

Enabling Knowledge-Driven Care at Scale through CDS Hooks and the FHIR Clinical Reasoning Module

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Abstract

Interoperable clinical decision support (CDS) holds great promise for ensuring that patients receive the best care possible based on the latest medical knowledge. Building on prior efforts at standards-based CDS interoperability, as well as rapid adoption of the HL7 FHIR standard by the EHR vendor community, various stakeholders including EHR vendors, knowledge vendors, and healthcare systems are working together to enable interoperable knowledge-driven care through the CDS Hooks and FHIR Clinical Reasoning specifications. These specifications are being harmonized into a single unified HL7 specification, and the goal of this unified specification is to enable EHR systems to both (i) invoke external CDS Web services and (ii) consume external knowledge artifacts such as order sets, rule specifications, and documentation templates in a standard manner. In this panel, the latest developments will be discussed by leaders of this effort from the EHR vendor community, the CDS knowledge vendor community, the standards development community, and the healthcare provider community. The panel will demonstrate interoperable CDS implemented on multiple EHR platforms using this approach. The panelists will also describe key challenges and lessons learned, solicit feedback from the audience, and describe planned future work to continue advancing health and health care through interoperable CDS.

Description

The panel will be organized as follows:

Time	Speaker	Topic
10 min	Strasberg	Need for CDS interoperability, history, and challenges
15 min	Rhodes	Overview of unified CDS specification (CDS Hooks + FHIR Clinical Reasoning)
15 min	Shekleton	Cerner perspective
15 min	Doyle	Epic perspective
15 min	Kawamoto	Health care system perspective
20 min	All	Panel discussion with audience

Dr. Strasberg will serve as the moderator and introduce each of the panel members and their organizations. Dr. Strasberg will then describe why CDS interoperability is needed, briefly summarize prior work, and outline challenges to achieving interoperable knowledge-based care. This overview will be followed by presentations by the panelists, who will describe the unified FHIR-based standards for CDS interoperability (Rhodes); provide EHR vendor perspectives for supporting these CDS interoperability standards (Shekleton and Doyle); and describe how interoperable CDS can and is improving patient care at the healthcare delivery system level (Kawamoto). Panelists will also showcase interoperable CDS using this standard approach. These presentations will be followed by a panel discussion with the audience moderated by Dr. Strasberg.

Strasberg: Dr. Strasberg is VP of Medical Informatics at Wolters Kluwer Health, a leading CDS knowledge vendor with CDS solutions such as UpToDate® and Medi-Span®. He is co-chair of the HL7 CDS Work Group. Dr. Strasberg leads Wolters Kluwer's efforts in interoperable CDS. Dr. Strasberg will provide an overview of why CDS interoperability is needed to enable knowledge-driven care at scale. He will also provide a brief history of prior standardization efforts upon which the present initiative builds, and he will discuss key challenges to CDS interoperability.

Rhodes: Mr. Rhodes is EVP of Advanced Consulting at HarmonIQ Health Systems Corporation, a health IT company focused on interoperable solutions to improve patient health. Mr. Rhodes is also the principal subject matter expert for the Clinical Quality Framework (CQF) initiative sponsored by the Office of the National Coordinator for Health IT (ONC) and the Centers for Medicare and Medicaid Services (CMS) to enable interoperable CDS and electronic clinical quality measurement at scale. Mr. Rhodes will describe the unified FHIR-based CDS interoperability specification, which represents a unification of the CDS Hooks and FHIR Clinical Reasoning specifications. This unified specification is anticipated to be balloted as an HL7 standard in September 2017. This unified specification supports both (i) the sharing of CDS capabilities through Web services and, equally importantly, (ii) the sharing of CDS knowledge artifacts (e.g., event-condition-action rules, order sets, and documentation templates) as FHIR resources. The sharing of CDS knowledge artifacts involves the use of the HL7 Clinical Quality Language (CQL) expression language, and the sharing of CDS capabilities through Web services can leverage CQL or any other expression language. Both CDS interoperability approaches utilize the FHIR data model and profiles, which are expected to continue to evolve through the work of various HL7 Work Groups including the HL7 Clinical Information Modeling Initiative (CIMI) Work Group.

