CDS System Research

Kevin Scharnhorst

This is a simple research exercise to identify and describe two Clinical Decision Systems (CDS) found through internet research.

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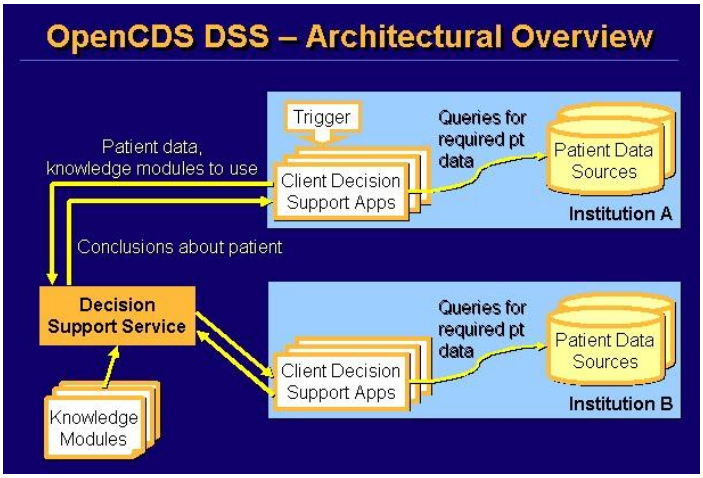
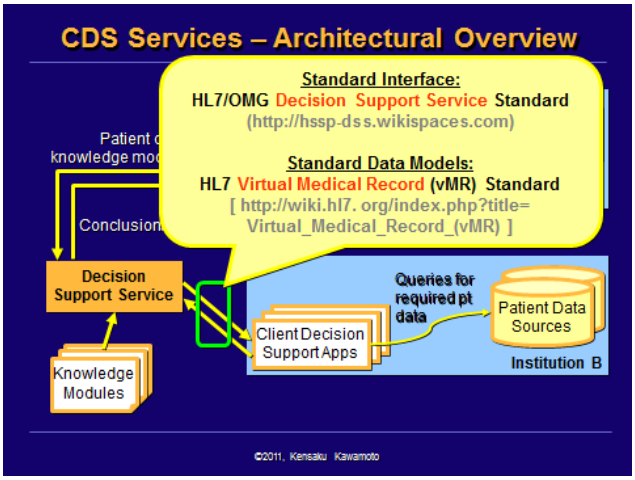
Clinical Decision Support System 1 (CDSS1) – Open CDS

OpenCDS is a clinical decision support system created to address a specific need for an "application-independent CDS resource that can be efficiently leveraged by diverse healthcare systems and health IT settings to improve patient health" (Kawamoto, OpenCDS: an Open-Source, Standards-Based, Service-Oriented Framework for Scalable CDS, 2011). OpenCDS is a collaborative effort with a community that is growing and includes a number of prominent members with an established reputation in CDS. Namely: EBSCO (a leading knowledge content provider); Intermountain Healthcare (world-renowned for its cutting-edge CDS); Veterans Health Administration (largest healthcare provider network in the US); University of Utah; Apelon (an industry leader in open-source terminology services with their Distributed Terminology System (DTS)); and more than a dozen others in total. (Kawamoto, OpenCDS.org)

Since OpenCDS is an open source project, all of its technologies and architecture is as well. The founder chose to deliver its solution through open source channels to help "foster adoption and collaboration" (Kawamoto, OpenCDS: an Open-Source, Standards-Based, Service-Oriented Framework for Scalable CDS, 2011). The idea being to offer CDS as a software service (SaaS) through a standards-based solution that leverages a service oriented architecture (SOA). As explained by Dr. Kawamoto (the OpenCDS founder), SOA empowers business needs to be fulfilled through the orchestration of platform neutral, network-accessible, software services that provide core business functions through well-defined interfaces (Kawamoto, Honey, & Rubin, The HL7-OMG Healthcare Services Specification Project: Motivation, Methodology, and Deliverables for Enabling a Semantically Interoperable Service-oriented Architecture for Healthcare, 2009). OpenDNS is based on a web based service delivery of CDS developed at Duke University.

