This research describes the design process for a model-driven rule authoring environment. Clinical decision support rule authoring is a complex endeavor, involving the need for both content domain and technical expertise, and is fraught with the potential for error as rules are refined and adapted from narrative recommendations to formal statements to setting-specific adaptations. Several prior studies have focused on the usability issues surrounding front end tools such as electronic health records and computerized provider order entry systems. Studies of back end tools are rare. In addition to facilitating the design of the authoring environment, this study also seeks to extract the important rules and challenges faced by clinical decision support rule authors.

CDS rule authoring remains a time-consuming and costly challenge for healthcare organizations wishing to deploy CDS. These challenges have historically limited the penetration of CDS. However, with increasing pressures to deliver higher quality care in a challenging reimbursement environment, and with federal Meaningful Use incentives mandating the use of CDS, it is no longer practical for most healthcare organizations to continue to put off CDS implementation. Therefore, a CDS rule authoring environment that is 1) interoperable, 2) flexible, and 3) user-friendly is desired. The Office of the National Coordinator for Health IT (ONC) has led the development of the Health eDecisions Interchange Schema to address the first requirement, while the 2nd requirement was the subject of previous work conducted by members of the study team. This study sought to address the third requirement by eliciting a mental model of rule authoring as well as the unique challenges perceived by CDS rule authors today.

Methods

Semi-structured Stakeholder Interviews

- Conducted 7 interviews with representatives from 4 healthcare organizations
  - Interviews were semi-structured and in nature

Thematic Analysis

- Created a coding scheme consisting of 9 concepts common to most interviews
- Interviews were transcribed and coded according to this scheme
- Several themes emerged during the review process

Distillation of Principles to Guide the Creation of a CDS Authoring Tool

- The aim of this study was to create a mental model of CDS authoring, as well as identify unique challenges that clinical decision support rule authors face
- The study used a qualitative research approach to gather insights from experts in the field
- The interviews were conducted with representatives from various healthcare organizations
- A coding scheme was developed based on the themes that emerged from the interviews
- The themes were refined and validated through a peer review process
- A set of principles was derived from the themes to guide the creation of a CDS authoring tool

Lessons Learned

Theme 1: CDS should support consensus building. Specifically, the tool should provide alternative views of the CDS content to facilitate review by a variety of stakeholders.

- The tool should facilitate clinician understanding and participation.
- The underlying content repository should support the storage and retrieval of associated educational artifacts.

Theme 2: CDS artifacts should be built and described using workflow-independent templates.

- The tool should facilitate clinician understanding and participation.
- The underlying content repository should support the storage and retrieval of associated educational artifacts.

Theme 3: CDS should support clinician input.

- The tool should facilitate clinician understanding and participation.
- The underlying content repository should support the storage and retrieval of associated educational artifacts.

Notes

Disclaimer: Views expressed are those of the authors and not necessarily those of the organizations with which the authors are affiliated.

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The Arizona State University Institutional Review Board (ASU IRB) reviews, and study protocol and granting exemption with the imposition of the requirement that data could be stored in such a way as to allow re-identification of the study participants after the fact.