Standards in Health Information Technology: Promise and Challenges

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Abstract
Implementation of health information technology (HIT) can lead to improved quality of clinical care, including improved guideline adherence, better surveillance and decreased medication errors [1]. In the context of health information technology, computer-based clinical decision support (CDS) systems can improve clinician performance and reduce the rate of errors in practice [2]. Indeed, the promise of electronic health records lies principally in the integration of patient data from diverse sources that enables clinicians to take action [3]. While considerable work has been accomplished, the lack of widely agreed standards remains an impediment to the implementation of HIT generally and to clinical decision support in particular [4]. This applies both to patient data as well as to clinical knowledge that might be applied to those data to assist clinicians in making decisions [5].

Accordingly, it is useful to analyze the present status of standards in the domain of HIT. In order to be of maximum benefit to symposium attendees, such an analysis will focus on several key areas:

- An overview of standards that can facilitate HIT implementation;
- Practical aspects related to standards that should be taken into account when purchasing or developing systems;
- Challenges and hindrances to HIT deployment presented by the current state of standards, including their proliferation and overlap.

Standards: Process + Data + Knowledge
The process by which standards are developed is important. Key sources of CDS standards have been established, consensus-based standard development organizations such as HL7, ASTM and CEN. Industry-based groups and government agencies have contributed still more standards.

While developing standards in this fashion is generally a good thing, the resulting proliferation of standards, sometimes overlapping or otherwise in conflict, offers the potential for confusion. In particular, vendors of HIT systems may not know which standard will predominate and hence be worthy of adoption. As a result, harmonization of standards is crucial, and the activities of the Consolidated Health Informatics initiative in the USA and the Health Information Technology Standards Panel are key in this regard.

However, merely having harmonized standards is insufficient if they are not used or are used improperly. Accordingly, a certification scheme, such as that being developed by the Certification Commission for Healthcare Information Technology, is necessary to ensure compliance with standards.

Standards that arise through this process of creation and harmonization are important for clinical decision support in two ways: codification of data and representation of knowledge. In order for data integration or computer-based reasoning to occur, adequate data of appropriate types identified in interpretable ways must be available. This in turn demands standards for a data model, a query language, a messaging scheme and terminologies. Having such data will help support a myriad of important activities, including individual patient care, public health surveillance, research, finance schemes such as pay for performance and other quality improvement programs.

In addition to standards for data, CDS will be enhanced by standards for knowledge representation. Present CDS is characterized by labor-intensive, local implementation of general clinical knowledge, resulting in wasteful redundancy of effort and impaired dissemination of knowledge over the health care delivery system. Good standards for knowledge representation facilitate sharing of expert knowledge in computable format while still allowing local customization, including linkages to local data.
repositories. A number of standards have been developed, including the Arden Syntax, but none has realized this promise of knowledge sharing.

Summary

HIT in general and clinical decision support in particular offer the promise of improved care of patients and populations. Standards for data and knowledge representation are important to realize this promise. Emphasis on the process of development of standards and harmonization of the resulting standards is key. Practical guidance is needed to help purchasers and implementers of systems make sense of the proliferation of standards and choose wisely when evaluating or purchasing systems that incorporate HIT standards.

BIOSKETCH

Robert A. Jenders, MD, MS, FACP, FACMI is associate professor in the Department of Medicine at Cedars-Sinai Medical Center (CSMC) and the University of California, Los Angeles (UCLA). Co-chair of the clinical decision support technical committee in Health Level Seven since 1998, he has long worked on the development and implementation of standards for clinical decision support, including the Arden Syntax. Additional activities related to development of standards have included service as technology chair of the National Vaccine Advisory Committee’s Workgroup on Immunization Registries and as a participant in the recent process sponsored by AMIA to produce a national roadmap for clinical decision support. He is a member of the Clinical Decision Support Task Force of the Healthcare Information and Management Systems Society and a co-author of the HIMSS 2005 Book of the Year, *Improving Outcomes with Clinical Decision Support.* Also, he is a member of the interoperability workgroup of the Certification Commission for Health Information Technology.

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References


