

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Conflict of interest

None declared.

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