Emerging Health Threats Journal 2011, **4**:s132. **doi:** 10.3134/ehtj.10.132

www.eht-journal.org

ABSTRACT

A model for flu outbreak surveillance that describes the time lag for data reporting from the first presentation of a case to diagnosis

RE Gamache and S Grannis

Regenstrief Institute, Inc., Indianapolis, IN and the Indiana University School of Medicine, Indianapolis, IN, USA
E-mail: rgamache@regenstrief.org

Objective

This poster will present a predictive model to describe the actual number of confirmed cases for an outbreak (H1N1) based on the current number of confirmed cases reported to public health. The model describes the methods used to calculate the number of cases expected in a community based on the lag time in the diagnosis and reporting of these cases to public health departments.

Introduction

Reporting notifiable conditions to public health authorities by health-care providers and laboratories is fundamental to the prevention, control, and monitoring of population-based disease.[1,2] To successfully develop community centered health, public health strives to understand and to manage the diseases in its community. Public health surveillance systems provide the mechanisms for public health professionals to ascertain the true disease burden of the population in their community.[3] The information necessary to determine the disease burden is primarily found in the data generated during clinical care processes.[4]

Methods

Syndromic and clinical data were collected from the various participating providers throughout the state.[5] These data sources include; emergency departments, hospitals, outpatient centers, and other ancillary care data sources. Table 1 lists the ICD9 codes used to establish an influenza diagnosis. An influenza diagnosis is based on the CDC definition. All messages for patients in the Marion County area were processed to identify any individual with a flu diagnosis. For each case, the data were searched for the initial encounter for that patient with the health care system concerning their symptoms. The lag time from the initial encounter and diagnosis was calculated from the difference of these two events.

Results

Figure 1 provides a summary of the lag time information. The median time for a clinical diagnosis to be seen in this system is 5 days. An analysis of the time differences in relationship to the number of syndromic cases provides a 'near real-time' estimate of the actual number of influenza cases (seeking care) occurring in the community. These results are compared with the actual information collected and other community-based simulations.[6] The primary difference is that this simulation is based on events that are currently occurring in the population.

Table 1 ICD9 codes used to determine influenza or an influenza-like illness diagnosis

ICD9 code	*Simple description*
487.x	Flu diagnosis
488	H1N1 diagnosis
780.6, 780.6x	Fever diagnosis
786.2	Cough diagnosis
460, 461.x, 462, 463, 464.x, 465.x	Upper respiratory tract infection

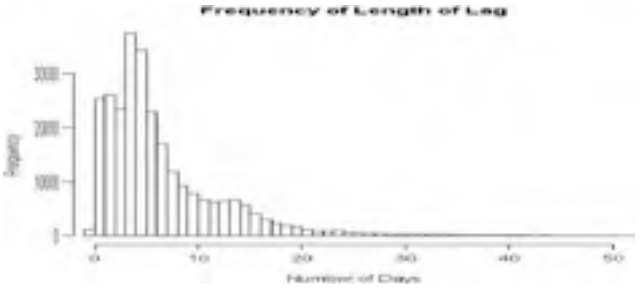

Figure 1 Counts of the number of days after a provider sees a patient until a diagnosis is received through the electronic messaging system. Over 95% of the data was received by day 21.

Conclusions

Although diagnosis data may not be required to identify a disease outbreak in the community, the additional clinical diagnosis information is beneficial for public health departments particularly for the deployment of specific countermeasures based on the presences of a given infectious agent in the population. A better understanding of the actual number of infected and contagious individuals in a community provides public health departments a more realistic level of the disease burden, which is particularly useful when deploying countermeasures in the community.

Acknowledgements

This paper was presented as a poster at the 2010 International Society for Disease Surveillance Conference, held in Park City, UT, USA, on 1–2 December 2010.

References

1 Chorba TL, Berkelman RL, Safford SK, Gibbs NP, Hull HF. Mandatory reporting of infectious diseases by clinicians. *JAMA* 1989;**262:**3018–26.
2 Committee on Emerging Microbial Threats to Health Division of Health Sciences Policy, D.o.I.H. *Microbial Threats to Health in the United States*, Joshua L, Robert ES and Stanley Jr CO (eds). Institute of Medicine, National Academy Press: Washington, DC, 1992.
3 Germann TC, Kadau K, Longini Jr IM, Macken CA. Mitigation strategies for pandemic influenza in the United States. *Proc of the Natl Acad of Sci* 2006;**103:**5935–40.
4 Overhage JM, Grannis S, McDonald CJ. A Comparison of the completeness and timeliness of automated electronic laboratory reporting and spontaneous reporting of notifiable conditions. *Am J Public Health* 2008;**98:**344–50.
5 Grannis S, Wade M, Gibson J, Overhage JM. The Indiana Public Health Emergency Surveillance System: ongoing progress early findings and future directions. *AMIA Annu Symp Proc* 2006; 304–8.
6 Halder N, Kelso JK, Milne GJ. Analysis of the effectiveness of interventions used during the 2009 A/H1N1 influenza pandemic. *BMC Public Health* 2010;**10:**168.