

Development of a digital tool as clinical decision support of Tick-borne encephalitis (TBE) risks in United States travelers

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Tick-borne encephalitis (TBE) is a serious tick-borne disease in Europe. Despite increasing recognition among travelers, high resolution data on the distribution of the TBE virus (TBEV) are lacking which complicates travel-based risk assessments for optimal implementation of vaccine recommendations for TBE. In 2024, we launched a first-generation digital clinical decision support (CDS) tool to aid healthcare providers (HCP) assess TBEV exposure risks in travelers to Europe. Here, we report the results and feedback from 21 HCPs who recommend TBE vaccination for U. S. travelers and evaluated the CDS tool based on user experience, accuracy, comprehensiveness, and utility during point-of-care to inform travel-associated risks of TBEV.. All (100%) respondents reported the tool was easy-to-use and helpful for patient-level risk assessments of TBEV exposure. The most common feedback was requests for broader geographic data (19%; 5/21), particularly in higher-risk countries of Eastern Europe feedback, inclusion of other travel-vaccines (e.g., dengue, Chikungunya) and interoperability with electronic health record systems (16%; 4/21). We then implemented additional updates to the tool, including sub-nationally reported TBE/V cases (2020-2023) in 9 additional countries (n=28) and 65 newly identified TBEV foci (n=621) (2023-2024) extracted via systematic search. Importantly, this second-generation tool provides higher-resolution visualization of potential TBEV “hotspots” in the context of users’ travel plans (destination, month, duration, and activities). Overall, this work shows how CDS tools can support the evaluation of travel-based TBEV exposure risks which is critical to inform uptake of personal protection measures against TBE, including vaccination.