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The Asthma Clinical Assessment Form and Electronic Decision Support Project (ACAFE): Collaborative Innovation and Development

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Abstract

Objective: The objective of this study was to describe the development of a dynamic and interoperable clinical platform prototype designed by Emergency Physicians.

Method: The investigators used collaborative innovation approach.

Results: A disease specific clinical platform that streamlined information processing and incorporated clinical pathways and quality control into workflow.

Conclusions: Collaborative innovation and problem orientated approaches are required to develop effective health informatics solutions in Emergency Medicine.

Keywords:

asthma, decision support, collaborative innovation

Introduction

Implementation of interoperable health information technology (IT) platforms and electronic decision support systems (EDSS) are important strategic goals for future health systems around the world[1,2].

Acute asthma is a common cause of presentations to Emergency departments. Current evidence suggests that asthma management in Emergency Departments (ED) is inconsistent, resulting in suboptimal compliance with evidence-based guidelines[4,5,6,7]. We report on the first interoperable and dynamic EDSS developed by Emergency Physicians for use in ED.

Methods

Conceptualisation and hypothesis generation

Key to development was identifying problems and dilemmas facing clinicians in a busy emergency department. Some of the problems identified through consensus were multiple and disparate information or data entry points, inconsistent use of clinical pathways and lack of real time quality control mechanisms.

Literature review

We performed a literature search through Medline and relevant Health Informatics publications from 1996-2006 to identify examples of EDSS for ED

Field study

A feasibility study was undertaken by Health Information Specialists to review processes of care in the current ED environment

Collaborative innovation

This concept involves the collaboration of business and consumer partners to create new products or identify new trends based on consumer needs [8]. In this project a small group of clinicians and health informatics specialists (HIS) worked together to identify clinician needs and structure workflow models (Medical Systems Development and Research Group - see www.msdrg.org).

Clinical platform development

HIS and clinicians collaborated to model clinical workflows in ED. Rapid prototype engineering was employed to continually improve on the modeling process.

Clinical platform architecture

The system aimed to comply with the National E-Health Transition Authority (NEHTA) standard guidelines for electronic decision support systems [9]. The system was also developed to adhere with HL7 principles relating to semantic and functional interoperability [10].

System evaluation

The system was evaluated in three phases: internal beta testing, simulation trials using emergency department doctor performance and clinical implementation trials.

Results

Clinical platform development

Through collaborative innovation over 12 month period, an online interface known as the Asthma Clinical Assessment Form and Electronic decision support (ACAFE) was developed.

Clinical platform features

The clinical platform incorporated multi-environment display panels focusing on ED workflows. Panels were organised using pan-out user interface design and followed the logical steps from top to bottom and left to right. ACAFE offered decision support in several dimensions. This included support for clinical diagnosis and management plan processes. The system promoted uptake of evidence based guidelines through severity grading pathways. ACAFE allowed monitoring of various clinical performance indicators such as waiting times, consultation times and discharge rates.

Basic System Architecture

Minimum server operating requirements for ACAFE system included PC with Intel Pentium III™ compatible 700MHz processor, 512MB RAM, with Windows XP Professional Service Patch 2™ operating system. The system was hosted on Internet Information Services 5.1 and accessible via hospital intranet. Further details of the system can be viewed at http://www.ostechnology.com.au/product_acafe.html

Discussion

ACAFE was the first decision support system designed to solve specific problems relating to ED information flows and adherence to clinical pathways. This problem orientated process was achieved through collaborative innovation.

The result was a dynamic interoperable clinical platform which enabled streamlining and consolidation of ED documentation and facilitated use of clinical pathways. This was coupled with real time quality control features that allowed monitoring of trends and variations in clinical practice.

Conclusion

We have demonstrated that novel solutions to information processing problems in the ED can be created using collaborative innovation and problem-orientated approach. This has important practical implications for future EDSS developments.

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