

Cardio-HIT Phase II

Principal Investigator:	Kmetik, Karen, Ph.D.
Organization:	American Medical Association
Mechanism:	RFA: HS07-002: Ambulatory Safety and Quality Program: Enabling Quality Measurement through Health Information Technology (EQM)
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Target Population: Adults, Congestive Heart Failure, Heart Disease

Summary: Quality measure exceptions are defined by the Physician Consortium for Performance Improvement® (PCPI) as reasons why patients who are eligible for a measure based on a broad criterion, such as diagnosis (the patient has coronary artery disease) or age, may not be candidates for a particular aspect of care because of a medical (allergy to drug), patient (preference), or system (shortage of influenza vaccine or inability to pay) reason. With the growing levels of public and private clinical performance measurement activity in the United States, the use of exceptions has received increasing attention from varying stakeholders including consumer and patient groups, physicians, payers, policymakers, performance measure developers, and product vendors of electronic health records (EHRs). In the context of physician performance measurement, exceptions are an element of physician performance measure design that is intended to fulfill four functions: promote appropriateness of care, facilitate quality improvement and patient management, track variations, and prevent unintended penalization of physicians.

The quality measure and EHR collaboration, known as Cardio-HIT, explored analysis of exception reporting across physician practice sites with different EHR products. This project was a 2-year, observational study of quality measure exception reporting on the feasibility and reliability of integrating the nationally-recognized American College of Cardiology (ACC)/American Heart Association (AHA)/PCPI-developed physician performance measures for coronary artery disease (CAD) and heart failure (HF) into five EHR-equipped cardiology and internal medicine practices. This project is one of the first systematic investigations into these key issues that emphasize the use of different EHRs at different independent practice sites.

The overarching objectives of the study were to:

- Advance the science of performance measurement through quantitative study of the prevalence and patterns of exception and performance reporting.
- Advance empiric knowledge of the relative accuracy of exceptions.
- Inform the national debate on the role of exception reporting in physician performance measurement through qualitative study of key stakeholder perspectives.
- Delineate patient population more accurately through improved exception categorization.

The process of integrating the ACC/AHA/PCPI measures into an EHR, exporting de-identified data to

a central warehouse, and developing and distributing the results followed a multi-phased approach involving each practice site and the Iowa Foundation for Medical Care, which managed the Cardio-HIT clinical data warehouse. The team from the individual practices consisted of staff well-versed in the technical requirements of data extraction from their EHR, and a physician leader with detailed knowledge of the use of EHR data in the clinical workflow of the practice. The data to inform the work were collected from the following vendor products: Epic Spring; NextGen; Hybrid EHR; Touchworks by Allscripts; and GE Centricity. At the time of the study, the EHR product versions in use were not certified by the Certification Commission for Health Information Technology; however, all vendors, with the exception of the Hybrid EHR, are certified now.

Two sources of data were used for this study: 1) the CAD and HF performance measure data, which were collected in practice site EHRs and exported to a data warehouse by all Cardio-HIT sites, and: 2) detailed data on reported performance and exceptions, which were collected via manual abstraction by trained abstractors. The data generated through the Cardio-HIT project also provided actionable feedback to physicians about the quality of care being provided by the analyses of the exception data reported for the integrated performance measures. Physician access to exception data from the EHRs at the point of care is critical for improving clinical decisionmaking and patient outcomes.

Specific Aims:

- Develop an empirical understanding about prevalence and patterns of exception reporting among physicians using EHRs and reporting national performance measurements. Exception and performance reporting data were used from the Cardio-HIT sites to quantify prevalence and patterns of exceptions and performance for two measure sets: CAD and HF. **(Achieved)**
- Evaluate the feasibility and accuracy of exception reporting among physicians in the following ways: 1) conduct organizational evaluations to characterize and assess the ability of EHR-enabled practices to capture data required for exception reporting and assess variation in this process; and 2) evaluate the accuracy and validity of automated exception reports and identify key sources of measurement error. **(Achieved)**
- Analyze and then address stakeholder perspectives concerning exception reporting in physician performance measurement to develop refined principles and methods regarding the use of exception reporting in performance measures. Convene key stakeholders in physician performance measurement, document stakeholder perspectives, and develop a consensus guideline concerning the use and operationalization of exceptions in national physician performance measures. **(Achieved)**

2009 Activities: The grant team completed data abstraction, review, and analysis of patient-level data from the five practices participating in Cardio-HIT for selected AHA/ACC/PCPI CAD and HF performance measures.

