



P 34 Climate model of tick-borne encephalitis (TBE) morbidity dynamics in Karelia (north-western Russia)

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The central regions of Karelia are crossed with the north-western border of TBE areal in Russia. Abiotic factors play an increasingly important role in the dynamics of the epizootic and epidemic processes on the areal periphery. Structure analysis of the numeric series of different biotic components of TBE foci and the morbidity dynamics has shown that all investigated variables are polycyclic and consist of trend, quasi-periodical, and random components. Quasi-periodical variations include short-and medium-term cycles with 2–5 and 10–17 years periods. Stable medium-term cycles are also noticed in climate variations.

Until the early 1990s, TBE morbidity in Karelia was sporadic. In the following years, there were considerable growth rates of around positive trend. TBE incidence per 100,000 population rates ranging from 1.0 (1992) to 15.3 (2003). Spectral analysis and resistant non-linear smoothing of the morbidity index identified 2 medium cycle of 8 (1992–1999) and 11 years (2000–2010). These waves are most closely related to the medium-term fluctuations of the climate.

Morbidity was not registered in the cool years with the amount of average monthly temperatures during the warm period less than 63°C and in dry years with quantity of precipitation during the warm season less than 300 mm. Rising temperatures and increased rainfall above the mentioned minima are accompanied by morbidity increase that interchanges with a decrease after temperature increase and rainfall decrease above optimal means. The model illustrates situations in which limit impact on natural TBE focus could have both the resource deficiency and excess. Stable temperature increase in last decades has resulted in TBE foci activation and morbidity increase followed by foci depression and morbidity decrease.

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