



Background

Electronic health records (EHRs), when used effectively, can improve the safety and quality of medical care. For maximum benefit, however, EHRs must be paired with clinical decision support (CDS) systems to effectively influence physician behavior. CDS includes a variety of techniques designed to facilitate and guide doctors' decision making toward evidence-based practice. Common examples of CDS include computerized checks for drug interactions and electronic reminders for screening tests like mammograms and Pap smears.

While the evidence that CDS can be effective is clear, current use and adoption of CDS is limited. In fact, most of what we know about CDS comes from only four academic medical centers and integrated delivery networks. Wider adoption of decision support has been held back by a variety of issues, including:

- Difficulty translating medical knowledge and guidelines into a form that can be used by EHRs.
- Technical challenges in developing a standard representation for CDS content that could be shared across sites.
- Absence of a central knowledge repository where human readable and executable guideline knowledge can be shared and stored.
- Challenges in integrating decision support into the clinical workflow and other barriers to IT adoption
- Limited capabilities for clinical decision support in commercially available electronic health record (EHR) systems.

The AHRQ Clinical Decision Support Consortium

While these issues have been barriers for adoption of clinical decision support systems they are surmountable, as evidenced by a small number of sites where decision support is pervasive. We believe that the biggest challenge to fostering widespread adoption of clinical decision support is in documenting, generalizing, and finally translating the experience from these advanced sites to a broader community of care sites. To address this challenge, investigators from Brigham and Women's Hospital, Harvard Medical School, and Partners HealthCare (PHS), have formed the AHRQ Clinical Decision Support Consortium (CDSC) in collaboration with the Regenstrief Institute, Kaiser Permanente Northwest Research Group, the Veterans Health Administration, Masspro, GE Healthcare, NextGen and Siemens Medical Solutions.

The goal of the CDSC is to assess, define, demonstrate, and evaluate best practices for knowledge management and clinical decision support in healthcare information technology (IT) at scale – across multiple ambulatory care settings and EHR technology platforms.

Our work is guided by a series of high-value research questions:

- How do we **improve** the translation of knowledge in clinical practice guidelines into actionable clinical decision support in healthcare information technology?
- How do we optimally **represent** knowledge and data required to make actionable clinical decision support content in human readable and machine readable and executable forms?
- How do we **collate, aggregate, and curate** knowledge content for clinical decision support in a knowledge portal used by members of the CDS Consortium? How may we use such a tool to support knowledge management and collaborative knowledge engineering for clinical decision support at scale, across multiple healthcare delivery organizations, and multiple domains of medicine?
- How do we **demonstrate** broad adoption of clinical decision support at scale in different healthcare IT products that are used in disparate ambulatory care delivery settings? Such demonstrations may show the utility of a

simplified clinical decision support knowledge specification in human readable form, as well as the utility of publicly available CDS web services, and their incorporation in CCHIT-certified electronic health records (EHR).

- How do we **define** and **evaluate** best practices in response to the above assessments and demonstrations? Evaluation must include an assessment of how to incorporate clinical decision support services at scale in a variety of vendor healthcare information technologies, as well as products developed in academic settings. Further, how do we **deploy** clinical decision support services in healthcare information technology in a manner that improves CDS impact?
- How do we broadly **disseminate** the lessons learned over the course of these investigations to key audiences, such as the academic informatics community, patient safety and quality groups, medical specialty societies, small office practice settings, and others?

CDS Consortium Activities

The CDS Consortium will carry out a series of activities over the next two to five years:

- **Carry out a survey of knowledge management practices:** CDSC researchers will travel to a representative Consortium member site to gather information on their decision support systems and knowledge management practices. This team will use a mix of surveys, in-depth interviews, and observations as well as conduct follow-up visits to the sites after demonstrations have been completed.
- **Translate guidelines into actionable decision support tools:** The CDSC Knowledge Translation and Specification team (KTS) will select medical guidelines and develop standards and mechanisms for these guidelines into unambiguous knowledge specifications. Those specifications will be used in the subsequent service and demonstration projects.
- **Build a knowledge portal and repository (KPR):** The KPR team will develop knowledge management tools for use in the development, review, publication, cataloging and archival of clinical guidelines in human and machine-readable forms.
- **Develop CDS Services:** The CDS services team will take the knowledge specifications developed by the KTS team and develop publicly available web services that will implement the KTS team's logic. These services will be made available to clinical information systems.
- **Carry out demonstrations of CDS across sites:** The CDS Demonstrations Team will implement decision support interventions using the content and services developed in the consortium. The initial demonstrations will occur in the Partners Longitudinal Medical Record (LMR) and will incorporate other sites in future years.
- **Build "dashboards" to measure the success of our CDS:** The CDS Dashboards Team will develop performance reporting tools and clinical dashboards so that providers and site clinical quality staff can review adherence to CDS Consortium guidelines.
- **Evaluate our work:** The evaluation team will coordinate CDSC evaluation activities across all teams and act as expert consultants to each team as they develop and carry out their evaluation plans.
- **Make recommendations:** Based on what we learn, the CDSC will make recommendations to electronic health record vendors, clinical content vendors and regulatory and certification authorities about best practices and capabilities for decision support.
- **Disseminate our results:** Along with Masspro, the Massachusetts quality improvement organization, and the AHRQ National Resource Center for Healthcare IT, we will share and publish our findings and clinical decision support content and best practices developed by the CDS Consortium. We will incorporate lessons learned about CDS into online learning modules for physicians as part of Masspro's DOQ-IT University initiative, and in the AHRQ National Resource Center.

Conclusion

The CDS Consortium is confident that working together, with Agency for Healthcare Research and Quality (AHRQ) support, significant progress towards widespread adoption of clinical decision support can be made in a short period of time. We expect to deliver first results by the end of the first year of the study. More detailed information is available upon request. Please visit our public website for CDSC study:

<http://www.partners.org/cird/StaffPrj.asp?cBox=CurrProj&prAb=ACDSC>