The Digital Formulary: Development of an Intranet Drug List for a University Hospital

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Background. In an effort to help streamline the flow of clinical information at the University of Michigan Medical Center (UMMC), a joint project between Medical Center Information Technology staff and School of Information students built a prototype hospital formulary (hospital approved drug list for the institution) information system. This project sought to eliminate multiple printed and electronic versions of the formulary by providing live, web-based access to information about the formulary from a newly built client-server Pharmacy system. By creating for clinicians a single point of access to the formulary which pulls up-to-date information from the production Pharmacy system database, significant cost savings are expected due to elimination of duplication and streamlining of workflow.

Over the last two years Pharmacy Services has worked with a pharmacy information system vendor to replace and upgrade the functionality provided by a legacy system. In contrast to the mainframe-based legacy system, the new system is built on the Informix relational database platform, which allows greater opportunity to present relevant information to the clinical community via the intranet.

Traditionally, Pharmacy Services has published a pocket-sized formulary annually as a reference for all UMMC clinicians. Because it is a print reference, this formulary represents a point-in-time view of the hospital formulary as excerpted from the mainframe system, formatted using desktop publishing software, and sent through a printing process. Often the formulary itself has changed by the time the new print version reaches clinicians. This lag, combined with a lack on the part of many clinicians to check any reference source before ordering medications, often results in duplication of effort, paperwork, and increased time to delivery of medications.

With the installation of a new client-server based system, Pharmacy Services hoped to use the UMMC Intranet as a new means by which to publish the formulary. The use of the relational database structure allows information from the live production database to be displayed to clinicians at UMMC.

System. The project team built the web-based prototype as a searchable and browsable interface to the formulary as stored and updated, real-time, on the Informix database. The project team was focused on making the system reliable, robust, and extremely efficient for the clinical decision-making process.

Through a series of physician interviews, the project team gathered data for use in interface and functionality design. Building upon the results of these interviews and the informational structure inherent to the drug information contained in the formulary database, a prototype was developed. The prototype used the same data model as the Informix database, installed and populated on a Microsoft Access database on a Windows NT machine. Using Allaire Cold Fusion, database queries were constructed to extract formulary information in response to user inquiries and results were formatted according to the web interface specifications derived through the interviews. Ultimately, the Cold Fusion prototype will be interfaced with the Informix database when the final production database is installed.

Evaluation. Functionality provided through the interface includes browsing either alphabetically or by drug class, searching by full brand or generic drug name, and partial name matching. In addition to drug dose and drug form information, the system adds cost information to each query result. This combination of functionality and information robustness is designed to provide the clinician with as much information as is possible to focus the medication ordering process both to drugs in the approved formulary and drugs with specific restrictions or preferred alternatives.

Conclusions. Initial testing indicates that the prototype indeed provides the required information in a manner that should be easily implementable in the production environment.

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