MEDINFO 2007
HISA Ltd Australia
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The Improvement of Timeliness and Data Quality of Notifiable Disease Reporting by Implementation of an Electronic Reporting System

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Abstract and objective

Physicians' reporting of suspicious or confirmed communicable diseases to government department of infectious disease management is very important for prompt outbreak identification and control to protect the community. The inefficient paper and fax reporting traditionally used cannot cope with imminent infectious risk An electronic reporting system has been developed to facilitate frontline case reporting and infection management works. A proper design and implementation of the reporting system integrated with clinical workflow gains clinicians' acceptance and in turns improves the timelines and data quality of the case reporting. The electronic reporting data available in the system is then be used by different users of the infection management by providing real time operational management reports to facilitate infection management works. Study has been started to use the electronic reporting data to further improve case notifications by cross-checking with laboratory data and cluster outbreak identification across the territory.

Keywords:

electronic notification, infectious diseases, reporting, infection, surveillance

Methods

Hospital Authority of Hong Kong (HA) manages 43 public hospitals with 47 specialty outpatient clinics and 74 general outpatient clinics (GOPCs). Centre of Health Protection (CHP) of Department of Health is the government body for the infection management of the community. Clinicians are required by law to report suspicious and confirmed cases of 32 Notifiable diseases to Central Notification Office (CENO) of CHP, together with hospital Infection Control Teams (ICTs) and Head Office Infection Control Team (CCID). The inefficient paper and fax reporting traditionally used cannot cope with imminent infectious risk and an electronic reporting system named Notifiable Disease and Outbreak Reporting System (NDORS) has been developed to facilitate frontline case reporting and infection management works.

A NDORS Project Working Group with frontline hospital infection control teams and head office infection management staff, clinicians, health informaticians and IT staff was established in April 2005 for detailed study the user requirements, the clinical workflow of case reporting and the follow-up actions of different levels of hospital infection control teams, and development and implementation of an the electronic reporting system. The problems of paper and fax reporting were identified to be dealt with the electronic reporting system (*appendix*). A 4-month pilot study of NDORS implementation was carried out in 3 public hospitals and 3 GOPCs in March 2006. After pilot evaluation, NDORS was fully implemented to HA hospitals and clinics in July 2006. Study has been started to use the electronic reporting data to further improve case notifications by cross-checking with laboratory data and cluster outbreak identification across the territory.

Results

For the 3-month full roll-out period of NDORS, in parallel with paper and fax reporting, there were 2330 cases (i.e. 95%) reported via NDORS to relevant parties. Since the pilot run of NDORS, there was 1059 clinicians used NDORS to report the Notifiable diseases. The average time interval taken between a doctor submitting a case and receiving the CENO system reply was 35s (2s to 4min18s). About 15 cases (1 %) of the NDORS reported cases were sent to CENO system via auto fax, due to server or network problems and non-compliance with validation rules set for electronic data transfer between the two systems. Positive feedbacks were received from different levels of users including convenience, timeliness and data quality (both for the completeness of data and the decrease of duplication of case reports) of case reporting with NDORS. The efficiency of infection disease management works was improved with the electronic reporting data and real time management reports.

Conclusion

Prompt identification and control of infectious disease outbreaks would minimize the impact of the communicable diseases outbreak to the community. Proper design and implementation of electronic reporting system improves the acceptance of the users and in turns, the timeliness and data quality of infectious disease notification. The effi-

ciency of infection management works is improved. The reporting data would be used to further facilitate the case notification and surveillance of cluster outbreak in the community.

Appendix

Comparison of Paper & Fax Reporting and Notifiable Disease and Outbreak Reporting System (NDORS)

Paper & Fax Reporting	NDORS	Benefits
Filling paper form	▪ Clinicians report case via all the CMS workstation during their clinical care of the patients ▪ Interfacing with patient master index demographic data ▪ Electronic forms with structured data fields with different checking rules	▪ Improve timeliness of case reporting by providing a more convenient way of reporting which is integrated with clinical workflow ▪ Decrease time used for reporting ▪ Improve data quality
Fax to Hospital ICTs, CCID of HAHO & CENO of CHP	▪ Submission of case reports to Hospital ICTs, CCID of HAHO & CENO of CHP simultaneously by clicking the "submit" button ▪ Updated information can be accessed +/- sent to 3 different parties via auto fax	▪ Decrease works used for reporting ▪ Prevent discrepancy of data among the 3 different parties
Loss of paper forms	▪ All case reporting records are stored in and viewed by clinical staff via NDORS	▪ Better history tracking for notifiable disease reporting records ▪ Decrease duplication of case reporting (by providing case report history view and checking rules of case report duplication) ▪ Records can be edited & updated via NDORS and updated information can be accessed +/- sent to 3 different parties via NDORS ▪ Online management reports for infection control management, surveillance and research
Reporting with reference to different sources of criteria for reporting (paper records, CHP website)	▪ Information provided on the updated list of notifiable diseases to be reported, the updated criteria of reporting &the updated contact details of different parties	▪ Improve data quality ▪ Decrease works for reporting ▪ Improve communication among different users