

# Summary of tick-borne encephalitis surveillance results. Implementation of case definitions in Poland

Pawel Stefanoff<sup>1</sup>, Andrzej Zielinski<sup>1</sup>, Millicent Eidson<sup>2,3</sup>, Dale L. Morse<sup>2,3</sup>

1) National Institute of Hygiene, Department of Epidemiology, Warsaw, Poland,

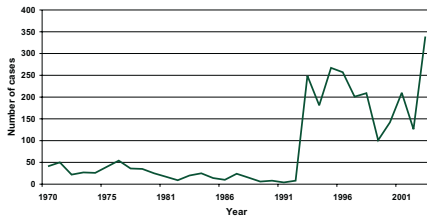
2) Department of Epidemiology and Biostatistics, University at Albany, SUNY, Rensselaer, NY, USA

3) New York State Department of Health, Albany, NY, USA.

## Background

- Tick-borne encephalitis (TBE) has been endemic in Poland for several years.
- The disease can lead to disability or death, and despite existing vaccination programs is an increasing problem.
- The reported number of cases has varied since 1993 from 50 to 100 per year (Figure 1).

Figure 1. Reported cases of tick-borne encephalitis in Poland, 1970-2003



- In 2004 new case-definitions of TBE were established for the surveillance system in Poland.
- The aim of this study was to describe cases reported in Poland from 1999-2002 and to compare differences by category of case definition.
- Detected differences could help appropriately target interventions to improve reporting and the use of confirmatory diagnostic tests.

## Material and Methods

Existing TBE reports from the years 1999-2002 were described and analysed using a new case definition (Table 1).

Table 1. Tick-borne encephalitis case definitions, Poland, 2004

Possible case	a. clinically compatible disease (febrile illness with diverse neurological symptoms of aseptic meningitis or encephalitis), AND b. onset of illness during a period of increased tick activity (between April and November).
Probable case	Possible case AND a. ill person visited an endemic area during previous 6 weeks, OR b. detection of specific IgM antibodies in serum, with no history of vaccination against any flaviviral disease during previous 3 months
Confirmed case	Possible case AND a. detection of specific IgM or IgG antibodies in cerebrospinal fluid, OR b. fourfold or greater rise in serum antibody titre, with no history of vaccination against any flaviviral disease during previous 3 months, OR c. viral isolation from tissue, blood, or cerebrospinal fluid.

Cases were compared using the new case definition groups by year, season of onset, gender, age group, urban/rural residence, occupation, clinical course and geographic location.

Statistical analysis:

- All variables were categorised.
- Cases were compared using case definition groups with the chi-square test.
- A logistic model was used to detect factors predicting the probability of being classified as a confirmed case.

## Results

Figure 2. TBE cases by gender and age, Poland, 1999-2002, n=607

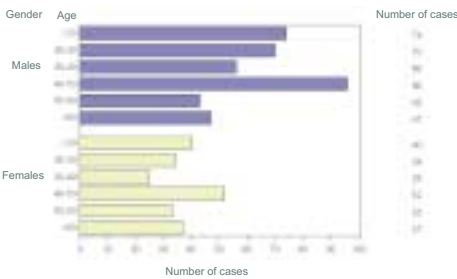
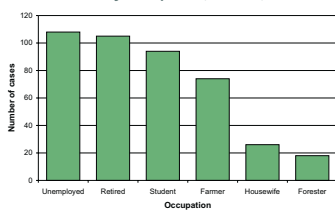


Figure 3. TBE cases by occupation, Poland, 1999-2002, n=425



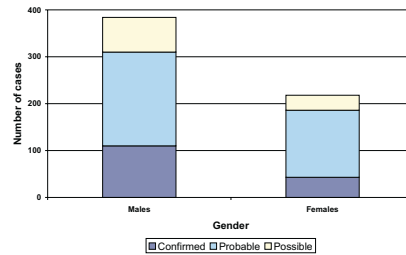
Of the 607 reported cases, 602 (99.2%) were classified as possible, probable or confirmed.

