

West Nile Virus Outbreaks in Canada under Expected Climate Conditions

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Abstract : Background: West Nile virus is increasingly an important public health issue in North America. In Canada, WNV was officially reported in Toronto and Montréal for the first time in 2001. During the last decade, several WNV events have been reported in several Canadian provinces. The main objective of the present study is to update the frequency of the climate conditions favorable to WNV outbreaks in Canada. Method: Statistical frequency analysis has been used to estimate the return period for climate conditions associated with WNV outbreaks for the 1961-2050 period. The best fit is selected through the Akaike Information Criterion, and the parameters are estimated using the maximum likelihood approach. Results: Results show that the climate conditions related to the 2002 event, for Montreal and Toronto, are becoming more frequent. For Saskatoon, the highest DD20 events recorded for the last few decades were observed in 2003 and 2007. The estimated return periods are 30 years and 70 years, respectively. Conclusion: The emergence of WNV was related to extremely high DD values in the summer. However, some exceptions may be related to several factors such as virus persistence, vector migration, and also improved diagnosis and reporting levels. It is clear that such climate conditions have become much more common in the last decade and will likely continue to do so over future decades.

Keywords : West Nile virus, climate, North America, statistical frequency analysis, risk estimation, public health, modeling, scenario, temperature, precipitation

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