Team Project: Assignment 2
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Clinical Decision Support System (CDSS) Rule Enabling Compliance with Stage 1 Meaningful Use Criteria

Context: When a patient is being prepared for discharge from the hospital, a major part of the process involves ordering discharge medications. The CDSS will retrieve the patient's history of drug reactions/allergies and the combined active and admission drug lists in order to establish a reconciled medication list.

1. The proposed CDSS adheres to the core criteria for **Stage I Meaningful Use** as defined by enabling "one clinical decision support rule" (Federal Register, 2010). Table 1 below represents mapping of the CDSS to the requirements for demonstrating Meaningful use cited (for hospitals) in the Final Rule from the Department of Health and Human Services published in the Federal Register on July 28, 2010 (Silva, 2010) (Federal Register, 2010).

Table 1. Demonstration of Alignment of CDSS to Meaningful Use Requirements

Meaningful Use Requirement	CDSS Solution Fulfillment
Maintain active medication list. (Federal Register, 2010)	At the point of discharge, the patient's active medication list needs to be updated in order to be maintained as the new active medication list. This CDSS algorithm computerizes the reconciliation task to ensure the list is accurately maintained and can be completed in less than the estimated 10 minutes.
Maintain active medication allergy list. (Federal Register, 2010)	New medication allergies may have been detected during hospital treatment. The updated information needs to be added to the discharge medication allergy list. This CDSS algorithm computerizes that reconciliation task to ensure the medication allergy list is accurately maintained and can be completed in less than the estimated 10 minutes.
CDS rule addresses issue of high clinical priority. (Federal Register, 2010)	In July 2004, the Joint Commission announced 2005 National Patient Safety Goal #8 to "accurately and completely reconcile medications across the continuum of care" (Joint Commision, 2005). The CDSS addresses this national clinical goal.
Provide patients with an electronic copy of their health information, including medication lists (Federal Register, 2010)	The output of the CDSS is a discharge medication list which is available to patients electronically.
Capable to exchange key clinical information, for example medication lists (Federal Register, 2010)	The CDSS permits medication lists to flow in and out of the care environment, coming in upon admission and going out upon discharge.

2. **Patient outcomes will improve with the implementation of the CDS rule by enabling the reduction of medication reconciliation** errors that previously occurred based on an inconsistent, non-systematic update process. Consistent medication reconciliation, aided by the CDSS tool at the point of discharge/transfer, will offer an updated and reconciled medication list that meets facility and regulatory standards (Benjamin, 2010). Additionally, the tool will improve coordination of care, decrease errors and decrease likelihood of polypharmacy via a unified process that supports overall medication management. The notion behind the tool is to attain the goal of "the right patient, the right drug, the right dose, the right route, and the right time" (Blumenthal & Tavenner, 2010). .

3. There are several facets to consider with respect to implementing the CDSS: 1) **feasibility**; 2) **workflow impact**; 3) **training**; and 4) **cost** implications.

Feasibility of implementation: In order to provide foundational capabilities to support data exchange across clinical care venues, an interface engine will be needed to permit messages to be transmitted between the inpatient EMR and the proposed CDSS. Interfaces will also be required between the CDSS's Inference engine and the knowledgebase components of the EHR system for message transfer and translation.

The inference engine will need to support merging the admission medication list with the active medication list according to predefined combine rules based on the established clinical workflow rules. The combine rules require that the inference engine know how to group medicines by class so as to determine a similar medication by its function. The knowledgebase will need an external information source to provide the medication classification information. For example: (Coumadin and Aspirin need to be categorized as anticoagulants.) The knowledgebase will also need to store external and internal medication terminologies and the mappings between them to facilitate translation within the Interface Engine. A graphic user interface (GUI) will allow physicians to override suggested reconciliations and approve the reconciled medication list.

