User-centered Integrated Clinical Decision Support System for Improving Medication Safety

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Clinical decision support systems (CDSSs) have become increasingly available in commercial patient data management systems (PDMS). CDSSs make it possible to periodically or at certain events carry out predefined decision rules based on data that is available in the PDMS. Clinical studies have shown that CDSSs increase patient safety and compliance.

However, CDSSs are still underused and often disabled in clinical practice for two important reasons. First, a CDSS usually provides a way of designing decision rules by an end user, but in clinical situations this is often cumbersome for physicians and nurses who do not have the time or the equivalent computer training. Second, decision rules are limited to the snapshot data available to the PDMS. PDMSs may not always contain information from the hospital information system, physician order entry and laboratory information systems.

To address these issues, we have designed and implemented a medication safety system for use at the intensive coronary care unit of the Erasmus Medical Center using a commercial PDMS (Draeger Innovian Critical Care) and with a user-centered decision support tool. Data integration from our PDMS and other information systems is based on XML and a history of data samples is kept for querying temporal data. The physicians are able to upload and test decision rules online by using Excel instead of a dedicated decision rule editor.

Preliminary results show that simplifying the CDSS for the clinicians may address the underuse of CDSS in clinical practice. Results of a clinical evaluation of the system will be reported.