Evaluating West Nile Virus and Saint Louis Encephalitis Surveillance in Harris County, TX, 2010-2014

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Background

- Harris County has a population of over 4.3 million people, and 2.1 million are under the jurisdiction of HCHPES
- West Nile Virus (WNV) and Saint Louis Encephalitis (SLE) are endemic to the area
- While ~80% of those infected are asymptomatic1, WNv and SLE can cause severe and debilitating symptoms
- Between 2010-2014, HCHPES received 295 arbovirus reports leading to 133 WNV, 4 SLE, and 2 unspecified flavivirus cases

Objectives

Surveillance System
- Monitor morbidity and mortality due to arboviruses
- Detect outbreaks
- Identify geospatial patterns and changes over time
- Recognize distribution of cases vs mosquitoes
- Inform control and prevention efforts

Evaluation
- Evaluate the HCHPES WNV and SLE surveillance system during 2010-2014
- Examine utility of the data for outbreak detection
- Recognize strengths and weaknesses in system
- Determine timeliness for each step
- Establish if set goals are met
- Identify where improvements can be made

Methods

Used the CDC recommendations in the Updated Guidelines for Evaluating Public Health Surveillance Systems.2

Simplicity
Assessed using system map and investigation factors

Data Quality
Completeness measured as the proportion of missing or unknown responses for essential variables

Timeliness
Measured by calculating median times between important investigation steps and determining the percent of the investigations that meet the pre-defined goals

Representativeness
Annual crude rates of HCHPES cases were compared to rates in Texas and the United States

Control Measures
A standard arbovirus season of 162 days was created using the earliest and latest infection dates of all cases. Daily rate was calculated by dividing cases infected before and after aerial spraying by the number of days before and after, respectively. Predicted cases was computed by applying the spray rate to the remainder of the season.

Conclusions

- Strong arbovirus surveillance is important to prevent morbidity and mortality in Harris County residents
- The system produces robust data in a manner that meets quality and timeliness goals
- Investigations are complex and require a substantial amount of time at every step
- Arbovirus data can be used to inform control measures

Recommendations

- Evaluate timeliness annually to ensure improvements and quickly discover issues
- Update the surveillance system to collect laboratory information
- Improve collection of data for race and ethnicity of cases
- Increase collaboration with Mosquito Control

Limitations

- Due to the high proportion of asymptomatic cases, the true incidence of arbovirus infections can never be known
- Many timeliness issues are out of the control of the Epidemiology program and would be difficult to improve

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References


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