Linking Guidelines for Mammography to an Electronic Medical Record for Use by Patients

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Mammography guidelines can be difficult to use and may offer conflicting results. We have developed an application that automatically obtains relevant patient information from an electronic medical record and provides patients with the interpretation of three different guidelines, enabling them to compare the various authoritative recommendations.

Introduction. Traditionally, clinical guidelines are used by only by clinicians; patient-oriented versions are generally less available. Besides being difficult for patients to use, guidelines can offer conflicting advice, which may lead to confusion and interfere with decision making. For example, medical experts simply do not agree on the frequency of performing the mammography for breast cancer screening for 40-year-old women or even on which cases it has any value at all. To address these problems, we have integrated rule-based clinical guidelines with an electronic medical record for use directly by patients, to support patient-oriented guidelines with patient-specific recommendations.

Methods. We obtained guidelines from three organizations: the National Cancer Institute (NCI), the American Cancer Society (ACS), and the American College of Physicians (ACP). We identified the risk factors used by each to make its recommendation and created a matrix of all possible risk factor combinations and corresponding recommendations for each guideline. The application was designed to carry out two main functions: collection of relevant risk factor data and presentation of recommendations. The application was linked to a Web-based medical record system for use by patients called the Patient Clinical Information System (PatCIS) [1] at the New York Presbyterian Hospital. Since the patient's medical record number (MRN) is known to PatCIS, it can query the repository seamlessly for relevant data. The data entry form is then composed dynamically, based on which data elements are still needed. Logic was developed to provide two sets of recommendations. The first set shows the recommendation of each individual guideline, including links to the original guidelines. The second recommendation is a synthesis of the three recommendations into a single one. Finally, the application was integrated into PatCIS as one of its "guideline" buttons; when the button is selected, PatCIS passes user information (including the MRN) to the application.

Results. *System logic*: The three guidelines all referenced the same risk factors: gender, age, date since last mammogram, and family history of breast disease. The first three of these factors were available from the repository. *System operation*: The user starts by clicking the "Guideline" button and then selecting “Mammogram” from the list of choices. The application retrieves and displays the user's risk factor data from the repository and requests any additional necessary data (unless the patient is a male). Based on the combination of data from the repository and supplied by the user, the guideline recommendations are generated and displayed. The text includes hyperlinks to the original guidelines at the respective societies’ sites.

Discussion. The current application has four characteristics that set it apart from typical Web-based mammography guidelines. First, it is oriented towards patients, rather than physicians. Second, it presents dynamic, patient-specific recommendations, rather than a long textual description of all recommendations. Third, it obtains (where possible) clinical information directly from a clinical information system, rather than requiring data entry by the user. Fourth, it allows the user to make side-by-side comparisons of recommendations from authoritative guidelines.

There are still many areas for future extensions to this work. The usability of the system remains to be evaluated. We do not know, for example, if patients will be able to provide appropriate responses to the requested data. Nor do we know if they will prefer the side-by-side comparison of the guideline recommendations, versus the synthesis, versus a simple “yes/no” answer. We are currently recruiting PatCIS users; the system will track their usage of the application, and follow-up evaluation will seek answers to these questions.

Reference:

1. Cimino JJ, Sengupta S, Clayton PD, et al. Architecture for a Web-based clinical information system that keeps the design open and the access closed. JAMIA; 1998;4 (Suppl):121-125.