

Challenges in Surveillance for Chikungunya Virus (CHIKV) Infection

Cynthia A. Lucero-Obusan*¹, Patricia Schirmer¹, Gina Oda¹ and Mark Holodniy^{1,2}

¹Stanford University, Division of Infectious Diseases and Geographic Medicine, Palo Alto, CA, USA; ²Department of Veterans Affairs, Office of Public Health, Washington, DC, USA

Objective

We describe challenges and lessons learned conducting surveillance for Chikungunya virus (CHIKV), an emerging infectious disease in the Americas.

Introduction

CHIKV is transmitted by mosquitoes and often occurs in large outbreaks with high attack rates. Common symptoms (which can be severe and disabling) include fever, joint pain/swelling, headache, muscle pain and rash. In December 2013, the World Health Organization reported local CHIKV transmission in the Caribbean. In July 2014, the first locally-acquired case in the continental U.S. (Florida) and increasing cases in Puerto Rico (PR) were reported. Due to the growing outbreak, VA Office of Public Health began conducting ongoing surveillance.

Methods

CHIKV infection surveillance in 2014 was performed using a variety of data sources: (1) VA ESSENCE for outpatient, emergency room and inpatient encounters; (2) electronic laboratory data from VA Healthcare Associated Infection and Influenza Surveillance System (HAISS) Data Warehouse and VA Corporate Data Warehouse; (3) facility reports (includes issue briefs, communication with local Infection Preventionists and individual case reports from providers). Chart reviews were performed on all potential cases to understand surveillance limitations and identify ways to improve case detection.

Results

As of August 14, 2014, 21 confirmed/probable cases were identified at 10 VA hospitals. Nine were locally-acquired in PR, 8 in Dominican Republic (DR), 3 in Haiti, and 1 had exposures in both DR and Haiti. Median age of cases was 63 years (range 22-83), 19 (90%) were male and 8 (38%) required hospitalization.

The majority of VA cases were initially identified via electronic laboratory queries (13, 62%), followed by facility reports (7, 33%) and lastly, ESSENCE (1, 5%).

Principal challenges with ESSENCE were lack of a specific CHIKV ICD-9 code and providers using symptom codes in the initial and subsequent encounters, even after CHIKV was confirmed. Additionally, visits containing proper mosquito-borne fever ICD-9 codes (ICD-9: 066.3 or 065.4) had low specificity. Most of these visits had other diagnoses (e.g. West Nile Virus or Dengue), remote infection histories or had CHIKV in the differential but it was never confirmed. None received a mosquito-borne fever ICD-9 code during initial evaluation, even though many reported mosquito bites, travel to regions where CHIKV is circulating and/or epidemiologic links to other individuals diagnosed with CHIKV. Four were miscoded as Dengue (ICD-9: 061). Only 7 cases ever received an ICD-9 code for mosquito-borne fever, allowing them to be eventually identified in ESSENCE. For these, it was an average of 20 days after first presentation (range 1-44 days) to find a follow-up visit which was properly coded. The most common codes assigned on initial

evaluation were: Fever (ICD-9: 780.60, 8), Joint Pain (ICD-9: 719.4, 5) and Unspecified Viral Infection (ICD-9: 079.99, 4).

Limitations with electronic laboratory reports included lack of CHIKV testing (many suspect cases identified via ESSENCE could not be confirmed), long turn-around times for results and lack of uniformity in lab test naming. In some cases, we discovered CHIKV testing as "Dengue", and "Miscellaneous", or results buried in physician progress notes or scanned reports never entered in the laboratory section. Challenges with relying on facility reports highlighted the fact that facilities are not necessarily aware of these cases and infection control was not always informed of suspected or confirmed cases, as CHIKV is not yet a notifiable disease.

Conclusions

Based on our experience, a combination surveillance strategy using multiple electronic and non-electronic data sources is essential for CHIKV detection. Recent improvements include: (1) expansion of our electronic laboratory query to capture additional CHIKV test names; (2) developing CHIKV testing capability in our VA Public Health Reference Laboratory; (3) distribution of educational and surveillance materials to raise awareness, encourage testing and proper coding, and improve CHIKV identification. No ICD-9 code query or ESSENCE syndrome group has been useful for early CHIKV case identification. Identification via ESSENCE may improve with the switch to ICD-10 in 2015, as this system contains specific codes for CHIKV.

Keywords

Department of Veterans Affairs; Chikungunya; ICD-9; Disease surveillance; Electronic laboratory data

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*Cynthia A. Lucero-Obusan
 E-mail: cynthia.lucero@va.gov

