



Review Article

The International Scientific Working Group on Tick-Borne Encephalitis (ISW TBE): Review of 17 years of activity and commitment



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ABSTRACT

Tick-borne encephalitis (TBE) has been a growing public health problem in Europe and other parts of the world for the past 20 years. In 1999, in order to encourage the control of TBE, international experts created a new body: The International Scientific Working Group on Tick-Borne Encephalitis (ISW-TBE). This Working Group has been composed of internationally recognized scientific experts from tick-borne encephalitis virus (TBEv)-endemic and non-endemic regions with extensive personal expertise in the field and a high level of commitment to improve the knowledge of TBE and to increase the public awareness of TBE. Since the foundation of the Working Group, ISW-TBE members meet annually. Every meeting is dedicated to a specific topic, and since 2004 a yearly conference report has been published to inform the scientific community about the latest developments. Among the specific issues that have been extensively discussed over the years were the following: clinical aspects of the disease, TBE in children and golden agers, epidemiology, possible causes for the increase in TBE incidence in Europe, TBE and awareness, TBE and travel, (low) vaccination rates, and the cooperation with the European Centre for Disease Prevention and Control (ECDC). This paper gives an overview of the most important activities and achievements of the ISW-TBE over the past 17 years.

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Contents

| | |
|---|-----|
| 1. Background and rationale | 399 |
| 2. Annual meetings | 400 |
| 3. TBE: disease and epidemiology | 400 |
| 4. Possible causes for an increase of TBE morbidity | 401 |
| 5. Specific topic: the awareness program | 401 |
| 6. Specific topic: the traveling program | 401 |
| 7. Specific topic: low vaccination rates | 402 |
| 8. Specific topic: Cooperation with the European Centre for Disease Prevention and Control (ECDC) | 402 |
| 9. Specific topic: TBE in children and golden agers | 402 |
| 10. Conclusion | 403 |
| Acknowledgements | 403 |
| References | 403 |

1. Background and rationale

For a long time, tick-borne encephalitis (TBE) was believed to be a rather limited problem encountered in a few well-defined endemic areas. However, this notion had to be revised already many

years ago. TBE has been a growing public health problem in Europe and other parts of the world for the past 20 years.

In order to encourage working on the prevention of TBE, an international effort was launched in 1999 with the aim to investigate and approve this situation. International experts created a new body: The International Scientific Working Group on Tick-Borne Encephalitis (ISW-TBE). This Working Group has been composed of internationally recognized scientific experts from tick-borne encephalitis virus (TBEv)-endemic and non-endemic

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Table 1
Main aims of the ISW-TBE.

| |
|---|
| * Promote national and international collaboration on TBE on scientific, medical and regulatory issues; |
| * Stimulate and coordinate applied and basic research on TBE; |
| * Contribute to training and educational programs in the field; |
| * Provide high-quality information on TBE and promote its dissemination; |
| * Promote and apply international standards on epidemiological TBE surveillance; |
| * Define and promote proposals to harmonize national and international policies on TBE prevention. |

Table 2
Identified key problems & proposals of the ISW TBE.

| |
|---|
| * Increasing number of cases in many European countries |
| * Under-diagnosis of cases in some countries |
| * Still low vaccination rates in many European countries (endemic areas) |
| * Lack of information regarding distribution of the virus, the disease, assessment of tick bite risk |
| * Lack of awareness of local health authorities – lack of officially recommended vaccination |
| * Change of lifestyle: increasing leisure time spent in nature with increasing outdoor activities, increasing travel and mobility within Europe |

regions with extensive personal expertise in the field and a high level of commitment to improve the knowledge of and to increase the public awareness toward TBE. The pharmaceutical company Baxter, a manufacturer of TBE vaccines for more than 35 years, was invited by the Working Group to join the ISW-TBE. In 2014, the acquisition of Baxter's International Inc.'s portfolio of marketed vaccines has been completed by the Pfizer Corporation.

The initiative to set up the ISW-TBE was taken by members of the former University of Vienna, now Medical University of Vienna, in an effort to spread the experience in TBE prevention gained in Austria to other countries and to support them in establishing and expanding their own prevention programs (Kunze and Kunze, 2003). Such experience is of particular importance in the case of social marketing, including public awareness campaigns that are a prerequisite to create the necessary problem awareness toward this disease. Information measures are needed to reach both the general public and the professional community; and international efforts will be able to supplement local information measures. The main aims of the ISW-TBE are summarized in Table 1, and the key problems identified by the group are shown in Table 2.

