Meaningful Use and Personalized Patient Education

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ABSTRACT

Limited health literacy affects a large portion of the US population, compromising patient engagement in the health care decision-making process and self-care. In order to help patients become better informed about their health and health care options, the Meaningful Use Regulation for Electronic Health Records includes a number of measures to stimulate patient engagement, including delivery of patient-specific education resources into EHR systems. In this panel, experts in information retrieval, patient education, and context-specific knowledge integration into EHR systems will discuss state-of-the-art advances in consumer health education, including personalized consumer information retrieval methods, consumer health knowledge resources with EHR integration capabilities, knowledge integration architectures, and a set of international standards to facilitate this kind of integration. The panelists will present a series of large-scale implementation examples, discuss challenges and limitations of the proposed approach, and talk about potential future directions.

INTRODUCTION

New models of care, such as the American Academy of Pediatrics Medical Home [1] and the Future of Family Medicine project New Model,[2] attempt to overcome the shortcomings of traditional models of care through a continuous, comprehensive, coordinated, and patient-centered approach in which patients are engaged to actively participate in the decisions and processes related to their care.

In order to be partners in the decision making process, patients need to be well-informed about their health and health care options. However, limited consumer healthcare literacy, which affects nearly half of the adult US population, has been a significant barrier to patient engagement and the overall quality of care, leading to poor outcomes such as higher morbidity, increased hospitalizations, and medication non-adherence.[3]

Recent efforts have been aimed at better assessing healthcare illiteracy and at designing various approaches to mend it. Among these approaches, access to online health knowledge resources is a promising strategy to promote health literacy, but significant barriers still compromise their use, with both patients and providers becoming overwhelmed with the vast amount of information available.[4] Hence, there is a need for tools that help health providers and consumers locate relevant, high quality knowledge in a timely manner and in the context of need.[5]

The recent Health Information Technology for Economic and Clinical Health Act (HITECH) in its Meaningful Use Regulation for Electronic Health Records includes a number of measures to stimulate patient engagement, including delivery of patient-specific education resources into the EHR so these resources can be offered to the patient as appropriate.[6] The key to retrieving highly-personalized patient education content is the ability to understand and capture the context in which needs for patient education arise. Context-aware knowledge retrieval applications (a.k.a. “infobuttons”) have been developed to meet the information needs of health care providers.[7] The same architecture used in provider-focused context-aware knowledge retrieval can be leveraged to deliver personalized health information to consumers.

From a technical standpoint, four elements are needed in order to enable the context-aware integration between EHR systems and consumer health information resources: 1) EHR systems that are able to capture the context of interactions between providers and the computer; 2) high-quality consumer health information resources that understand context and respond to requests with highly-personalized content; 3) a knowledge broker to orchestrate the interaction between one EHR and multiple resources;[8] and 4) a set of standards to facilitate the integration among these three components.[9]

In this panel we will discuss those four elements in more detail, bringing different perspectives from academia, health care information technology standards, industry, and government agency. The panelists will present previous and ongoing large-
scale implementations examples. In addition, the panelists will discuss state-of-the-art advances in personalized knowledge retrieval as well as roadblocks and technical challenges in making further advances in this area, which is critical to the realization of patient-centered health care.

**PANEL TOPICS AND STRUCTURE**

**Topic 1: Personalized knowledge retrieval (Mostafa).** MedSIFTER is a personalization engine which takes advantage of a machine-learning technique, known as reinforcement learning, to aggregate documents and data contextually relevant to a patient's profile. MedSIFTER is capable of interfacing with the popular MedlinePlus system and automatically extracting content that match with profiles. MedSIFTER's chief architect is Dr. Javed Mostafa. At UNC-Chapel Hill Dr. Mostafa serves as the Director of Biomedical Informatics for the Translational and Clinical Sciences Institute, where he is engaged in several applied informatics projects. MedSIFTER's reinforcement learning user-profiling component has been subjected to extensive evaluation, whereby it was shown to be robust and effective.[10] Currently MedSIFTER is undergoing longitudinal usability evaluation with a user population. We are also engaged in expanding MedSIFTER's capability so that it can take advantage of a Personal Health Record (PHR) system to directly populate the user-profile with critical data. Two related goals are to ensure that it complies with and takes advantage of the current context-aware knowledge retrieval standard and that it can interface with diverse set of established health document/data resources. For achieving these critical goals, an initiative is under way with the collaborators that will participate in this panel discussion.

**Topic 2: Healthwise (Hall).** Leslie Kelly Hall, Healthwise Senior Vice President for Products, will describe an ongoing project between Healthwise and the Department of Defense (DoD). Healthwise, a patient education solution provider, has developed an Infobutton Manager application with the U.S. Army’s Telemedicine and Advanced Technology Research Center (TATRC) for integration in the DoD’s EHR system, AHLTA. With a focus on providing specific patient education materials and instructions during a visit, the Infobutton solution will help users of AHLTA (or any other EHR or HIT application and any other content resource) provide the right information to the right person at the right time.

**Topic 3: Consumer Health Information activities at the National Library of Medicine (Cimino).** Dr. James Cimino is the Chief of the Laboratory for Informatics Development at the NIH Clinical Center and the National Library of Medicine. His research work has included the development of infobuttons to link electronic health records to on-line knowledge resources,[7] and their integration into EHRs, including an early PHR.[11] Dr. Cimino will present work conducted at the National Library of Medicine, by himself and others, that address the needs for high-quality consumer health resources (such as MedlinePlus[12]), methods to deliver these resources in highly personalized ways (such as the Infobutton Manager[13] and InfoBot[14]), and tools (such as the Librarian Infobutton Tailoring Environment) to support medical librarians (or their proxies) in defining how such resources can be brought to bear in their own institutions.

**Topic 4: HL7 Infobutton Standard and open-source knowledge broker (Del Fiol).** Dr. Del Fiol is a co-chair of the HL7 International Clinical Decision Support Work Group and the lead author of the HL7 Context-Aware Knowledge Retrieval (Infobutton) Standard. This standard has received wide industry adoption, especially among knowledge resource providers, including patient education resources. Dr. Del Fiol is also the lead architect of OpenInfobutton, an open-source reference implementation of the HL7 Infobutton standard funded by the Veterans Health Administration (VHA) Chief Health Informatics Office Innovation Program.[9]

Dr. Del Fiol will provide an overview of the standard and standards-based implementation examples that include various healthcare organizations and knowledge resources. He will also talk about the OpenInfobutton project including a demonstration, a status update, and instructions on how to use it or engage into this collaborative open source software development project.

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**REFERENCES**
