

## You Can't Manage What You Can't Measure

**Background knowledge:** There is a steady increase in the demand of quality metric reporting by public and private sectors, as well as an internal demand. Not only is the demand increasing, but the type of metrics, whether it be for preventative services, chronic disease management, surgical or other quality metrics for specialties is also increasing. Measuring quality can be a laborious and expensive effort for an organization. Timely results are needed to affect change.

An automated reporting system can provide an efficient and consistent method for evaluating quality of care metrics that enables an organization to identify gaps in care and develop initiatives to improve care.

**Local problem:** Marshfield Clinic is one of the largest comprehensive medical systems in the United States and is a national leader in leveraging health information technology to further medical research and provide safer, more efficient, patient-centric care. The system of care is geographically dispersed across central and northern Wisconsin. The Marshfield Clinic's long term strategy has been aligned with the six aims of the Institute of Medicine. The electronic health record (EHR) and enterprise data warehouse have enabled this strategic direction.

The commitment to quality by the Clinic is exemplified by the inclusion of an overt statement about delivering high quality in the mission statement. Without measuring the quality, one can only assume the care delivered is of high quality. Timely feedback is needed to critically assess the care provided and meet the increasing demand for quality reporting by the multiple entities – private, government, and for public reporting. To evaluate our quality and identify areas to improve our measures, a reporting system is needed that is scalable and nimble to rigorously monitor, identify gaps and evaluate progress.

**Intended improvement:** A fully automated, scalable and efficient reporting system was developed to meet the demand of quality metric reporting. Using evidenced-based medicine guidelines, a quality metric reporting application was developed to measure, monitor and manage key metrics and initiatives in order to make an impact to the delivery of health care. Providing measuring capabilities helps the Clinic determine where its efforts should be focused to provide efficient patient centric care. With the identification of several areas of concern, the Quality Improvement and Care Management (QICM), HIT and Clinical teams worked together to implement several interventions.

Improving the quality of care in approximately 60,000 patients with one of the chronic disease states of interest, and seen by 250 primary care providers across 45 Centers required a systematic approach. The reporting system delivers consistent, timely and transparent results to every reporting level, i.e. System, Division, Department, Provider. Gaps in care can be quickly identified that facilitates interventions that can be developed and implemented to address the areas of concern, and progress can then be monitored. To efficiently and effectively identify opportunities to improve the quality of care, it was necessary for the Marshfield Clinic system to implement a fully automated, near real-time reporting process that would improve feedback response times and enforce transparency and accountability.

**Planning the intervention:** A scalable data manipulation tool was utilized that allows insight into patient populations with different disease states. Using evidence based medicine guidelines, QICM and the Analytics team developed a set of functional requirements that serves as a communication tool among the clinical and programming teams. The functional specifications provides clear definition of the expectations and makes the data defensible. The specifications are translated into a series of bi-directional programs that run daily to provide timely feedback for patient and population-focused care. The programs mine through millions of patient encounter records in an enterprise data warehouse to 1) identify the appropriate patient populations, 2) attribute the patient's care to the appropriate care provider, 3) evaluate more than 30 metrics for the patient population of interest, 4) stores the results back into the enterprise data warehouse, 5) provides feedback for all organization levels using dashboard technology, and 6) sends the results back to the EHR for patient-centric care.

Programs were developed to be scalable allowing for additional disease states to be evaluated without additional programming. Diagnostic codes for a new disease state are simply added to a table and the programs accommodate the additional disease state. Metrics are also table driven and are mapped to a disease state allowing for reuse of existing metrics. The patient population algorithms ensure accuracy in identifying the patient population and ensuring that the Clinic is managing their care. Provider attribution is determined using two methods. The first uses self-reported data that is collected at point of care. The second method uses an algorithm to assign a provider based on plurality of care. Approximately five percent of the patient population is assigned to a personal provider; the remaining ninety-five percent uses the self-reported personal provider.

After evaluation of the disease states, the provider attribution and evaluation of the quality metrics, the results are stored into data warehouse tables. These tables are then made available for reporting and analysis. Dashboards were developed that provide feedback at the system, division, department and provider levels. The provider view allows drill down to patient level detail enabling providers to see which patients with a given disease state are at goal or not at goal. Feedback is given in multiple formats, such as summary data, trending data, statistical process control charting and a comparative analysis view among peers.

The QICM team uses the results of the reporting system to identify clinical teams that prosper, as well as identify where gaps may occur. Interventions are developed that are communicated throughout the system. Monthly control charts are used to monitor interventions to detect changes in care. For example, initial results of diabetic foot exams identified the lack of a consistent method to record the foot exam with all appropriate aspects of the exam documented. The QICM team developed an electronic ink over foot exam form that was implemented within the EHR and accessible using the tablet computers that were being rolled out at the same time. The foot exam form provides a standardized list of the necessary clinical points to be covered. The QICM teams worked with medical assistants to train them on the use of the electronic form and the necessary components of a thorough foot exam. Today, the EHR notifies the medical assistants when the foot exam is due or overdue for the patient with diabetes. The medical assistant initiates the foot exam and completes the initial review. The ink over form is then accessed by the physician who completes the foot exam. Great coordination among HIT and

QICM teams was accomplished. Documented compliance rates improved nearly 80% in a 24-month period.

