Automated Methods to Improve the Completeness of Key Data Elements in Infectious Disease Response

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Background

• In 2013, the Bureau of Infectious Disease began an evaluation of MAVEN, the Massachusetts Virtual Epidemiologic Network (MAVEN), the state’s infectious disease surveillance and case management system
• Assessed the completeness of core data elements for disease follow-up
• Town specific results (Key Indicator Reports) were disseminated to all 351 local boards of health

Background (cont.)

• Results from the evaluation found that certain core data elements were not completed during case investigation
• At the same time, the Office of Integrated Surveillance and Informatics Services (ISIS) was exploring the use of new functionality in MAVEN, “Concerns”
Concerns in MAVEN

- Concerns are color-coded text which are specific to a disease event
- Concerns appear in the main notification section of a disease event
- Highlight critical questions that need to be completed during case follow-up

Concerns for Salmonellosis

- For salmonellosis and other enteric diseases, ISIS created the following concern: “Please note the case’s occupation in the Demographic Question Package.”
Concerns for Babesiosis

- For babesiosis, ISIS created the following concern: “Please note in the Risk/Exposure/Control & Prevention Question Package whether or not the case has received a blood transfusion, tissue products or organ transplant in the past year.”

Methods

- At the end of 2014, we assessed whether concerns were effective in improving completeness
- Using SAS (9.3), we compared percentages of completeness between 2013 and 2014 using logistic regression
- To determine whether concerns were the main reason behind a possible improvement, we also compared percentages of completeness with other core variables in the key indicator reports that were not highlighted by concerns

Salmonellosis

- Completeness of Occupation information between 2013 and 2014

  Odds Ratio: 3.95; 95% Confidence Interval: 3.28, 4.76; p-value <0.0001

  Events in 2014 were 4 times more likely to have Occupation completed compared to events in 2013

Comparison to other core variables without a concern: salmonellosis

- 30% reduction in missing information vs. a 3% reduction in missing information
Babesiosis

- Completeness of Blood Transfusion, Tissue or Organ Transplant Information between 2013 and 2014

Odds Ratio: 2.34; 95% Confidence Interval: 1.58, 3.47; p-value <0.0001

Events in 2014 were 2.3 times more likely to have blood transfusion information completed compared to events in 2013

Comparison to other core variables without a concern: babesiosis

Blood Transfusion

Hospitalized

10.5% reduction in missing information vs. a 3% reduction in missing information

Conclusions

- Incorporating concerns in MAVEN significantly improved completeness for core variables
- Although we saw some improvement in the other core variables, questions with concerns were more effective in prompting a response

Future Steps

- ISIS is now considering other diseases where concerns would be useful
- ISIS plans to continue monitor the completeness of these questions to see if this trend continues
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