The knowledgebase will also need to have a set of decision objectives and each medication will need a characteristic that supports operating on it according to decision criteria that may apply (e.g., selecting more powerful agent with a longer acting agent). Accordingly a set of suggest rules would be needed that encode the circumstances under which a particular suggested objective would be selected. The system will identify where the suggest rules may need to be modified. A GUI will allow system administrators to manage the knowledgebase (Versel, 2010).

Workflow Impact: A brief survey of clinical stakeholders suggests the process of performing the medication reconciliation may take slightly longer than current processes, but the overall value based on reduction of errors and improved outcomes justifies the change. The principal reason supporting an increase in time required to complete medication reconciliation is a learning curve associated with the change and need for change management. Over time, however, clinicians view the benefits of the tool as an enabler of efficiency, reducing time required to address post-discharge medication issues that arise from inaccuracies in the legacy process. These expectations serve as the basis of developing appropriate evaluation measures for the project. The system will be designed to capture information throughout the process to measure system performance as compared to these baseline expectations. Moreover, since the CDSS requires an electronic admission medication list, workflow upstream may be impacted. Therefore, the project will need to allow input and coordination with admission processes and training may be required for groups responsible for capturing and encoding of the admission medication list. Further, groups involved in outbound data will need to be accommodated since the discharge medication list will consist of an electronic object that would be distributed back to other stakeholders (e.g. nursing home, personal health record (PHR), physician practice(s)).

Training: Training will be an integral component of the project and will occur using appropriate delivery channels to stakeholders and end users who would be affected, such as administrative and clinical end users. Knowledge transfer for end users and administrators would occur at multiple points in the development cycle. A train-the-trainer approach will be employed to develop subject matter expertise within the user's organization to support

eventual independent operation of the tool. For example, a clinical nurse will become a super user available to train physicians, answer process questions or troubleshoot the utility.

Cost: Developing a budget quality estimate for development and sustainment of a CDSS requires assessment of the knowledge, skills and abilities of resources, as well as their availability for the development effort. Generally, the following types of resources will be required for CDSS development: Project Manager, Technical Architect, Programmer(s), Statistician, Data Modeler, and Business Analyst. The project would take approximately 6 to 9 months based on full time commitment from these resources. This estimate is based on comparing the specified level of complexity with comparable projects completed within the organization. Adjustment of staffing forecasts in support of the effort will be based on the product lifecycle stage and needs resulting from change orders. For example, initial planning and development would start with higher staffing levels, then after testing and Go-Live phases, the team size will be reduced for maintenance and on-going support purposes.

Assumptions:

- Existing helpdesk will integrate the tool into the enterprise IT helpdesk portfolio to minimize ongoing support costs.
- Periodically, staffing needs and costs will be reassessed based on the established change management and governance process, as well as IT customer satisfaction surveys.

4. **The following two recommendations for CDS rules would increase clinical value while complying with the goals of Stage 2 EHR Meaningful Use (Versel, 2010):**

    1. Continue development of additional decision support rules aimed at improving clinical outcomes using Pareto principles. Specify utilization of dashboards to summarize performance compared to plan to enable active monitoring and decision making that drives continuous process improvement. Focus on aspects of care target for particular treatments rather than broad-ranging tools. For example, in the case of the rule we've described,, create an expanded list beyond the top 100 drugs.

    2. Stage 2 criteria should be directed towards enabling better outcomes, while promoting innovation. However, flexibility should serve as a guiding principle to ensure realization of tangible benefits are not limited, so targets must be prescriptive yet broad enough to accommodate multiple approaches and solutions. Specifically, the second recommendation is that the CDS rule triggers an alert to changes in orders that vary from the original set by more than 30 percent for additional manual verification. The tool also may provide a follow-up diagnostic list based on the medication list to ensure health maintenance monitoring for follow-up outpatient or post-acute care diagnostics.

Works Cited

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Glossary

Medication Reconciliation: "A formal process of identifying the most complete and accurate list of medications a patient is taking and using that list to provide correct medications for the patient anywhere within the health care system" (Definition of Terms, 2010).