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Unanticipated Workflow Characteristics after Implementing a Computerized Vaccination Reminder System: A Case Study

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Abstract

Computerized reminder systems can increase vaccination rates in the outpatient setting. Achieving a high level of system integration may support busy clinicians and result in higher compliance. After successful implementation of a closed-loop, informatics-based pneumococcal vaccination reminder infrastructure in the ED, we discovered several, unanticipated workflow details that may have impacted the implementation approach. Despite the participation of the ED staff in designing the workflow of the vaccination reminder system, the workflow details would have been challenging to predict.

Keywords:

emergency medicine, pneumococcal vaccines, case reports

Introduction

Pneumococcal vaccination is recommended for all patients older than 65 years and those younger than 65 with a comorbid illness. Current vaccination rates remain far below the Healthy People 2010 target of 90%. The Emergency Department (ED) has been suggested as a suitable environment to offer vaccination and feasibility has been demonstrated. We implemented an end-to-end computerized vaccination reminder system in the ED using four different information systems, including the ED triage application, the computerized provider order entry (CPOE), the order tracker system, and the longitudinal electronic medical record system (EMR).

Unanticipated workflow details

With close participation of the ED staff a workflow for the pneumococcal vaccination program was mapped out using flow diagrams, which were repeatedly reviewed and discussed during the weekly team meetings. To design a system that would fit into the existing ED workflow, our goal was to create a sustainable system that would require limited additional data entry by ED clinicians. As part of designing the system, we conducted a survey of ED physicians and nurses to evaluate their beliefs, opinions, and interest in a vaccination reminder system. The survey results helped us to identify clinician education foci and guide design aspects.

The initial implementation phase included observation periods to elicit complaints and discover system issues. We discovered several subtle process and procedure variations that were originally not accounted for: (a) Nurses were able to short-circuit the reminder system and preemptively order the vaccine with physician approval prior to the physician prompt. (b) As the reminder was tied to the first CPOE session, it occurred that physicians completed the first session prior or during the nurses vaccination screening task. (c) More patients than expected seemed to decline vaccination during the triage process, a result of triage nurses' workload leading the triage nurse to decline on behalf of the patient without completing the actual screening task. (d) Despite several educational communications with the physicians, they remained unclear that patients consent was already obtained at triage, which we were able to clarify with a small wording change in the physician reminder. (e) Some eligible patients consented to receiving the vaccine, but their reason for the ED visit did not require the use of the CPOE system. (f) During an information system upgrade, the infrastructure for capturing the physicians' refusal reasons got disconnected during a limited time period.

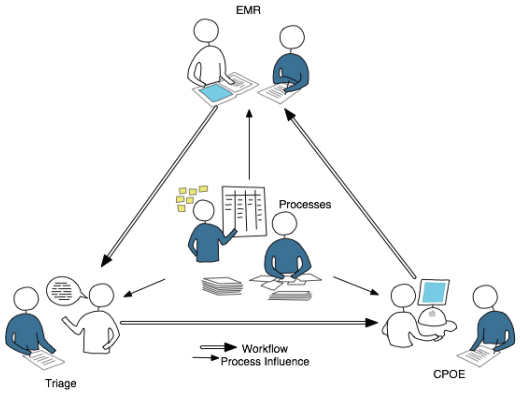

Figure 1 – System design and processes

Discussion

Although we discovered several unanticipated workflow details immediately after implementation, the close communication with the clinicians allowed us to modify the

system so that it remains part of the ED workflow. After 12 months the computerized reminder system seems to be a sustainable informatics approach improving vaccination rates in the ED.

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