INTEGRATED SYNDROMIC AND VIROLOGIC SURVEILLANCE SYSTEMS FROM TAIWAN'S EXPERIENCES IN FACING GLOBAL CHALLENGES OF EMERGING INFECTIOUS DISEASES

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OBJECTIVE

Emerging and re-emerging infectious diseases (EID/REID) involve large populations at risk and thus they might lead to rapidly increasing cases or case fatality rates. Living in this global village, cross-country or cross-continent spread has occurred more frequently in recent decades, implying that epidemics of any infectious disease can expand from local to national to international if control efforts are not effective.

BACKGROUND

Taiwan has experienced several EID/REID outbreaks, such as enterovirus 71 (EV71) in 1998, 2000-2002, dengue hemorrhagic fever (DHF) in 2001-2003, inter-hospital nosocomial infection of severe acute respiratory syndrome (SARS) in 2003, and island-wide low pathogenic avian influenza (LPAI) H5N2 in poultry farms in 2003-04. Therefore, the hospital emergency department-based syndromic surveillance system (ED-SSS) was established to obtain daily electronic data for monitoring 11 symptoms/syndrome such as fever, respiratory, influenza-like illness (ILI), GI, CNS, rash-related syndrome etc.(Wu TS et al., 2008). In addition, virologic and serologic surveillance of live-bird market personnel and poultry workers for AI and on-going investigation of daily meteorological factors associated with the outbreak of LPAI and HPAI viruses (Liu CM and King CC, 2007) have been implemented for pandemic influenza preparedness. We found that it is too late if cases are reported based on only severe symptoms/signs. The aims of this study were: (1) to develop an integrated ED-SSS with timely and automatically collecting data from hospitals, (2) to compare mild vs severe cases of novel enterovirus or ILI using flexible definitions of syndrome groups of chief complaints/ICD-9 CM for early detecting EID outbreaks, (3) to grasp epidemiologic characteristics of different virus isolated from our ED-SSS, and (4) to provide feedbacks to decision-makers to enhance the capability to prevent disease outbreaks.

METHODS

The study selected the five hospitals located in different geographical areas of Taipei City. There are eight syndrome groups for routine surveillance and another five dynamically defined syndrome groups for extra-targeted surveillance. The historical limit method, using the short-term and long-term baselines, was used for aberration detection, and the alerts were delivered for enhancing specimen taking and virologic surveillance. The analyzed surveillance data were presented mainly using web pages.

RESULTS

The patterns of the syndrome for mild vs severe enterovirus infection (EVI) **(Fig 1)** or ILI cases were quite different. In addition, epidemiologic characteristics of different viruses can provide better clues to enhance the effectiveness of integrated surveillance **(Table 1)**.

Fig. 1 Comparison Mild EVI vs Severe EVI through our Taipei City ED-SSS between Nov.1 2005 and June,29, 2008

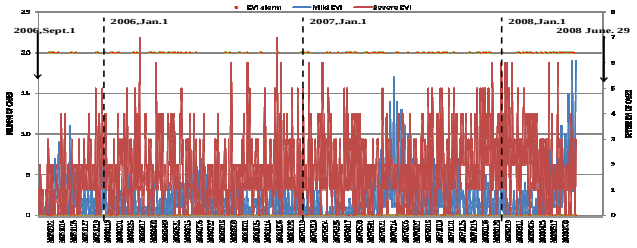

Table 1. Age for Different Virus Isolated

Viruses	□ 3 Yr	4—7 Yr	8—13 Yr	□ 14 Yr	Unknown	Total No.
Flu A	0 (0%)	1 (17%)	0 (0%)	4 (66%)	1 (17%)	6 (100%)
Flu B	0 (0%)	1 (20%)	1 (20%)	3 (60%)	0 (0%)	5 (100%)
enterovirus	10 (56%)	6 (33%)	1 (6%)	1 (6%)	0 (0%)	18 (100%)
Adenovirus	3 (43%)	1 (14%)	2 (29%)	0 (0%)	1 (14%)	7 (100%)
parainfluenza	0 (0%)	0 (0%)	1 (100%)	0 (0%)	0 (0%)	1 (100%)
HSV-1, HSV-2	1 (20%)	0 (0%)	1 (20%)	2 (40%)	1 (20%)	5 (100%)

Conclusions

Integrated surveillance with virus and epidemiologic data has proved its effectiveness to control the newly emerging red-eye enterovirus outbreak in Taipei City in 2008. It will be very helpful in formulating better public health policies and preparedness against future challenges from emerging/ re-emerging infectious diseases.

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