Chapter 1.19
An Overview of Efforts to Bring Clinical Knowledge to the Point of Care

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ABSTRACT

By bringing people the right information in the right format at the right time and place, state of the art clinical information systems with imbedded clinical knowledge can help people make the right clinical decisions. This chapter provides an overview of the efforts to develop systems capable of delivering such information at the point of care. The first section focuses on "library-type" applications that enable a clinician to look-up information in an electronic document. The second section describes a myriad of "real-time clinical decision support systems." These systems generally deliver clinical guidance at the point of care within the clinical information system (CIS). The third section describes several "hybrid" systems, which combine aspects of real-time clinical decision support systems with library-type information. Finally, section four provides a brief look at various attempts to bring clinical knowledge, in the form of computable guidelines, to the point of care.

To be effective, (clinical decision support) tools need to be grounded in the patient's record, must use standard medical vocabularies, should have clear semantics, must facilitate knowledge maintenance and sharing, and need to be sufficiently expressive to explicitly capture the design rational (process and outcome intentions) of the guideline's author, while leaving flexibility at application time to the attending physician and their own preferred methods. (Shahar, 2001)

INTRODUCTION

By bringing people the right information in the right format at the right time and place, informatics helps people make the right clinical decisions. Cumulatively, these better decisions improve health outcomes, such as quality, safety, and the cost-effectiveness of care. This improvement has been a mantra of informatics at least since the landmark article by Matheson and Cooper in 1982. This chapter provides an overview of the efforts over the years to develop systems capable of delivering such information at the point of care. Such an overview should help illustrate both the opportunities and challenges that lie ahead as we struggle to develop the next generation of real-time clinical decision support systems for use at the point of care.

VISION TO ACHIEVE

The ultimate goal is to provide patient-specific, evidence-based, clinical diagnostic and therapeutic guidance to clinicians at the point of care; this guidance should be available within the clinical information system (CIS) that defines their current workflow. In addition, we must have the tools necessary to enable clinicians, without specialized programming knowledge, to enter, review, and maintain all the clinical knowledge required to generate this advice. Finally, we must have the ability to rapidly change the clinical knowledge, test it, and make it available to clinicians without having to wait for a regular CIS updating schedule.

Questions That Must Be Answered Prior to Creating Such Systems

What information or knowledge is required to help the clinician make the right decision to achieve the desired health outcome?

Who will be the information's recipient (e.g., physician, nurse, pharmacist, or even a specific individual such as the patient's primary care physician)?

When in the patient care process is the intervention applied, for example, before, during (which can be broken down into sub-activities such as order entry or progress note creation) or after the patient encounter?

How is the intervention triggered and delivered? For example, does the system or the clinician initiate it? How much patient-specific data (if any) is needed to trigger system-initiated interventions? How much is the intervention output customized to the clinical workflow stage, the clinician, and or the patient? For system-initiated interventions, how can the threshold be set to minimize nuisance alerts? How intrusive should the information be (Krall, 2001)?

Will the clinicians find the information useful (Krall, 2002a, 2002b)? What can we do to minimize the number of false positive alerts?

Where will the clinician be when receiving the intervention, for example, with the patient at the bedside or in the office? What should happen if the information becomes available at some future point when the clinician is no longer with the patient to whom the information pertains?

Which medium will be used to convey the message, for example, e-mail inbox, wireless and/or handheld device, pager, CIS/CPOE screen, or printed pre-visit encounter sheet?

Is there a demonstrable return on investment (ROI) that is due exclusively to the clinical decision support intervention or feature?

BACKGROUND

Where Do We Stand?

Numerous attempts have been made to bring various forms of clinical information to the clinician at the point of care. One way to solve this