OpenCDS is made up of "Knowledge Modules" which return machine readable information on the patient-specific conclusion. The data payload is passed using HL7/OMG Healthcare Services Specifications. Below is a high level view of the architecture with the second image (to the right) depicting the standards-based protocols in use. (Kawamoto, OpenCDS: an Open-Source, Standards-Based, Service-Oriented Framework for Scalable CDS, 2011) A more detailed view of the key components within the OpenCDS architecture can be found at https://sites.google.com/site/opencdspublic/key-components.





On the OpenCDS.org website, one implementaiton example is given with an operational deployment done for doing online triage for the University of North Carolina at Chapel Hill. It was implemented against their KeonaHealth system. In addition to this example, it was recently announced that Intermountain Healthcare through the Homer Warner Center for Informatics Research will be identifying ways for how OpenCDS can be leveraged within the Intermountain clinical information system architecture. (Kawamoto, OpenCDS.org) A demo presentation is also provided using the NQF Measure 31 for Meaningful Use.

Version 1.0 which is considered the release client was made publicly avialble through OpenCDS.org on 01/16/2012. One thing that is lacking is a means for measuring the methodolgies successfullness. Given its recent release, I expect to see more successful examples for how OpenCDS is being utilized across the Healthcare domain as it continues to gain more momentum.

Clinical Decision Support System 2 (CDSS2) – A User Designed Bedside Glucose Tool

The second clinical decision support tool I found is a bedside tool that was designed by users and done by Intermountain Healthcare (IHC) in Salt Lake City, Utah. When we think of CDS it is easy to think of large, complex and integrated solutions. IHC is world-renowned for their leadership within the CDS domain. IHC is known predominantly within the CDS space for their system known as HELP which is abbreviated for Health Evaluation through Logical Processing. HELP is responsible for is used for routinely providing clinical, administrative, financial and decision support functions. (Gilad & Gardner, 1991) HELP has been operational since 1967. (Gardner, Pryor, & Warner, 1998) I wanted to find an applicable example of CDS being used in a more isolated instance instead of a full-blown integrated solution. The bedside tool I found was developed for Intermountain' s LDS Hospital in order to provide insulin therapy instructions for intensive care unit (ICU) patients. (Nelson & ALlen, 2006)

At IHC, they promote best practices through Board Goals developed by clinical programs. One such goal set in 2005 was to "achieve a high level of glucose control for the ICU population; maintaining glucose levels within a tight normal range" (Nelson & ALlen, 2006). So in this example, IHC set their own goal and metrics to measure success. The team involved in creating this CDS based bedside tool included a team of clinicians, analysts and software developers that "worked together to develop a user interface for a bedside decision support tool designed to assist clinicians in aggressively managing blood glucose for their ICU patients" (Nelson & ALlen, 2006). The end goal was focused on replacing the paper based glucose protocols with a bedside decision tool.

Initially a prototype was delivered without the necessary nurse workflow analysis. While it was adequately able to accomplish the decision support it added unneeded confusion to their workflow and made their job duties more cumbersome. The feedback was taken and nurses were involved in iterative focus group evaluations to accomplish the decision support and make workflows more streamlined.

The final result of the project was a simplification of a "multi-step initiation process into a simple 3 step process and combining documentation and decision support instructions into a single, manageable bedside workflow process for the nurse" (Nelson & ALlen, 2006). In addition, "a special timer display clock was also developed and runs on the bedside workstation monitor showing the time remaining to the next glucose assessment" (Nelson & ALlen, 2006). This CDS has been implemented since in 5 adult ICUs between February and July 2005 and has since been rolled out to all of IHC's adult ICUs. (Nelson & ALlen, 2006)

This practical example applied in a clinical setting is a great one to consider as we consider application for CDS beyond this academic learning setting.

Works Cited

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