An Experimental Fully Automatic Syndromic Surveillance in Japan

Yasushi Ohkusa, Ph.D.[1], Tamie Sugawara, Ph.D. [1], Hiroaki Sugiura,M.D. [2],

Kazuo Kodama,M.D. [3],Takushi Horie,M.D. [4],Kiyoshi Kikuchi,M.D.,Ph.D.[5],

Kiyosu Taniguchi,M.D.,Ph.D.[1], Nobuhiko Okabe,M.D.,Ph.D.[1]

1)National Institute of Infectious Diseases, 2)Sugiura Clinic,3)Kodama Clinic,4)Chiimiya-Horie Clinic

5) Department of Pediatrics, Shimane Prefectual Central Hospital,

Objective

Since we don't know when such a disaster may occur, we have to perform this syndromic surveillance routinely, and thus the system should be automatic. Namely, information is drawn from electronic medical records (EMR), and is statistical analyzed, aberrations are detected and then

Results are reported by e-mail or HP. It is preferable that this system be fully automatic. Though many systems of this type have been developed in the US, they have not been well developed in Japan. So as to develop such a system, we made a prototype system and have been performing prospectively and evaluating the system.

Method and Material

5 clinics and 1 large hospital with 700 beds in a local city which has a population of 0.1 million cooperated in this project. We developed the system within a clinic or hospital and then integrated the aberration information from those medical institutions since November 2006. The system is described briefly as follows: Using backup data from EMR, we count the number of cases of a designated symptom excluding negative meaning; we apply Poisson regression using the number of the week, dummies for holidays or the day after a holiday, the day-of-the-week, and time trends to the data for all days up until the day before yesterday. If the actual number of cases yesterday exceed the estimated number of cases and its probability is less than a certain criterion, an aberration is detected; These procedures are performed in a medical institution; Then the number of cases with a certain type of symptoms and aberration information are sent to a server outside of the medical institution; The server provides an HP which shows the number of cases in a medical institution only for that medical institution and local outbreak information which is the sum of the aberration level in each medical institution; The latter information is also provided to the public health center or local government (Figure1).
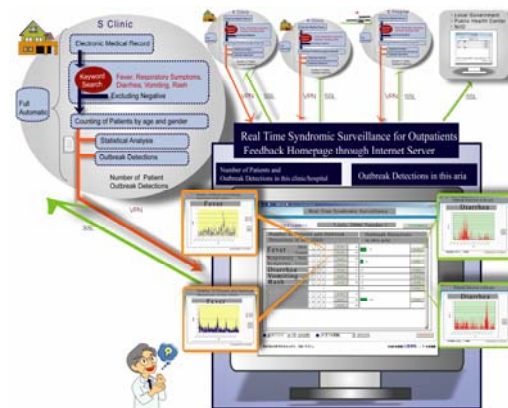
Results

The system seems to be working well without any trouble for nine months. It can detect late influenza epidemic on 9th March.

Discussion

Though current national survey needs more than ten days since patients visited and thus it is not useful for doctor's diagnosis, our system provide the epidemic information next day since patients visited, and so it can helps doctor's diagnosis. Therefore, if we can extend our system national level, we can monitor outbreak of pandemic flu or bioterrorism attack automatically at all time.

Figure 1: System Components

Further information: Y. Ohkusa ohkusa@nih.go.jp