Graphical Modeling of HEDIS Quality Measures and Prototyping of Related Decision Support Rules to Accelerate Improvement

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Abstract

We describe the application of the RetroGuide analytical toolset to quality improvement in osteoporosis and cholesterol management. Our graphical executable scenarios enable user-friendly modeling of temporal processes and retrospective prototyping of decision support on real EHR data. The graphical format is well understood by clinicians and improves the analyst-clinician collaboration.

Introduction

Many healthcare organizations have to report an increasing number of quality of care measures. The predominant method to model and solve such requirements is using SQL-based tools. However, existing database tools do not provide good support for solving time-related questions and SQL is not easily understood by clinicians. We used our previously developed analytical infrastructure called RetroGuide (RG) \cite{1} to partially model two HEDIS 2007 quality improvement (QI) criteria developed by National Committee on Quality Assurance (NCQA). We also looked beyond the measure definition and retrospectively simulated decision support rules to capture pertinent clinical scenarios. We used data from the Enterprise Data Warehouse (EDW) at Intermountain Healthcare (IHC). IHC is a not-for-profit integrated delivery system of 21 hospitals with an affiliated health plan.

Methods

The two selected HEDIS measures were: “Osteoporosis Management in Women Who Had a Fracture” (OMW) and “Cholesterol Management for Patients with Cardiovascular Conditions” (CMC). For OMW we used a cohort of 1,469 female patients with a history of bone fracture. For CMC our cohort had 1,427 patients with a history of AMI, CABG or PTCA. We followed the standard RG methodology described elsewhere \cite{1}. RG’s target users are not only analysts, but also QI clinicians.

Preliminary Results

OMW: The RG output report showed that 7.96\% of the patients had an osteoporosis drug prescription and 3.15\% had a report about bone mineral density test within 6 months from the fracture. In terms of potential areas for improvement, we found that 21.96\% of non-compliant women had an established prior diagnosis of osteoporosis (via ICD9 billing code or EHR problem list) and 11.2\% had 2 or more encounters within 6 months after the fracture. We also studied women with fracture at age 65 to 66 (prior to the measure-qualifying-age of 67) and found that 12.0\% had a prior diagnosis of osteoporosis; 20.0\% had an additional fracture prior to age 65; and 4.67\% had a record of therapy prescription only after 2 or more previous fractures. CMC: We found that 43.24\% of CMC patients had proper cholesterol screening performed and 31.53\% were in good control. We investigated what percentage was close to the threshold level (100-130 mg/dL) and on a low dose of a lipid-lowering agent (2.66\%). In 13.38\% of the non-compliant patients we found evidence of 2+ laboratory-test-episodes or 3+ encounters within the desired time window. These results are limited by the presence of appropriate codes and completeness of the EHR available at IHC.

Discussion and Conclusion

RG’s key advantages are: (1) Graphical approach to modeling analytical questions. Such graphical middle layer facilitates better clinician-analyst collaboration (executable flowcharts will be included in the poster version); (2) Ability to model a set of criteria where parameters or results from previous restricting criterion can be easily used in subsequent criteria; (3) Ability to easily extent the HEDIS model with additional relevant analytical questions; and (4) Ability to prototype several versions of decision support on retrospective data and observe potential impact prior to deployment (with support for patient level execution trace and EHR drill down capabilities). We have been unable to find published studies exploring concrete decision support modules to improve an organization’s performance on HEDIS measures, or an analytical infrastructure that supports execution of graphical decision logic prototypes on retrospective data from a large EDW.

References