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ZIKATracker: A mobile App for reporting cases of ZIKV worldwide

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Abstract

We have developed a mobile App called ZIKATracker (zikatracker.net) to voluntarily be used to report ZIKV cases on a public or private level. As the Zika virus (ZIKV) infection zones are rapidly expanding across South, Central, and North America, and reports have emerged linking ZIKV infection with developmental defects and neurological sequelae, reporting the movement and sequelae of ZIKV is essential. ZIKATracker is a multi-lingual App (English, French, Spanish, and Portuguese) freely available to anyone worldwide wishing to report a suspected or confirmed case of Zika virus and related symptoms. Knowledge gained from the use of this App will help direct the implementation of mosquito control measures in needed areas, bring aid to those affected by the Zika virus, and understand the movement and sequelae of ZIKV as it spreads through communities and across continents.

Key words: Zika virus; Mobile App; Zika Tracker; Flavivirus; Chikungunya; Dengue virus; mosquito.

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Introduction

The Zika virus (ZIKV) infection zones are rapidly expanding, and the situation has recently transitioned from an outbreak to a near pandemic [1,2]. Importantly, reports have suggested a link between neurological symptoms and birth defects following ZIKV infection in adults and pregnant women [3-7]. Because of the speed at which the virus is spreading, the possibility of many people acquiring significant symptoms due to infection, and the unknown transmission dynamics [1,7-11], we urgently need a mechanism of accurate and real-time reporting of ZIKV cases for altering health-care centre approaches and initiating vector control strategies. We have developed a mobile App called ZIKATracker (zikatracker.net) to be used to report ZIKV cases on a public or private database. As a collaboration with mWater and the University Health Network (Canada), the International Institute for Infection & Immunity (China), and Immune Diagnostics & Research (Canada), ZIKATracker is freely available to any person worldwide in four languages (at the present time in English, French, Spanish, and Portuguese). The purpose of ZIKATracker is to report the frequency of ZIKV symptoms and confirmed cases through a survey answered and submitted by volunteers and medical professionals. Consent to sharing of information either publically or privately is required to participate in the survey App. Knowledge gained may help implement mosquito control measures, bring aid to those affected by the Zika virus, and understand the movement of ZIKV through communities and across continents.

ZIKATracker

Zika tracker is a mobile web-based App that can be used on both an android or iPhone smart phone. It is a short survey that will be used to report suspected and/or confirmed cases of Zika Virus. The survey will take approximately 30 seconds to 5 minutes to complete, depending on the amount of information the user wishes to submit. The App has 13 questions and the submission can be marked either public or private. Questions can be left blank if chosen by the User. The survey will ascertain if the user is a Clinician, Health Practitioner

or Other, followed by questions/instructions regarding the comprehension of and consent for using the survey. If the instructions have not been read or consent has not been given, the survey will discontinue. The App will then ask if the user is reporting a suspected or confirmed case of Zika virus as well as the location of the case and the nearest water source. By recording the location of the case water source, the water source may then be investigated for mosquito breeding if evidence indicates increased transmission/cases. At this point the user may submit the survey or continue to additional questions. Additional questions on the survey include: Have zika viral infections been diagnosed in your community, city, province, or island? Are there outbreaks of other arboviruses or measles virus in your community such as Chikungunya, Dengue Virus, or Yellow Fever? Is the reported case Male or Female? What is the Age of the reported case? A strictly private question will be asked to give the user the opportunity to report symptoms and the time of symptoms' appearance that is specific to their confirmed or suspected Zika virus infection. The symptoms include: Rash, Fever, Swelling, Joint Pain, Tingling (Fingers, Arms, Toes, Legs), Numbness (Fingers, Arms, Toes, Legs). Ascertaining the geographical location by country of symptoms associated with ZIKV infection may help scientists and clinicians determine if there is country-specific sequela such as microcephaly. Currently, it is undetermined if ZIKV cases linked to microcephaly have been observed only in Brazil.

Participation and privacy

Privacy and respect of the participant/user was central to the design of ZIKATracker. The purpose of ZIKATracker is to report cases so that aid may be brought to specific areas where the virus has been identified. ZIKATracker is not to be used encourage stigmatization of affected communities or suggest travel restrictions. Therefore, we have instituted three levels of privacy and participation protection in ZIKATracker. First, participation in this survey is voluntary and the participant is able to opt-out of the survey at any time before the information is electronically submitted. Secondly, the level of privacy protection and the amount of involvement by the user are determined by the user. Questions can be left blank. No question is mandatory. The third level of participation and privacy reflects on the use of location. When a user chooses to submit their location, the geographic coordinates will be randomly offset by approximately 3 city blocks. No specific addresses will be recorded and any visualizations made of the locations will have a maximum zoom level that will make it impossible to resolve individual households. Location of reported cases is important for authorities to implement vector control and distribute aid, but the precise location (street address) of the reporter is not necessary for these means. No personal identifiers are used. All data is screened to ensure no personal identifying information is accidentally communicated.

Potential uses and benefits of ZIKATracker

Due to the nature of the survey, there are no direct benefits or risks to the user, only possible benefits to the user and user's community once action is taken by government and non-government organizations. Information from this survey may be used by a variety of health-care workers, epidemiologists, governments, and scientists (data modellers, entomologists) to understand the ZIKV and implement control strategies in communities of need. Knowledge gained may help implement mosquito control measures as well as bring aid to those affected by the Zika virus. Public data gathered through ZIKATracker may be used by Bioinformaticians and Epidemiologists to analyze the movement of the ZIKV, which will help inform other communities as well as prepare for future mosquito-born disease outbreaks.

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