



Case Study

Partners HealthCare: How an Integrated Healthcare System Created a Centralized Data Warehouse and Reporting System to Manage Quality

The Situation

The data that healthcare organizations collect as a byproduct of taking care of patients has a secondary, strategic value for understanding and improving practice performance. Clinical data can be used, for example, to analyze and boost quality metrics to achieve pay-for-performance (P4P) goals, accelerate electronic health record (EHR) adoption, gain accreditation from the Certification Commission for Healthcare Information Technology (CCHIT), as well as create disease registries to manage patient populations.

The Challenge

A few years ago, Partners HealthCare, a not-for-profit integrated health care delivery system based in Eastern Massachusetts, was challenged with delivering a quality reporting tool to support physicians using their enterprise-wide ambulatory longitudinal medical record (LMR). This was a significant challenge, since Partners is a federated healthcare system made up of teaching, community, and specialty hospitals including Massachusetts General and Brigham and Women's, and a growing group of independent physician practices that operate with varying affiliations but share a common medical record system.

Partners LMR is a composite application that renders, or displays, information drawn from various systems and sources through a services-oriented architecture. While this Web-based architecture has many benefits for a transactional system that takes care of patients, it presents real challenges for reporting and analysis because the data sits in disparate silos throughout the organization and cannot be easily cross-queried.

How could Partners' Quality Data Management group, managed by Jonathan Einbinder, MD, create a centralized data warehouse and quality reporting system to effectively and accurately manage data for reporting and analysis for clinical operations and quality?

The Solution

Working with Recombinant, Partners Clinical Informatics R&D was able to integrate the data from LMR sources as well as additional sources not available through LMR to deploy a centralized data warehouse and quality reporting solution called Report Central. Report Central includes an analytical data request system (ADRS), Web-based report portal, and clinical quality report library, which are now offered commercially through Recombinant.

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As an adjunct to LMR, Report Central serves as a separate reporting system with data incrementally extracted on a periodic basis so the performance of the transactional systems are not impacted. In addition, as a separate system, additional data can be combined from other sources for more expansive views and analysis. For example, core data sets such as patient problem lists, medications, vital signs, and clinical notes from LMR can be combined with information such as patient identity, schedules, and billing data. Useful metrics and reports can then be generated for on-demand and ad hoc queries, quality dashboards, and data marts for population management. These reports provide Partners clinicians and administrators with timely access to integrated views of quality data to better understand and improve their clinical practice through modifying clinical workflows and achieving better quality metrics.

Through the Partners Analytic Data Request System, individual clinicians, clinical-level staff (e.g., medical directors, nurse case managers, quality improvement staff), and hospital and enterprise administrators can submit requests for ad hoc consults to quality data management team members to fulfill. These requests can range from accessing compliance with Joint Commission regulations for documenting pain scores to providing lists of patients taking recalled or potentially unsafe medications. Partners has found (based on a limited series of 100 queries) that while individual clinicians run the most on-demand reports, the clinical-level staff asks for ad hoc requests most often. The number-one “select” data source (list of patients selected) for ad hoc queries is EMPI/patient demographics, and the number-one “where” data source (filters/criteria to produce a list) is medications by a fairly large margin.

Any of LMR’s 7,000 authorized users at Partners 300 practice sites can use Report Central, posing both an access and a security challenge. LMR users encompass a range of practice types, both academic medical centers and community practices, as well as user types: for example, primary care physicians, specialists, adult medical doctors, pediatricians, as well as non-physicians. How could an application be created that works across all these settings and users, and account for the personalized role-based security unique to healthcare? In other words, how can the system ensure the right people see the right information? The benefit of an electronic system is that it allows tracking and auditing from the back-end. However, connecting the right data from the data warehouse to the right person requires that certain logic be built into the reporting system. To assign accountability in quality reports and ensure patient privacy, logic must be incorporated that defines and determines whether a person is a patient of a particular doctor. For example a cardiac surgeon should have access to all the medical records of a patient on whom he has performed surgery. The medical director at a practice should have access to review all providers at their practice. Report Central, which uses an ASP .net application, applies role-based security to maintain the context of the user and to display only the menus, reports, and data within the reports that the user is authorized to see.

Through Report Central, users can generate a number of types of reports, including externally focused reports such as Joint Commission core measures; internally focused reports for quality improvement, clinical understanding, and efficiency improvements; population decision support for patient care; and research.

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Reports can range from simple descriptive reports, such as prescribed medications to review practice patterns and usage of the LMR, to more detailed, descriptive reports such as pediatric body mass index (BMI) percentiles, pediatric immunization schedules, or HbA1c control of a diabetes population for the panels of each PCP in the practice. Users can access both real-time and previously run reports to view historical results. The history also provides a mechanism to supply any necessary audits of the exact content of data delivered in reports to providers.

The biggest challenge in the delivery of the system has been the “denominator problem,” identifying, for example, which physicians are in a clinic and the patients of those physicians. The reporting application applies logic for primary care physicians, specialists, pediatricians, non-primary care physicians, etc., at both academic medical centers and in the community. Working with Partners, Recombinant used a variety of approaches to define the panels. For example, Brigham and Women’s Hospital supplies its panels as a data source that is loaded every week, while Massachusetts General Hospital panels are derived using registration data (from the EMPI) combined with schedule data. If a physician is listed through free text as a patient’s PCP in the EMPI registration data, the system maps them to a coded LMR provider through a mapping of variations of how the names have been entered. Non-PCP panels for urgent care, nurses, and specialty practices are defined using transaction data. If the patient has seen a provider two times and two notes have been written within the last two years, then the two are linked. Additional logic supports new practices to look within a one-year timeframe when only a small amount of historical data is available.

Since the reporting system can be built incrementally, Partners is working with Recombinant to further extend the use of its quality reporting in a number of areas. It is looking to develop more physician performance metrics; moving beyond ambulatory EHR to Medication Reconciliation and eMAR (Electronic Medication Administration Record); adding new features to Report Central including the ability for clinicians to edit their patient panels, enter notes into reports at a patient level, and make reports more actionable (via LMR) to improve the automation and tracking of batch letters; and improving adoption by close ties to incentives and tightening alignment with decision support.

The implementation of Report Central helped Partners achieve CCHIT certification for the LMR in 2006. But the benefits of Report Central have gone far beyond certification. By creating a centralized data warehouse and quality reporting system, Partners is able to use clinical data to gain a better understanding of performance and to support new ways for ensuring patients receive high- performance care.

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