Development of a Taxonomy of Setting-Specific Factors for Adaptation of Clinical Decision Support Rules

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Abstract

This research examines how a general clinical decision support (CDS) rule can be incrementally customized to take into account setting-specific factors. We classify the types of adaptations that are used in several previous practice settings and generate a theory around them. This work serves as an underlying principle for the design of an implementer’s Workbench, a tool that will facilitate adaptation of best practice rules by non-information technology (IT) specialists for their settings.

Introduction

Clinical decision support (CDS) rules that are written generally to be in use in any healthcare setting require customization when implemented at a particular practice or health care system (HCS). This process has been found typically to require considerable time and effort, as well as expertise in information technology (IT) and knowledge of the clinical area in question. This work further finds that the rule designer should interact when data are needed, any modifications of thresholds, timing for alerting, and nature and form of transmission of advice or decisions as a result of the runring. We will call considerations setting-specific factors (SSFs) and consider the customization of a rule using SSFs as stage 3 of a 4-stage rule refinement model, which was originally developed as part of the Minnesota Initiative [1].

Methods

Initial Taxonomy Construction

- Utilized “Implementation Considerations” list from SDOH CDS2002 as a starting point. Project team members also had been a part of the project. Settings and setting factors were leveraged implicitly.
- A selection of the final list was the NQF CDS Taxonomy, which was completed as part of this project. Therefore, the NQF CDS taxonomy was leveraged explicitly.

Refinement Through Analysis of Existing Rules

- CDS rules gathered from the Minnesota Initiative for diabetes management were used in a "reverse engineering" evaluation. CDS rules collected from the Morningside Initiative for diabetes management were used in a "design engineering" evaluation.
- The implementation was also informed by previous research efforts, namely, the NQF CDS Taxonomy [2] and the Structuring Care Recommendations for Clinical Decision Support "Implementation Considerations" (also known as “in-use factors”) [3].

Refinement Through Observation of Medical Practices

- "Observation" was the process of studying system-wide problems and solutions through discussion and observations. It was done in a single office (site) to study a single practice family to pass a multi-site (family) test, multi-site test.
- "Editing" was the process of studying system-wide problems and solutions through direct observation of electronic medical records. It was done in a single office (site) to study a single practice family to pass a multi-site (family) test, multi-site test.

Rule Refinement Process (Stage 2 — Stage 3)

Our focus was on the process of creating a stage 2 rule, starting with a stage 2 rule in an iterative stage to stage 3 iteration. This concept considers the evolution of the stage 2 rule to selecting and incorporating SSFs.

Notes: An add on code is used in the table for describing the refinements introduced and presenting the evolving rule to enable readability.

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<thead>
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<th>Evidence-Based Medicine Statement</th>
<th>Code</th>
<th>Description</th>
<th>Evidence Base</th>
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Synthesis of prior research and novel data collection were used to create and expand the taxonomy.

Currently constructing a software tool (the Implementer’s Workbench) to allow users to create and customize CDS rules.

Summary/Future Work

A taxonomy was developed to capture the types of variations introduced in rules as they are deployed to a specific setting.

The taxonomy will be used in rule authoring/refinement software (the Implementer’s Workbench) being developed for subject matter experts.

Future Work

- Currently constructing a software tool (the Implementer’s Workbench) to allow users to create and customize CDS rules.
- Active participation in the ONC Health Informatics initiative to support robust knowledge authoring standards.
- Validation of the SSF taxonomy through implementer’s workbench testing.

- Expansion of the SSF taxonomy into a full ontology to enhance the rule authoring and validation process.

Notes and References


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