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The world of smoke, mirrors and climate change

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The increasing trend in reports that relate the emergence and re-emergence of arthropod-borne infectious diseases to changes in climate is becoming as striking as the rise in the number of various diseases that have been studied. Now, Lindgren and Gustafson¹ conclude that the increase in the incidence of tick-borne encephalitis (TBE) in Sweden since 1984 is due to climate change (more specifically several temperature variables) and should, therefore, be added to this epidemiological 'hall of fame'².

There might be some truth to the relationship between climate change and TBE incidence, but metaphorical smoke and mirrors obscure the analysis presented in this study. The 'smoke' renders various parts of this study less than transparent. First, temperature thresholds for the development of *Ixodes ricinus* are cited from studies of the American tick, *Ixodes scapularis*, thus ignoring a large body of published data on the European cousin. Second, the authors have ignored recent analyses of the pan-European multi-variable climatic determinants of TBE virus transmission, and predictions of the probable impact in forecast climate change, which matches the observed decrease in TBE incidence along the southern edge of the current European range³. Third, the report confusingly refers to an increasing slope when it presents data for an increasing correlation coefficient. Finally, data from earlier years with very high TBE incidence (1956 and 1958) are omitted without explanation. The 'mirror' is needed to appreciate fully the graphs presented in this article. The cardinal sin of mixing a dependent axis (TBE incidence) with an independent axis (number of days in the chosen temperature ranges) masks a visual impact that belies the statistics. In 12 out of the 15 years (1984–1998), increased TBE incidence is not associated with greater numbers of warm spring days or cold winter days than occurred in the 1960–1983 period. Also, three out of the four highest TBE incidence years during 1960–1983 were associated with less than average warm spring days and more than average cold winter days, which is exactly the opposite of the post-1983 trend!

During a time when the government of the world's largest polluter remains unconvinced of the importance of climate change, we should be striving for more scientific work in this arena that is a little less impeachable.

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