Shekleton: Mr. Shekleton is a Vice President and Distinguished Engineer at Cerner Corporation. Mr. Shekleton is the Project Lead of the multi-stakeholder CDS Hooks initiative, which has brought together a diverse group of EHR vendors, CDS knowledge vendors, and healthcare systems around the vision of interoperable CDS. Mr. Shekleton will describe Cerner's strategy and roadmap for supporting interoperable CDS, which includes providing production-level support for CDS Hooks in its product lines. He will also show examples of interoperable CDS solutions operating in the Cerner environment using these interoperability specifications, and he will provide his thoughts on the future of interoperable CDS at Cerner and across the industry, including his thoughts on how standards-based CDS knowledge artifacts could potentially be supported by EHR vendors such as Cerner.

Doyle: Mr. Doyle is a senior Software Developer and a leader of CDS development and initiatives at Epic, including Epic's efforts in the area of standards-based CDS interoperability. He will describe why Epic sees value in CDS interoperability, and how Epic is seeking to support the best care possible for every patient through the sharing of best clinical practice and the latest medical knowledge. Mr. Doyle will describe Epic's strategy and roadmap for interoperable CDS and will provide examples of interoperable CDS solutions operating in the Epic environment. Mr. Doyle will also provide his thoughts on the future of interoperable CDS at Epic and across the industry, including how CDS interoperability could be supported not just through services but also through the sharing of interoperable CDS knowledge artifacts such as rule definitions and order sets.

Kawamoto: Dr. Kawamoto is Associate Chief Medical Information Officer, Assistant Professor of Biomedical Informatics, Director of Knowledge Management and Mobilization, and Chair of the CDS Committee at the University of Utah. Dr. Kawamoto is also co-chair of the HL7 CDS Work Group and co-Initiative Coordinator for the ONC/CMS-supported CQF initiative. Dr. Kawamoto also co-leads the University of Utah's Interoperable Apps and Services (IAPPS) initiative, which is a multi-stakeholder effort to enable standards-based, interoperable applications and software services to improve health and health care. Dr. Kawamoto will describe why interoperable CDS is urgently needed to enable the ubiquitous availability of advanced CDS across healthcare delivery systems. He will then describe how the University of Utah is supporting the standards described in the panel through an open-source implementation of a CDS Hooks adapter for the Epic EHR platform, as well as through OpenCDS (www.opencds.org), an open-source CDS framework that provides support for standards-based CDS delivery. Dr. Kawamoto will also show how the University of Utah is leveraging these standards to improve patient care and the physician experience, including through the use of these CDS interoperability approaches within SMART on FHIR applications interfaced with the Epic EHR. Dr. Kawamoto will also discuss key lessons learned and the work that remains in achieving optimized patient care supported by effective, comprehensive, and interoperable CDS.

Strasberg: Dr. Strasberg will lead a moderated discussion with the audience. The objectives of this discussion will be to answer questions from the audience, engage in a stimulating exchange of ideas, and gain further insights on the topic from audience members' collective experiences. The questions listed below will be used to stimulate this discussion.

Significance of panel topic and anticipated audience

Effective CDS is critical for ensuring that patients receive optimal patient care and for healthcare systems to survive and thrive in a value-based payment environment. While history has shown that it is not feasible for individual healthcare organizations to develop the breadth and depth of effective CDS needed for realizing the full potential for knowledge-driven care, the unified CDS Hooks/FHIR Clinical Reasoning specification holds the potential to finally realize this vision given the strong support it is receiving from major EHR vendors such as those represented in this panel. Thus, it is imperative for biomedical informaticists seeking to improve the quality and value of health care to gain knowledge and insights into this important and rapidly progressing area of clinical informatics and health care delivery.

Discussion questions

What areas of clinical medicine do you think can benefit most from interoperable CDS?

What recommendations do you have for standards development and implementation in this area?

What gaps do you see in the current interoperability frameworks offered by EHR systems?

What can be done to facilitate order mapping from external CDS systems to local order catalogs?

Participation statement

All proposed panelists have agreed to participate in the panel if the proposal is accepted.