TBE among US civilian travelers and laboratory workers

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TBE among US travelers
TBE case identification in US

- TBE is not nationally notifiable
- No commercially-available test to diagnosis TBE
- Limited testing at academic centers, state public health laboratories, and US government facilities
  - Molecular and serologic testing available at CDC
- Identification relies on clinician to consider TBE in differential for returning travelers with clinically compatible illness
TBE case classification

- Clinically compatible illness AND laboratory evidence of infection

- Confirmed case
  - TBE virus antigen or nucleic acid, OR
  - ≥4-fold change in virus-specific neutralizing antibody titers*, OR
  - IgM antibodies with virus-specific neutralizing antibodies*, OR
  - IgM in CSF without IgM to other endemic arboviruses

- Probable case
  - IgM in serum or CSF with not other testing performed

*Titers also need to be 4-fold higher than other closely related flaviviruses (e.g., Powassan virus)
Overview of TBE cases among US travelers

- Prior to 2000, only one TBE case reported among US travelers†
  - 4 yo developed meningoencephalitis after returning from Hungary
- From 2000-2020, 11 TBE cases have been identified

# Sex and age of TBE cases — US traveler, 2000–2020 (N=11)

<table>
<thead>
<tr>
<th>Demographics</th>
<th>No. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sex</strong></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>10 (91)</td>
</tr>
<tr>
<td><strong>Age in years</strong></td>
<td></td>
</tr>
<tr>
<td>0-19</td>
<td>3 (27)</td>
</tr>
<tr>
<td>20-39</td>
<td>2 (18)</td>
</tr>
<tr>
<td>40-59</td>
<td>4 (36)</td>
</tr>
<tr>
<td>≥60</td>
<td>2 (18)</td>
</tr>
</tbody>
</table>
Month of onset of TBE cases — US travelers, 2000–2020 (N=11)
Clinical syndromes for TBE cases — US travelers, 2000–2020 (N=11)

<table>
<thead>
<tr>
<th>Clinical syndrome</th>
<th>No.</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Encephalitis</td>
<td>7</td>
<td>(64)</td>
</tr>
<tr>
<td>Meningitis</td>
<td>4</td>
<td>(36)</td>
</tr>
</tbody>
</table>
### Outcomes for TBE cases — US travelers, 2000–2020 (N=11)

<table>
<thead>
<tr>
<th>Outcome</th>
<th>No.</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Survived</td>
<td>9</td>
<td>(82)</td>
</tr>
<tr>
<td>Sequelae*</td>
<td>3</td>
<td>(27)</td>
</tr>
<tr>
<td>No sequelae</td>
<td>6</td>
<td>(55)</td>
</tr>
<tr>
<td>Died</td>
<td>0</td>
<td>(0)</td>
</tr>
<tr>
<td>Unknown</td>
<td>2</td>
<td>(18)</td>
</tr>
</tbody>
</table>

*Mild cognitive issues (n=2), neurologic (n=1)
Countries of probable acquisition of TBE — US travelers, 2000–2020 (N=11)

- Czech Republic (n=2)
- Sweden (n=2)
- Switzerland
- Switzerland or Austria
- Finland

- Russia (n=3)
  - Siberia
  - Siberia or other parts
  - Eastern

- China
Duration of travel for TBE cases — US travelers, 2000–2020 (N=11)

- Duration of travel documented for all cases
- Median = 24 days (range: 7 days to 2 months)
Travel-related information for TBE cases — US travelers, 2000–2020 (N=11)

- Activities
  - Hiking (n=3)
  - Substantial outdoor exposure in rural areas (n=2)
  - Camping (n=1)
  - Fishing (n=1)
  - Working on rental property (n=1)
  - Unavailable for 3 travelers (27%)

- Tick bite reported in 6 persons (55%)
  - >1 bite for 4 persons
Summary of TBE cases among US travelers

- Low number of cases
- Majority of cases in males; both adult and pediatric travelers
- Sequelae reported one-third of cases; severe outcomes rare
- Infection acquired in late spring and summer
- Infection acquired in countries throughout risk area
- Risk activities occurred in tick-habitats
TBE virus infections among laboratory workers
**Information on TBE virus and laboratory worker infections**

- Handled at biosafety level (BSL) 4 or enhanced BSL-3*

- Data on TBE virus infections in laboratory workers obtained from literature and surveys sent to national and international labs in 1976 and 1978†

- Since report of surveys published, one additional case reported‡

- Most laboratory workers routinely vaccinated against TBE

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*Enhanced BSL-3 is BSL-3 level containment procedures with additional precautions: 1) enhanced respiratory protection of personnel against aerosols; 2) HEPA filtration of exhaust air from the laboratory; 3) personal body shower upon exit; and 4) restricted access.

†The Subcommittee on Arbovirus Laboratory Safety of the American Committee on Arthropod-Borne Viruses. Am J Trop Med Hyg 1980
TBE virus infections in laboratory workers*

- 46 TBE virus infections identified among laboratory workers
  - 36 (78%) disease cases, including 2 deaths
  - 10 (22%) asymptomatic infections

- Route of transmission
  - 10 (22%) aerosol
  - 36 (78%) unknown

- 4 among US laboratory workers
  - 3 disease cases, including 2 deaths, and 1 asymptomatic infection
  - All aerosol exposure
  - None received vaccine

For more information, contact CDC
1-800-CDC-INFO (232-4636)

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.