A Novel Electronic Medical Record–Based Workflow to Measure and Report Colonoscopy Quality Measures

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*When I was in private practice, pulling adenoma detection rates (ADRs) by physician was easy. In 2007, we developed a method to calculate ADRs, which was a bit cumbersome but effective, and we began tracking them by physician. We provided every partner with his or her ADR as part of a package of quarterly performance metrics. By 2009, we had incorporated endoscopy and pathology into our electronic medical record (EMR) so ADR analysis became automatic. This allowed us to begin publishing our results on our website and ultimately in peer-reviewed journals (*Clin Gastroenterol Hepatol 2009;7:1335–1340 and Gastroenterology 2015;149:952–957*). I then moved to an academic medical center where the enterprise-wide EMR (Epic) did not interface with either our endoscopy reporting software or pathology results, and all hope of routine ADR measurement vanished. Everyone working in similar situations can relate to my frustration. In this month's Road Ahead column, Leiman and colleagues provide a straightforward method to extract ADRs from an Epic EMR. While this still requires physician input, it helps those of us in large health systems measure what is important in our ongoing efforts to reduce the incidence of colon cancer.*

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Documentation and reporting of quality metrics within the practice of medicine, including gastroenterology, is increasingly important to physicians, patients, and third-party payers.[1] Along with many other regulatory requirements, there is greater demand on providers and health systems to show that performance is being measured and ultimately used for the improvement in care.[2] Metrics and outcomes are typically practice specific, and ideally should be easy to measure, clinically relevant, and able to capture variation in care.[3] Despite these requirements there remains little guidance on how to implement these rules on an individual practice level.

For gastroenterology practices, colorectal cancer screening and polyp removal has been an area of focus for measuring provider performance.[4] Early efforts to quantify colonoscopy quality included the assessment of process surrogates, such as cecal intubation rates and withdrawal times.[5] Recent emphasis has shifted to the more clinically relevant outcome of adenoma detection rate (ADR), which is calculated by adding the total number of screening colonoscopies in which an adenoma is identified and removed, divided by the total number of colonoscopies performed by a physician.[4,6] Options for tabulating and reporting ADR and associated process measures include manual abstraction of data using a human resource and participation in a national registry, such as GIQuiC.[7] Such methods can be time-consuming and resource-intensive.

To make the process of data capture and abstraction for quality reporting less of a time and resource burden, natural language processing has been used for automatic extraction of relevant elements from procedural documentation and pathology reports. This approach, however, lacks sensitivity and specificity.[8–10]

Others have described using the electronic medical record (EMR) to acquire discrete data. Some of these efforts have targeted variables explicitly to reduce overuse and underuse of procedures through the creation of recall registries.[11,12] In the case of dedicated gastroenterology practices, the EMR may be used as a tool to capture all relevant procedural and outcome data for the extraction and reporting of performance metrics.[13] For those gastroenterologists working in academic

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Abbreviations used in this paper: ADR, adenoma detection rate; EMR, electronic medical record.

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medical centers or large health systems this can be substantially more difficult, particularly if they use specific systems, such as the integrated EMR from Epic Systems (Verona, WI), which is widely used among such physicians but does not have a straightforward or established mechanism for capturing or extracting this information.[14] Additionally, large health systems may find it difficult to track metrics, such as ADR, because information is stored in disparate systems, and it is a cumbersome process to combine and collate the information. Our work was designed to circumvent some of these issues.

In early 2014, we developed the idea of creating a simplified approach to capture, abstract, and report data for colonoscopy-based quality metrics within the Epic EMR. A working group composed of gastroenterologists, innovation experts, and computer technicians designed a comprehensive pathway with the specific goal of calculating and reporting the ADR as a composite for the practice as a whole and by individual physician. The second goal was to leverage the same workflow to populate a novel registry within the EMR for maintaining patient-specific screening and surveillance intervals. This registry subsequently will form the basis for an automated patient recall system. We hoped that our workflow would serve as a model for, or be assimilated by, other institutions using the Epic EMR.

Colonoscopy Workflow Development

In our practice, the typical physician workflow includes 2 permutations depending on whether or not tissue sampling is performed. All endoscopy reports are transferred in portable document format (PDF) to the EMR via a health level-7 interface. In the event no biopsies are performed, a procedural report is generated and a copy along with a letter is given to the patient and sent to the referring provider with final findings and recommendations. If biopsies are obtained, pathology results are reported via an electronic system (Cerner Corporation, Kansas City, MO) and routed to providers as an alert within a result inbox in Epic. These results are reconciled with the procedural findings before a final recommendation for follow-up or surveillance intervals is made and communicated to the patient and referring provider (Figure 1).

Observation of our own practice revealed provider-specific variation in how these final tasks to "close the loop" were performed and documented within the EMR, including with telephone calls, mailed letters, and
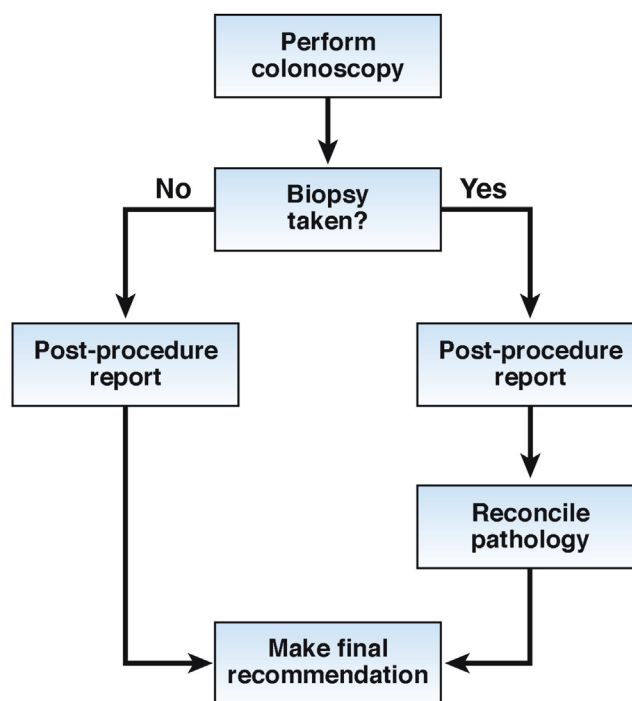

Figure 1. Typical colonoscopy workflow.

secure online communications. To accommodate this variety without complicating technical functionality, we created a single step in our new workflow by building a "SmartPhrase." The Epic EMR allows for the creation of such "SmartPhrases," which are reproducible text fields that can include modifiable language. A "SmartPhrase" can be used to capture relevant colonoscopy quality components as structured data elements, and does so independent of where the "SmartPhrase" is documented within a patient encounter. The "Smartphrase" can also be linked to a patient letter template with fields that are automatically populated directly from the "SmartPhrase." A distinct advantage of using the EMR in this manner is limited disruption to a typical clinical flow.

Within our system, we developed a single defined "SmartPhrase" in which providers document their colonoscopy findings and recommendations independent of whether or not biopsy specimens are obtained. This step can be performed immediately after completion of a procedure in which no tissue was obtained, representing 1 additional but brief and straightforward step to the traditional workflow that is performed while the medical record is still open. In this way, a true denominator for ADR calculations is obtained. Alternatively, after reconciling a pathology result, the "SmartPhrase" can be used within any Epic communication platform as part of the