Quality Dashboards: Technical and Architectural Considerations of an Actionable Reporting Tool for Population Management

Maya Olsha-Yehia\textsuperscript{1}, Jonathan S. Einbinder\textsuperscript{1,2}, MD, MPH, Eunice Jung, MPH\textsuperscript{1}, Jeffrey A. Linder, MD, MPH\textsuperscript{2}, Julie Greim, RN, MBA\textsuperscript{1}, Qi Li, MD, MBA\textsuperscript{1}, Jeffrey L. Schnipper, MD, MPH\textsuperscript{2}, Blackford Middleton, MD, MPH, MSc\textsuperscript{1,2}  

\textsuperscript{1}Clinical Informatics Research & Development, Partners Healthcare System, and  
\textsuperscript{2}Division of General Medicine, Brigham and Women’s Hospital, Boston, MA

Abstract: Quality Dashboards (QD) is a condition-specific, actionable web-based application for quality reporting and population management that is integrated into the Electronic Health Record (EHR). Using server-based graphic web controls in a .Net environment to construct Quality Dashboards allows customization of the reporting tool without the need to rely on commercial business intelligence tool. Quality Dashboards will improve patient care and quality outcomes as clinicians utilize the reporting tool for population management.

Introduction: By providing feedback on performance against different benchmarks, clinicians can gain insight on clinical performance goals, including pay-for-performance targets. Quality Dashboards take advantage of the structured data capture capability of our EHR. Quality Dashboards are intended to improve patient care and quality outcomes and to increase the perceived value of effective use of the EHR.

Background: Partners Healthcare System has developed the Longitudinal Medical Record (LMR), an ambulatory EHR used across the Partners network, which captures a variety of structured clinical data and includes such tools as charting, results management, referral management, and order entry. Quality Dashboards is a new module in the LMR. They give clinicians and other authorized users with summary performance measures for specific populations of patients, as well as providing the ability to drill down to individual patients. In addition, Quality Dashboards link directly to the patient’s electronic record and are actionable, allowing the user to take selected actions for groups of patients.

Methods: 

Data warehouse. In order to query against a patient population, there is a need for an aggregated data warehouse. The Quality Data Warehouse (MS SQL 2000) compiles and stores data from multiple sources, such as vital signs, Health Maintenance, medications, problems, enterprise master patient index and laboratory results.

Security. The Quality Dashboard is a web-based tool, and as such it is important to make sure that data presented remain secure at all times. The Quality Dashboard uses a session token from LMR and invokes a session service to identify the user. This ensures that the session is valid and makes it secure for Intranet access. For Internet access, in addition to a session token, the Quality Dashboard also receives a cookie set by lmr.partners.org (the Server for Internet use of LMR), which is used to invoke Quality Dashboard for a single sign-on. This ensures that the user is legitimate for Internet usage.

Dynamic Graphic View. Quality Dashboard presents a graphical view of benchmark comparisons (e.g., individual physician performance with the entire clinic, institution, Partners Healthcare, as well as externally based performance targets). These Web control charts have actionable functionalities, like drilling down into additional views for more detailed information about a selected patient population.

Patient Panel View. The patient panel view consists of a list of patients for a specific measure with the ability to sort and order the list per user preference. These lists can be saved and reused for future observations and analysis. Lists can also be generated using ad hoc, dynamic Boolean queries of different measures for a given condition (e.g., all patients with uncontrolled blood pressure and who are not on a beta-blocker). In addition, batch actions can be performed on these lists, such as enabling batch letters and laboratory test orders.

Technical Considerations. As a standard web-based application, the Quality Dashboard application is accessible via our Intranet and the Internet. Graphics are generated by server-based web control, which makes rendering much faster than using client-based web control. The Quality Dashboard is built on a .Net environment and allows flexibility, ease of use, and integration with existing systems at Partners.

Conclusion: The Quality Dashboard application is a web-based reporting tool that allows clinicians to better manage populations of patients. Quality Dashboards take advantage of the structured data capture capability of Smart Form and other clinical documentation tools in our EHR to create the underlying database.

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