Practical Approaches to Knowledge Management: Focus on Clinical Decision Support

Saverio M. Maviglia and Margarita Sordo

Partners Healthcare System, Boston, MA, USA
Division of General Internal Medicine and Primary Care, Brigham and Women’s Hospital, Boston, MA
Harvard Medical School, Boston, MA, USA

Abstract and Objective

Computerized clinical decision support attempts to systematically provide clinicians with the necessary information and knowledge for making the right decisions for each patient. This tutorial describes strategies and processes to create and maintain the clinical knowledge assets necessary for effective and sustainable decision support interventions. Attendees will learn about the different types of clinical knowledge assets and their application to support evidence-based medical practice and research. Knowledge curation and maintenance processes will be presented through practical and illustrative examples from real clinical settings, including the systematic transfer and synchronization of assets during the implementation of new clinical systems. The instructors will explain practical approaches to collaborative knowledge engineering and asset management leveraging their experience within large and integrated healthcare delivery organizations using in-house and vendor-based solutions.

Keywords: clinical decision support, knowledge management, knowledge engineering, system implementation, patient safety, quality improvement

Tutorial description

Clinical decision support (CDS) is widely recognized as a critical feature of any modern clinical information system or electronic health record. However, current healthcare CDS efforts frequently fail to consider the important aspects of knowledge content curation and long-term maintenance. Similar to what has been observed in other industries, healthcare must create processes to identify the “best” knowledge, ensure knowledge currency and specificity, align the application of knowledge to organizational goals, and systematically deploy the knowledge using IT-based and non-IT-based interventions.

This tutorial describes strategies, processes, and best practices to create and maintain the clinical knowledge content necessary for effective and sustainable CDS interventions. Attendees will learn the essential components of a successful Clinical Knowledge Management program, including the processes and tools required to create, deploy, disseminate, and maintain multiple types of CDS interventions. The instructors will describe practical approaches to collaborative knowledge engineering, leveraging their experience within large and integrated healthcare delivery organizations. A variety of examples will be used to illustrate curation and maintenance lifecycles from real clinical settings, including details about governance processes, personnel skills and roles, and software tools.

General Topics

1. Clinical Knowledge Management Program
   a. Strategic, governance, and business issues
   b. Implementation and staffing considerations
   c. Transferring assets to a new clinical system

2. Knowledge Content Lifecycle
   a. Collaborative development and review
   b. Systematic testing and monitoring
   c. Sustainable long-term maintenance

3. Knowledge Management Software Infrastructure
   a. Content modeling
   b. Technology and configuration options
   c. Demonstration of KM tools

Tutorial structure

The tutorial is organized in three 60-minutes parts, one for each main topic outlined above (half-day, 3 hours total). Each part will include a detailed topic description, with illustrative examples and demonstrations, and ample opportunity for questions and discussion. All presentation materials will be made available to registered attendees via a website, along with additional reference materials. Attendees will be encouraged to access the tutorial website before the event, once their registration is confirmed. During the event, attendees will be encouraged to actively participate in the discussions. The tutorial content level will be: 50% basic, 25% intermediate, and 25% advanced.

Educational Goals

By the end of the tutorial, participants will be able to:

1. Describe the main characteristics of a Clinical Knowledge Management Program and the importance of well-defined knowledge management practices.

2. Describe the phases of the knowledge lifecycle, and map each phase to relevant tools, processes, personnel, and artifacts.

3. Describe a metamodel for representing knowledge relevant to CDS, especially rules; and explain how the metamodel is critical to an effective knowledge management infrastructure.
4. Explain strategies to systematically transfer CDS knowledge to new clinical information systems and electronic health records.

**Expected attendees**

1. Physicians, nurses, and other healthcare professionals involved with configuration and maintenance of clinical knowledge content and CDS interventions
2. Knowledge engineers, informaticians, and business analysts involved with curation and deployment of clinical knowledge content and CDS interventions
3. Computer scientists, system architects, and software engineers involved with implementation of CDS and Knowledge Management functionality within clinical information systems and electronic health records
4. Decision makers seeking to understand the rationale for implementing Clinical Knowledge Management programs and CDS tools and interventions

**Tutorial presenters**

*Saverio M. Maviglia, MD, MSc*
- Clinical Informatics Associate Director, Partners eCare, Partners HealthCare
- Assistant Professor of Medicine, Division of General Internal Medicine and Primary Care, Department of Medicine, Brigham and Women’s Hospital, Harvard Medical School
- Practicing hospitalist, Brigham & Women’s Faulkner Hospital
- Chair, Partners Medication Knowledge Committee and Partners eCare Clinical Decision Support Committee

*Margarita Sordo, PhD*
- Senior Informatician, Partners eCare, Partners HealthCare
- Instructor, Division of General Internal Medicine and Primary Care, Department of Medicine, Brigham and Women's Hospital, Harvard Medical School
- Research Associate in Medical Informatics, Decision Systems Group, Brigham and Women's Hospital, Harvard Medical School (until 2008)
- Led the efforts to develop GELLO, an HL7 and ANSI standard guideline expression language for clinical decision support (2005)
- Principal analyst and implementer of eRecommendations for Clinical Decision Support sponsored by the Agency for Healthcare Research and Quality (2010-2011)

**Contact:**
Saverio Maviglia, MD, MSc
Partners Healthcare System
93 Worcester Street Wellesley, MA 02481
email: smaviglia@partners.org