

Monitoring for Local Transmission of Zika Virus using Emergency Department Data

Amanda Wahnich*, Ramona Lall and Don Weiss

Bureau of Communicable Disease, New York City Department of Health and Mental Hygiene, Queens, NY, USA

Objective

Case and cluster identification of emergency department visits related to local transmission of Zika virus.

Introduction

The first travel-associated cases of Zika virus infection in New York City (NYC) were identified in January 2016. Local transmission of Zika virus from imported cases is possible due to presence of *Aedes albopictus* mosquitoes. Timely detection of local Zika virus transmission could inform public health interventions and mitigate additional spread of illness. Daily emergency department (ED) visit surveillance to detect individual cases and spatio-temporal clusters of locally-acquired Zika virus disease was initiated in June 2016.

Methods

ED visits were classified into two Zika syndromes based on chief complaint text and the International Classification of Diseases version 9 and 10 diagnosis codes for patients ≥ 6 years old: 1) fever and 2) Zika-like illness. Zika-like illness was defined as visits with mention of Zika; symptoms of rash, fever, and either joint pain or conjunctivitis; diagnosis of Guillain-Barré syndrome; or diagnosis of rare and non-endemic arboviral infection.

We applied the prospective space-time permutation scan statistic¹ in SaTScan daily since June 2016 to the fever syndrome, selected as a single representative symptom, to detect clusters by hospital or zip code of patient residence. The maximum spatial cluster size is 20% of observed visits, and the maximum temporal cluster size is 14 days – reflecting the incubation period.² The study period is 90 days. Statistical significance is determined using Monte Carlo simulations ($N=999$). Any cluster with a recurrence interval ≥ 365 days is summarized in a map and line-list of contributing visits. The map depicts the zip codes of the cluster with an overlay of census tracts at highest risk for human importation of Zika virus, as estimated by a zero-inflated Poisson regression model developed at NYC DOHMH that is updated regularly to reflect the most recent available data on confirmed cases.

Zika-like illness syndrome visits are output in a daily line-list. DOHMH staff contact the EDs that patients visited to determine travel to Zika-affected country, clinical suspicion of Zika infection, and laboratory testing.

Results

During June 1–August 16, 2016, we observed a mean of 253 (range: 202–299) ED visits for the fever syndrome per day. Sixteen spatio-temporal fever syndrome clusters have been detected. Of these, 2 clusters were during testing and optimization of scan parameters, 13 were due to data quality issues, and 1 was dismissed due to the large geographic range of the cluster, spanning 3 boroughs.

During June 1–August 16, 2016, we observed a mean of 2.7 (range: 0–7) ED visits for the Zika-like illness syndrome. Daily counts ranged from 0–3 visits from June 1–June 16 and 1–7 visits since June 16. Nineteen visits that occurred from July 31–August 4 were further investigated to establish a protocol for follow-up. Of those, eleven patients reported recent travel to countries with local transmission, one had travel over 3 months ago and an alternate diagnosis, six had

unknown travel history due to incomplete follow-up, and one reported no travel. The one without travel had a diagnosis inconsistent with Zika virus disease. Subsequently, analysts contacted EDs only for the subset of Zika-like illness syndrome visits with no indication of travel or without an alternate discharge diagnosis. Findings from this effort will be presented.

Conclusions

The fever syndrome provides a means to monitor for clusters using ED data. Prospective cluster detection signal volume was manageable and has not identified clusters requiring additional investigation. The Zika-like illness syndrome can be used for case finding. Contacting EDs helps to supplement information missing in the syndromic system, such as travel history as well as Zika testing and diagnosis. As Zika-like illness syndrome counts are low and disease is emergent, contacting EDs is feasible and helpful in ruling out local Zika virus transmission. No visits or clusters to-date have indicated local transmission.

Keywords

Zika virus; syndromic surveillance; cluster detection

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References

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*Amanda Wahnich

E-mail: awahnich@health.nyc.gov