2. Annual meetings

The inaugurating meeting of the ISW-TBE was held in Salzburg, Austria, in December 1999. The philosophy and the objectives of the Working Group were established, and country reports were given to get an overview of the epidemiological situation and the taken efforts to prevent TBE. Since then the ISW-TBE members have met annually. Every meeting is dedicated to a specific topic, which is then extensively discussed. Since 2004, a yearly conference report has been published to inform the scientific community about the latest developments (Table 3; Kunze and the ISW-TBE, 2004–2015). At the second meeting, held in Stockholm in May 2000, a number of priority programs were defined and approved, including the improved and expanded search for TBE occurrence outside the known endemic regions, the assessment of implications of mobility and international travel on TBE incidence (traveling program), and the furthering of awareness toward TBE (awareness program). These programs are still on the agenda and will be described in detail in this paper.

Table 3
Overview of annual meeting topics from 2004 to 2015.

| | |
|------------------------|--|
| 6th conference (2004) | Tick-borne Encephalitis in Childhood |
| 7th conference (2005) | The Golden Agers and Tick-borne Encephalitis |
| 8th conference (2006) | Tick-borne Encephalitis – A European Health Challenge |
| 9th conference (2007) | Tick-borne Encephalitis: From Epidemiology to Vaccination Recommendations in 2007. New Issues – Best Practices |
| 10th conference (2008) | Cambating Tick-borne Encephalitis: Vaccination Rates on the Rise |
| 11th conference (2009) | From Childhood to Golden Age: Increased Mobility-Increased Risk of Contracting TBE? |
| 12th conference (2010) | TBE – Awareness and Protection: The Impact of Epidemiology, Changing Lifestyle and Environmental Factors |
| 13th conference (2011) | Tick-borne Encephalitis: New Paradigms in a Changing Vaccination Environment |
| 14th conference (2012) | Tick-borne Encephalitis: An Underestimated Risk. . .still |
| 15th conference (2013) | Tick-borne Encephalitis – A Notifiable Disease |
| 16th conference (2014) | Tick-borne Encephalitis – A Notifiable Disease, A Review After One Year |
| 17th conference (2015) | Tick-borne Encephalitis as a Notifiable Disease – Status quo and The Way Forward |

3. TBE: disease and epidemiology

TBE is a vector-borne disease. TBEv, the causative agent, is transmitted to humans through the bite of an infected vector tick (*Ixodes ricinus* or *Ixodes persulcatus*). Infection occasionally takes place by the consumption of contaminated unpasteurized dairy products (Mansfield et al., 2009). There are three subtypes within the species TBEv (family Flaviviridae): the European, the Siberian, and the Far-Eastern subtype. The European subtype is mainly found in Europe, but also in western Urals and in Siberia, the Siberian subtype is found in Siberia, the Baltics, and northern Finland, and the Far-Eastern subtype has been identified in eastern Asia (e.g. in Japan) and also in central and eastern Siberia (Mansfield et al., 2009; Bogovic and Strle, 2015). All subtypes are all closely related, both genetically and antigenically (Mansfield et al., 2009; Thiel et al., 2005).

The vertebrate hosts of *I. ricinus* and *I. persulcatus*, which may carry TBEv, are wild and domestic animals. The virus prevalence in ticks and the prevalence of infected ticks can vary substantially within and among risk areas.

The spectrum of clinical presentations ranges from simple fever to severe encephalitis with or without myelitis. Infection may result in death (0.5–2.0%, case fatality possibly higher for the Siberian subtype) or long-term neurological sequelae (up to 58%, according to the World Health Organization [Haglund and Günther, 2003; Bogovic et al., 2010]). To date, no causal treatment is known, however, infection and disease can be prevented by avoiding tick bites (using insect repellents, etc.) and vaccination. Currently four TBE vaccines are available, two Russian and two European vaccines. The European licensed vaccines include an Austrian vaccine (FSME – Immun[®] also known as TicoVac[®] in all Baltic and Scandinavian countries; Pfizer, formerly Baxter) and a German vaccine (Encepur[®], formerly Novartis, since 2015 GSK Vaccines). Both vaccines are [physically?] well tolerated and efficacious for immune-competent individuals aged >1 year and appear to protect against all TBEv subtypes circulating in Europe and Asia (WHO, 2011; Fritz et al., 2012).

TBEv is endemic in many parts of Europe, Siberia, Far-Eastern Russia, northern China and Japan and has a huge geographic distribution, including at least 34 countries (Bogovic and Strle, 2015; Lindquist, 2014).

The epidemiology of TBE in Europe is characterized by two distinct trends, i.e., a consistent expansion of risk areas on the one

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