V 13 Economic downturn results in tick-borne disease upsurge

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Zoonotic emergence is due as much to changes in human activities as to changes in their natural wildlife cycles. In 2009 relative to 2004–08, Latvia, Lithuania, and Poland suffered a 91, 79, and 45% upsurge in tick-borne encephalitis (TBE) cases, respectively. No other country suffered increases of more than 23%. We tested the alternative hypotheses that this rise could be a result of unusual weather patterns or reduction in economic well-being through the recession. For all 14 European countries with more than 10 cases per year, we extracted representative monthly rainfall and temperature data for 1989–2009 and used a principal components analysis (PCA) to remove covariation in the dataset. We then calculated the Euclidean distance to the PCA centroid, which summarized the degree of anomalies in the weather for each country and each year. Both 2008 and 2009 showed weather patterns very close to the average for the 1989–2009 period. Furthermore, those countries with TBE spikes in 2009 (Latvia, Lithuania, and Poland) did not differ from the other countries. We therefore discounted weather as an explanatory variable. To test for any effect of the economic recession, we used a multi-variate analysis to examine the predictive power of unemployment in 2009 and a range of socio-economic indices for the change in TBE case numbers in 2009 relative to 2004–08. The greatest increases in TBE incidence were correlated with a combination of a marked increase in unemployment and/or high background levels of poverty. The single most significant factor was the percentage of household expenditure spent on food. Mechanisms that link straitened economic conditions with TBE incidence include reduced uptake of costly vaccination, immunological compromise due to physiological and/or emotional stress, and activities that bring people into greater contact with infected ticks in their forest habitat in pursuit of wild forest foods.