

ABSTRACT

# The United States Department of Veterans Affairs Integrated Operations Center (VA IOC): collaborations for surveillance, analysis, and prediction for infectious disease threat preparedness—pilot review of dengue occurrence

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## Objective

The objective of this study is to describe Veterans Affairs Integrated Operations Center-enabled collaborations to enhance the synergy of relevant data/information from Veterans Affairs (VA) and non-VA partners for improved early warning, and situational awareness of infectious disease threats.

## Introduction

Under leadership of the Secretary of Veterans Affairs (VA), Office of Operations, Security and Preparedness has established the Veterans Affairs Integrated Operations Center, with the goal of enhancing integration and analysis of data, and information from VA's preparedness partners, both internal and external, for timely decision support.

The Office of Operations, Security and Preparedness oversee emergency preparedness for the VA, which includes responsibility for preparedness activities at Veterans Health Administration (VHA). The VHA provides medical care to over 5 million patients a year at 153 medical centers, and over 900 outpatient clinics in the United States, and the United States territories. The Office of Operations, Security and Preparedness is developing a VA-Subject Matter Expertise Center for Biological Events in collaboration with the VHA-National Infectious Diseases Program Office. The Subject Matter Expertise Center for Biological Events is initiating pilot projects to examine data sources, integration, and predictive analysis. The recent increase in dengue cases internationally prompted the Office of Operations, Security

and Preparedness, and the Subject Matter Expertise Center for Biological Events to establish collaborations, and investigate factors influencing dengue disease patterns in VHA facilities.

The National Weather Service has the mission to provide weather, water and climate data, forecasts and warnings for the protection of life and property, and enhancement of the national economy. The Veterans Affairs Integrated Operations Center enabled collaboration with the National Weather Service for integration of weather, water and climate data, and retrospective analysis into preparedness activities.

## Methods

The VHA patient treatment file administrative dataset was queried for occurrence of dengue, and dengue-like diagnosis codes in VHA inpatients across the nation for Federal Fiscal Years (FYs) 2008, 2009, and 2010 (up to July).

The National Weather Service used Advanced Hydrologic Prediction Service precipitation data. This quality-controlled data is projected into gridded images to provide spatial information. Analysis fields included departures from average, and percent of average (daily, monthly, and for a water year). Spatial variation data were contrasted with the rain gauge point data available from National Oceanic and Atmospheric Administration's National Climatic Data Center archive.

The environmental data for FYs 2008–2010 were added to the VHA dengue case data to evaluate if weather and water influences can be associated with disease occurrence in a

patient population, with the intent of laying the building blocks for a predictive model of disease.

### Results

As expected, dengue or dengue-like cases in VHA inpatients primarily occurred in Puerto Rico, where the disease is endemic. Thus, far in FY 2010, 35 cases have been recorded; FYs 2008 and 2009 had 31 and 14 cases, respectively. Interestingly, the case occurrence pattern was different for FY 2010 compared with FYs 2008 and 2009: cases in FY 2010 occurred in peaks in the winter, spring, and summer, whereas occurrence in the other years peaked only in the fall with low case numbers the rest of the year. The Advanced Hydrologic Prediction Service precipitation web portal provided access to images of observed precipitation, period normal, and departure from normal and percent of normal precipitation pre-compiled for time periods from one day to the water-year to date, to guide analysis of dengue fever outbreaks.

### Conclusions

This work demonstrates the value and potential of Integrated Operations Center initiatives within VA (for example, Subject Matter Expertise Center for Biological Events), and external collaborations (for example, National Oceanic and Atmospheric Administration) toward integrated disease threat prediction, prevention, and mitigation capabilities. The outcomes will drive policy to enhance care of VA's Veteran patients, and support preparedness activities that will improve national decision-making in support of the National Response Framework.

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