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Boosting Standard Order Sets Utilization through Clinical Decision Support

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Abstract

Well-designed standard order sets have the potential to integrate and coordinate care by communicating best practices through multiple disciplines, levels of care, and services. However, there are several challenges that are certainly affecting the benefits expected from standard order sets. To boost standard order sets utilization, a problem-oriented knowledge delivery solution was proposed in this study for clinical decision support (CDS) to facilitate access of standard order sets and evaluation of its treatment effect. In this study, standard order sets were created along with diagnostic rule sets which can trigger a CDS-based reminder to help clinicians discover hidden clinical problems and corresponding standard order sets during ordering. Those rule sets also provide indicators for targeted evaluation of standard order sets during treatment. A prototype system was developed based on this solution and will be presented at Medinfo 2013.

Keywords: Decision Support Systems, CPOE, Standard of Care

Introduction

Standard order sets represent the local interpretation of the best medical evidence for specific clinical problems. End users are encouraged (or mandated) to use these sets when ordering for patients with the specific diagnosis or condition for which the set was created. Undeniably, such a standardized care will reduce errors due to inconsistency or ordering mistakes and create a more efficient and predictable course of care for patients. Besides the challenges such as work effort to create agreement and standardization across the organization, there are two major snags of advancing standard order sets utilization: (i) how a specialist physician can be noticed to use the right standard order set during ordering when facing mixed multidisciplinary problems; (ii) there are no effective tools to support timely, efficient, and standardized treatment when clinicians are faced with clinical problems. False positive reminders can be dismissed if the problem was ruled out by clinicians. Clinician-initiated problems could also be added to the list and pulled corresponding standard order sets to the point of care.

Methods

As most of standard order sets are problem-targeted, we proposed a problem-oriented clinical decision support (CDS) solution to narrow the knowledge gap between order-sets creators and end users. In this solution, each standard order set is defined combined with a set of rules which could be used as inclusion criteria for this order set. Based on these rule sets, a CDS service maintains a real-time possible problem list for each patient through monitoring updates of clinical data. These potential problems along with diagnostic evidences and corresponding standard order sets will be pushed to computerized physician order entry (CPOE) system during ordering. Therefore, end users only need one click to “do the right thing” at the right time.

As this CDSS was not designed to automatically give precise diagnoses by itself, various-strength evidences, such as diagnostic laboratory testing result or a symptom derived from expert opinion, can be used to create rule sets. So, the development of standard order sets will not be limited by the evidences availability. Different strengths of evidences will give different confidence levels to problems that are inferred from these rule sets. False positive reminders can be dismissed if the problem was ruled out by clinicians. Clinician-initiated problems could also be added to the list and pull corresponding standard order sets to the point of care.

As rule sets provide specific indicators for each clinical problem, a graphic report can be generated to shown the correlation between problem indicators and standard order sets during treatment. This will help clinicians evaluate the treatment effect of the order on this patient. The aggregation analysis in a population will also be used to help the committee to review and update standard order sets periodically.

For example, a standardized insulin order set which was defined based on the physiology (“basal-nutritional-correction dose”) insulin regimens contains a rule set “blood glucose > 7.0 mmol/L”. Each time the blood glucose test result was updated, the CDS service will be triggered to assess the condition of the patient. The insulin order sets will be recommended to users when the condition is met. Then, a real-time trend chart of blood glucose will be generated to help user monitoring this patient and adjusting the dose of insulin during the treatment. Furthermore, a hypoglycemia standard order set which is used to support timely, efficient, and standardized treatment when “blood glucose < 3.0 mmol/L” was also incorporated with this protocol to prevent hypoglycemic.

Results

This solution covers full lifecycle of standard order sets: evidence-based creation, facilitated access through CDS, scientific evolution based on clinical results. A unified knowledge base portal and a CPOE system were developed based on this solution to evaluate its feasibility. This prototype system will be deployed in a clinical setting this summer. All the details will be presented at Medinfo 2013.

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