

Electronic School Absenteeism System for Multiple Disease Surveillance in Hong Kong

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Objective

We examined the utility of an electronic school absenteeism system for monitoring multiple types of diseases.

Introduction

Surveillance systems utilizing early indicator of disease activity would be useful for monitoring community disease pattern and facilitating timely decision making on public health interventions in an evidence-based manner. School absenteeism has been previously considered as a possible syndromic approach for monitoring influenza activity. We explored the feasibility and practicability of establishing an electronic school absenteeism surveillance system in Hong Kong for monitoring influenza-like illness (ILI) and other diseases using automatically captured data employing smart card technology.

Methods

The school absenteeism surveillance system was developed via the eAttendance module of the eClass system, a digital school administration platform operated by a local commercial vendor. In replacing the traditional paper-based roll call, students of the participating schools would swipe their smart card over a designated sensor at the school entrance each day to on entering the school to register their attendance. Electronic summary reports can then be generated automatically for each school in the eClass system, and transferred to our back-end server for analysis. The submitted records were anonymised and were stratified into ILI / upper respiratory tract illness, gastroenteritis, and non-sickness related absence in a subset of participating schools in the pilot study in 2008-2012 [1]. All collected absenteeism data were aggregated weekly, matched and compared with viral isolation data from hospital laboratory surveillance system and a current outpatient-based influenza sentinel surveillance system.

In the second phase of the study we recruited more schools and extended specific causes of absence to hand-foot-and-mouth disease (HFMD) as there had been elevated HFMD incidence in Hong Kong and elsewhere in Asia. Feedback reports on absenteeism patterns together with interpretation of the overall influenza disease activity in the community were generated on a regular basis during the epidemic season and distributed electronically to all participating schools.

Results

Our pilot surveillance initially began with 18 schools covering 17,255 students in 2008, and expanded in phases to 103, including 64 primary and 39 secondary schools covering 72,493 students in the current academic year of 2012-13. The schools were distributed evenly across Hong Kong Island, Kowloon, and New Territory to cover different districts, and represented approximately 10% of the registered number of schools and students in the territory. With the introduction of a more-user friendly dropdown list for entering the specific cause of absence in the user interface starting from this academic year, 35 (34%) of these schools were also submitting data for specific causes of absence in the system, including 26 (25%) submitting data for absence due to ILI or gastroenteritis and 22 (21%) submitting data for absence due to HFMD.

When comparing the school absenteeism rates with the reference data from pre-existing surveillance systems during March 2008 to June 2011, covering a total of 7 influenza seasons, clear and sharp peaks were detected from both the overall and ILI-specific data during most of these seasons, which generally occurred 1-3 weeks ahead of the peak in the hospital laboratory surveillance data (range 1 to 5 and -1 to 4 weeks; median 3 and 0.5 weeks for overall and ILI data respectively). Generally the school absenteeism data also showed much sharper peaks than the outpatient sentinel data, possibly related to better coverage of influenza activities in the community, where sentinel data could only capture episodes that required visits to the doctor's clinic. Elevated HFMD-specific absenteeism rates were also observed since early May 2013, in phase with HFMD consultation rate from sentinel general practitioners.

Conclusions

The result demonstrated the feasibility and potential benefit of employing electronic school absenteeism data as captured automatically by a smart card system as an alternative data stream for monitoring influenza activities, and flexibility in establishing surveillance for emerging diseases. The increasing popularity of usage of smart card technology in various community settings might also represent potentially timely and cost-effective opportunities for innovative surveillance systems.

Keywords

surveillance; absenteeism; influenza; hand-foot-mouth disease

References

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