An Examination of Syndromic Surveillance for Early Detection of Nosocomial Outbreaks

Kiyoshi Kikuchi[1], Yasushi Ohkusa,Ph.D.[2], Tamie Sugawara[2], Mika Shigematsu,M.D.,Ph.D.[2],Kiyosu Taniguchi,M.D.,Ph.D.[2], Nobuhiko Okabe,M.D.,Ph.D.[2]

[1]Department of Pediatrics, Shimane Prefectual Central Hospital, [2]National Institute of Infectious Diseases,

Objective

So as to be able to detect nosocomial outbreaks at an early stage, we examine the construction of a syndromic surveillance system for inpatients who have fever, respiratory symptoms, diarrhea, vomiting or rash and evaluate its statistical properties.

Method and Material

With the cooperation of a large hospital which has utilized electronic medical records since August 1999, we use the number of inpatients who have a certain type of symptom from 1999 to 2005. In order to detect outbreaks prospectively after January 1st, 2005, we at first estimate the baseline using the data from January 1st, 2003 to the day before any given day. Then we predict the number of patients in that day and judge whether or not an outbreak has occurred. We use poisson regression model so as to estimate baseline which contain dummy variables for epidemiological week number, the day-of-the-week, national holidays, the day after national holidays and long term trend as explanatory variables. So as to evaluate the system, we check its sensitivity and specificity to detect outbreaks other than those in previous patterns.

Results

There were 118,716 patients with fever, 130,070 patients with respiratory symptoms, 90,091 patients with diarrhea, 33,673 patients with cases of vomiting and 11,540 patients with rash from August 1999 to December 2005. In 2005 when we performed the surveillance system prospectively, there were 23,617 patients with fever, 23,698 patients with respiratory symptoms, 14,671 patients with diarrhea, 5,893 patients with cases of vomiting, and 2,486 patients with rash.

Cases and Outbreak Detection of Vomiting in 2005
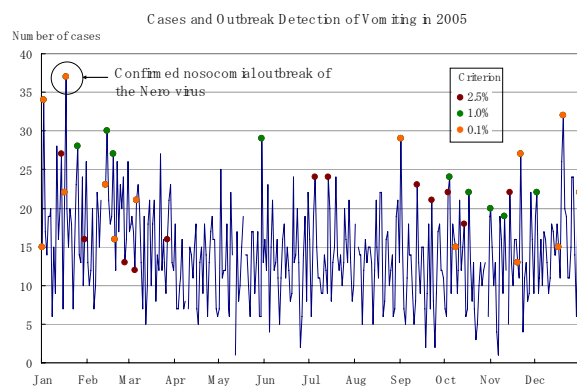
Discussion

This hospital experienced and confirmed a nosocomial outbreak of the Noro virus on January 27th, 2005. This syndromic surveillance identified an outbreak of vomiting at 0.1 % criterion on this day.

Conclusion

We confirmed that this system can detect nosocomial outbreaks and it has practical use. The next step should be further examination by wards. Then, we have to experiment with rapid information collection, analysis, reporting results and investigations by infection control teams. Finally, we can program this process automatically, and develop a system which can be conducted within hospitals.