Evaluation of Pilot Hospitals Participating in the Indiana Public Health Emergency Surveillance System (PHESS)

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OBJECTIVE

This evaluation was conducted to determine if any pilot hospitals have operational practices that may affect the ability of the PHESS to accurately and efficiently identify clusters of infectious disease in Indiana.

BACKGROUND

In 2004, the Indiana State Department of Health (ISDH) contracted with the Regenstrief Institute to build an information exchange infrastructure to support the collection of surveillance data.[i] This pilot program involves implementation of electronic reporting in 46 of the state's 114 emergency departments. Chief complaint data are collected and analyzed to identify clusters of disease earlier than a diagnosis can be confirmed or the disease reported to the ISDH.[ii] The system utilized the chief complaint coder CoCo to map the chief complaints into one of eight syndromes. This evaluation was completed after one-third of the pilot facilities were operational.

METHODS

The study involved the analysis of approximately 1000 randomly selected chief complaints from 17 emergency departments in pilot hospitals. An epidemiologist with medical experience independently coded approximately 17,000 chief complaints based upon a standard definition for each syndrome. The sensitivity, specificity, positive predictive value (PPV), and rank were calculated for each syndrome by hospital, totaling 136 observations. The Botulism syndrome was not observed at 5 facilities and these observations were not analyzed. A threshold of 70% was used to identify any hospital requiring additional analysis and syndrome ranks were reviewed to identify specific syndromes that may be problematic for a facility.

RESULTS

Of the 131 valid observations, 74% (97) showed all three measurements with values greater than 70%. Approximately 30% of the 34 observations with at least one value less than 70% involved chief complaints coded to the Constitutional syndrome. There were 22 observations with sensitivity and 17 with PPV lower than 70%. No observations showed specificity below the threshold. The rank of each hospital's sensitivity, specificity, and PPV generally varied between syndromes; however, a few hospitals with more advanced chief complaint coding systems ranked consistently lower. Chief complaints with certain keywords or phrases led to inaccurate syndrome coding.

CONCLUSIONS

This preliminary study illustrates that syndromic surveillance systems are sensitive to operational differences between participating hospitals, which must be identified in order for the system to efficiently identify disease clusters. The majority of observations were coded satisfactorily; however, analysis must continue to determine why 26% of the observations had calculated statistics lower than expected. Issues to address include: technology differences, keywords or phrases that trigger incorrect coding, and optimal study design.

Further analysis is required to identify which hospitals utilize technology that may produce more effective chief complaint coding. Recommendations for consistency in data entry should be addressed at the state level and implemented through individual hospital policies.

The design of the study posed limitations that were not foreseen. The hospital type and patient base affect the frequency at which different syndromes are observed. Specifically, small samples from specialty hospitals made it difficult to compare data between facilities through more advanced statistical analysis. Future evaluations should be designed using a set sample size for each syndrome based upon the syndrome frequency in a standard population, as opposed to a set total sample size per hospital.

REFERENCES

[i] Grannis S, Biondich P, Mamlin B, Wilson G, Jones L, Overhage JM. How Disease Surveillance Systems Can Serve as Practical Building Blocks for a Health Information Infrastructure: the Indiana Experience, Proceedings of the American Medical Informatics Association, Fall 2005 Symposium, Washington DC (In Press).
[ii] Henning K. What is Syndromic Surveillance? MMWR 2004;53(Suppl):7-17.