The practices reported data on 47,075 CAD patients for four CAD drug therapy performance measures (antiplatelet, low-density lipoprotein lowering, beta-blocker, and angiotensin converting enzyme inhibitors/angiotensin II receptor blockers [ACEI/ARB]), including exception reasons. Retrospective manual reviews of the EHRs were conducted on a sample of 538 patients with reported exceptions. Among patients with reported exceptions, there was 93 percent agreement between the reported exception and documentation in the EHRs based on an a priori list of appropriate exceptions. The “true exception” rate where an exception was reported and no drug was prescribed, across all sites and all measures was 3.5 percent, with variation across the measures ranging from 2.0 to 6.2 percent. Overall performance rate for all sites for the four CAD measures was 76.7 percent. Of the 167 patients with true exceptions, 97.5 percent had a reported exception found to be in agreement with the exception in the EHRs documentation. A manuscript on the CAD findings, [Exceptions](#)

[to Outpatient Quality Measures for Coronary Artery Disease in Electronic Health Records](#), was published in the February 2011 volume of *Annals of Internal Medicine*.

The practices reported data on 13,985 eligible HF patients for three HF drug therapy performance measures (beta-blocker, ACEI/ARB, and warfarin), including exception reasons. Retrospective manual reviews of the EHRs were conducted on a sample of 559 patients with reported exceptions, including patients with multiple exceptions. Among patients with reported exceptions, there was 87 percent agreement between the reported exception and documentation in the EHRs based on an a priori list of appropriate exceptions. The “true exception” rate where an exception was reported and no drug was prescribed, across all sites and all measures was 5.6 percent, with variation across the measures ranging from 5.3 to 6.2 percent.

The practices reported data on 12,403 eligible HF records for six HF performance measures (beta-blocker, ACEI/ARB, warfarin, left ventricular ejection fraction assessment, weight measurement, and blood pressure measurement). Retrospective manual reviews of the EHRs were conducted on a sample of 678 records where the numerator was reported. Few records were identified as “misclassification – exception found” because manual abstraction of the EHR found the measure was not met but an acceptable exception was identified. A small number of records were identified as “invalid – apparent quality failures” because manual abstraction of the EHR found the measure was not met and no acceptable exception was identified.

Grantee’s Most Recent Self-Reported Quarterly Status (as of December 2009): The project term is complete with all aims achieved.

Impact and Findings: Exception reporting was generally low, with high rates of agreement. This study identified aspects of care that are important to capture in an EHR for care coordination and patient safety. The specific reasons for a medical exception suggest standard categories of medical exceptions (e.g., clinical contraindications, drug allergy, or interaction). Because many exceptions are not absolute, physicians may decide to “override” an exception and provide the relevant aspect of care. Automatic reporting often missed critical information. With improvements in automated reporting, additional granularity may be possible in the future.

Physicians are more likely to accept the quality measure results as valid if they can account for exceptions. Many report frustration when exceptions are not permitted. Exceptions also provide a means to track variations in care and focus quality improvement efforts. For example, rather than simply report that 40 percent of eligible patients did not receive a particular drug, the data can show that 30 percent did not receive the drug for a reported medical reason, and 10 percent did not receive the drug with no reason provided. Further investigation of the 10 percent may be a good first step in targeting quality improvement efforts. The ability to collect and analyze exception data may prove valuable in understanding variations in care. Physician access to exception data from the EHR at the point of care is critical for decisionmaking and may help improve patient outcomes, perhaps through clinical decision support systems. These findings will enable the development and dissemination of health information technology evidence and evidence-based tools to improve health care decisionmaking using integrated data and knowledge management.

More detail on the project findings is included in Dr. Kmetik’s final report: [Kmetik 2009 Final Report](#).

Strategic Goal: Develop and disseminate health IT evidence and evidence-based tools to improve health care decisionmaking through the use of integrated data and knowledge management.

Business Goal: Knowledge Creation