Table 2. Tick-borne encephalitis case classification, Poland, 1999-2002

Classification	Number of cases	Percentage
Possible cases	106	17.6%
a. Clinically compatible	106	100.0%
b. Onset during tick activity season	106	100.0%
Probable cases	343	57.0%
a. Visit in endemic area*	N.A.	-
b. Specific IgM in serum	343	100.0%
Confirmed cases	153	25.4%
a. Specific IgM or IgG in CSF	142	92.8%
b. 4-fold rise in antibody Ig titre	17	11.1%
c. viral isolation from tissue**	0	0.0%

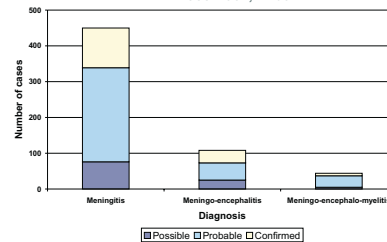
\* Data not reported in the forms.  
\*\* Test not performed in 1999-2002.

Figure 4. TBE case classification by gender, Poland, 1999-2002, n=607



There was a significant difference in case classification by gender ( $\chi^2=10.48$ ,  $p=0.0053$ ). 28.6% of male cases were classified as confirmed cases, compared with 19.7% of female cases.

Figure 5. TBE case classification by clinical diagnosis, Poland, 1999-2002, n=607



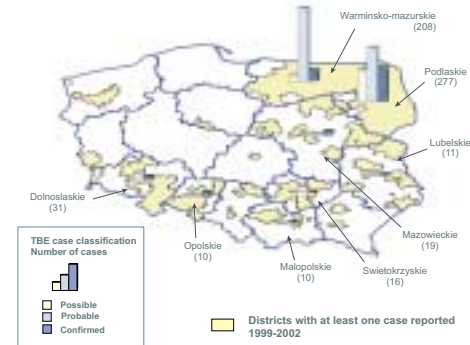
There was a significant difference in case classification by clinical diagnosis ( $\chi^2=11.79$ ,  $df=4$ ,  $p=0.019$ ). 32.4% of meningo-encephalitis cases were classified as confirmed, compared to 24.7% of aseptic meningitis cases.

No significant differences were established between the number of cases by case classification group for other clinical and demographic factors, such as: year of onset, season of onset, age, occupation, type of residential area (urban/rural).

The comparison of number of cases by case classification group for voivodeships showed highly significant differences ( $\chi^2=94.36$ ,  $df=8$ ,  $p<0.0001$ ) between regional case classification.

Geographic comparisons were performed only for provinces where more than 10 cases were reported during the period 1999-2002.

Figure 6. Geographic distribution of TBE classification, Poland, 1999-2002



The probability of being classified as a confirmed case was modeled.

- Controlling for geographic location, males were more likely to be classified as confirmed cases, compared to females (OR=1.92, 95% CI: 1.21 – 3.11,  $p=0.0069$ ).
- Controlling for demographic factors, living in Warminsko-mazurskie voivodeship was related with not being classified as a confirmed case, compared with living in other voivodeships (OR=3.99, 95% CI: 1.65 – 10.76  $p=0.0034$ ).
- Controlling for demographic factors, living in Podlaskie voivodeship was related with not being classified as a confirmed case, compared with living in other voivodeships (OR=1.68, 95% CI: 1.04 – 2.69,  $p=0.0319$ ).

## Conclusions

- Only 25% of TBE cases reported in 1999-2002 had sufficient diagnostic tests to meet the definition for a confirmed TBE case.
- Some endemic north-eastern regions of Poland, particularly Warminsko-mazurskie voivodeship, were less likely to perform confirmatory diagnostic testing of the cerebrospinal fluid and were more likely to rely on serologic results.

- The case report form needs to be modified to collect missing information (e.g., residing or visiting an endemic area). The usefulness of collecting this data should be assessed to determine its benefit in classifying cases.
- Viral isolation was never used to confirm TBE diagnosis in the 4-year period. There is a need to consider the usefulness of this test in the future TBE diagnostic protocol.
- Implementation of the new case definition needs to be linked to enhanced education about the appropriate diagnosis of the disease and the need for standard, uniform diagnostic protocols.