Programs are run nightly so data can be transmitted back to the EHR for patient-centric interventions. The QICM team works with departments to create interventions, such as, standing orders for appropriate laboratory monitoring in some situations. For example, clinical staff review the list of patients for pre-planning the visit, if an LDL is overdue, staff order the LDL for the upcoming appointment. Alternatively, if there is a clinical reason to exempt the patient from having the test, the clinical staff document those reasons and update the EHR.

The QICM regional teams visit departments quarterly to review their quality metric results and demonstrate the technology used to provide feedback. These opportunities for discussion allow for participation of the stakeholders in developing interventions or sharing interventions which have been found to be effective. Interventions are planned using the Plan-Do-Study-Act methodology.

**HIT dimensions utilized:** Having a highly integrated EHR, and a data transfer to an enterprise data warehouse provides endless opportunities to examine clinical, administrative and financial data in a highly efficient manner. Providing feedback in a visual and graphical manner with drill-down capabilities to the detail makes the feedback actionable and facilitates the planning of appropriate interventions. The EHR provides many support tools such as accessing the electronic ink over foot exam form, a Prevention Services application indicating when patients are overdue for services at the point of care, and Intervention List (iList), which helps in preplanning visits in a patient centric way.

**Outcomes:** Over 19,000 diabetic patients are monitored, the most current results for this population report the following: 24% increase in blood pressure control, 10% increase in A1C control, 24% increase in LDL control, 85% increase of retrievable documentation about tobacco usage and as reported above, an increase of 80% of appropriately documented foot exams. Please see the attached control charts demonstrating these improvements.

When providing feedback one can expect a cycle that includes denial, anger, bargaining, depression, and acceptance. Access to patient level detail allows an improved understanding of the process, and speeds up the change process. The feedback cycle provides a view into patient populations, and at the same time allows one to focus on patient level detail to improve outcomes.

An EHR to facilitate patient care, analysis of the data collected at point of care, and a sponsor, the QICM team, to champion the interventions and products with close involvement with the Analytics teams are all key to this successful story.

**Challenges and barriers:** Many challenges exist to quality metric reporting implementation throughout the Clinic system. IT systems must provide the right tools at the right time in the right place. Clinical staff work hard to address patient concerns and need tools in the EHR to facilitate this care. Tools have been put in place to address the quality of care, both at point of care and pre-planning of the patient visit, as well as timely feedback. Data collection efforts

need to be minimized, yet a need exists to provide meaningful use of the data. Balancing the two is critical. Extending the EHR with the use of analytics has provided an effective use of the health care data that enables the quality of care provided to be evaluated.

Quality metric feedback is not always well received. Results and patient attribution algorithms were not initially accepted. Providing patient level detail at the time of feedback allows quick assessment to confirm results. Aggregated results must have the ability to see patient level results to facilitate trust in the data and make it actionable. A feedback loop enables operational change and acceptance. Quality now has a new meaning. Quality is not just the service a patient receives, it is managing their care to prevent adverse events (ie – LDL control to prevent vascular events).

**Summary:** Feedback is needed to identify opportunities for improvement. To be able to manage the process, you must be able to measure it. We have developed a feedback loop that is facilitated by using HIT, championed by the QICM and adopted by clinical teams. Interventions have been successfully implemented throughout the system. The reporting system demonstrates progress in the metrics that are monitored.

**Interpretation:** Monthly control charts demonstrate interventions to achieve a desired outcome and sometimes demonstrate an undesired outcome. Having the monthly control charts allows one to assess which processes work, and which need further attention. Reporting the metrics at different organizational levels allows further interpretation of the results. Interventions may work in some areas, but not in others and using the data allows for learning and the advancement of quality of care.

**Financial considerations:** Potential savings of \$850,000 has been recognized by using the automated reporting system over a manual data collection effort. Nightly programs troll through millions of diagnostic, procedures, vitals, medications, laboratory, provider and patient demographic systems in 42 minutes on a virtual machine. The programs identifies 60,000 patients and evaluates 33 metrics. Compare this to a mandated manual chart review of 418 patient records and five quality metrics completed in 46 hours. It would not be cost-effective to manually review 60,000 medical records, nor would it even be feasible to resource. The Clinic made an investment of \$27,000 to develop the reporting application, but, more importantly the Clinic invested in a process to ensure delivery of high quality care that they are determined to provide.

**Conclusions:** Measurement and feedback systems are important to affect change. Leveraging HIT enables an effective manner to measure quality of care and identify opportunities to improve. This approach helps to determine where to expend efforts on interventions and promotes an efficient use of resources. Monthly control charts inform the Clinical teams if their initiatives are impacting patient care. These tools alone do not affect the change, team work does. These tools provide an efficient and effective system to allow the teams to measure and manage their interventions for patient centric care.

Attachment: Monthly Control Charts

