Automated recall system for colonoscopy: a generalizable informatics solution for procedures requiring timely follow-up

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A number of factors have led to a re-examination of how health care is delivered, with the specific goals of improving quality and reducing cost.[1-3] There is a dichotomy, however, as to how providers and patients view quality. Providers often view quality in terms of quality metrics (such as immunization rate, screening for colorectal cancer), whereas for patients, quality of life and patient-provider communication is more relevant.[4,5] Marrying the utilization of quality metrics with communication that patients deem useful and relevant is vital to improving overall quality.

Colonoscopy is the most common primary preventive modality in the reduction of colorectal cancer.[6-8] The decrease in the incidence of colon cancer in certain populations is thought to be attributable to increased screening.[9-11]

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Recently, development of endoscopy registries has taken place (example: GI Quality Improvement Consortium [GIQUIC]), which seek to standardize documentation within and between institutions as well as provide comparative analysis regarding documentation and procedure-related metrics.[12] The major challenge to greater adoption of such quality registries is the increased manual work required to collect and submit the data. Specifically, at most institutions, pathology systems do not integrate with the main electronic health record (EHR) or endoscopic electronic record system (EERS) in a way that allows for discrete data capture. Given that EHR is the primary tool used by physicians and, as such, becomes the legal record of choice, any registry or reporting tool that does not incorporate EHR in some way forces the physician to enter data redundantly, and adversely impacts work flow and efficiency. These barriers impede quality measurement and risk stratification and thereby limit adoption of nationwide quality improvement initiatives like GIQUIC.

This pilot study presents a programming solution that is able to marry patient communication with capturing of discrete data within EHR, which can be bundled with quality metrics captured within EERS, and can be uploaded to registry and reporting tools in an automated fashion. Additionally, the programming solution populates a recall registry that can be used to generate reminder letters to patients, all without any significant disruption to physician work-flow or manual input. The solution is now being piloted in a second institution and uses a generalizable approach that can be adopted by most institutions or practices, irrespective of the type of EHR or EERS used.

METHOD

We used process improvement techniques such as workflow assessments, workflow diagrams, and business process reengineering to gain a better understanding of the various tasks involved in communicating with patients and primary care providers, providing data for national quality improvement benchmarking and recalling patients at a future date when colonoscopies are due.[13] These techniques have been used successfully in other health
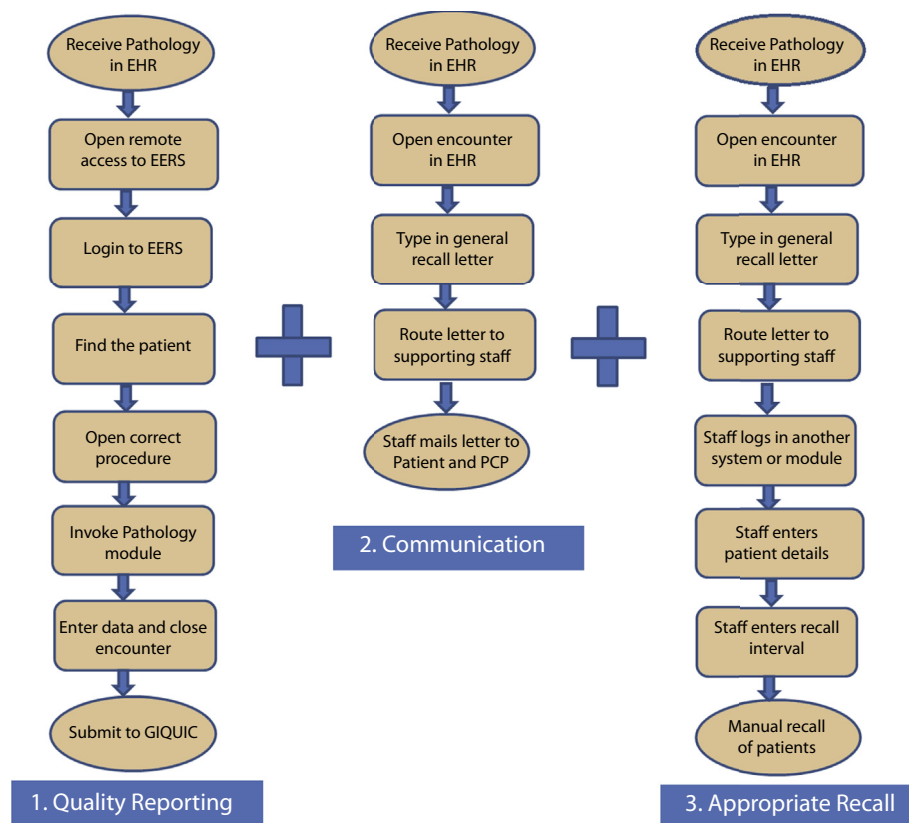
Figure 1. Schematic description of workflow analysis of gastroenterologists performing colonoscopy polypectomy showing parallel (and redundant) processes related to quality reporting, patient communication, and future recall before the initiation of SmartLetter. *EHR,* electronic health record; *EERS,* electronic endoscopic record systems; *GIQUIC,* GI Quality Improvement Consortium; *PCP,* primary care provider.

information technology implementations that have required revamping of workflow with a focus on improving patient safety, enhancing the quality of patient data collected, and maintaining provider efficiency and productivity.[14,15] Based on these assessments, we found that physicians and their supporting staffs were using redundant and parallel processes for each of the 3 tasks—communication about procedure results with patients and primary care providers, quality reporting, and future recall when the next procedure is due (Fig. 1).

This led us to re-engineer workflow by using a number of technologies integrated with the EHR system (Epic Systems, Verona, WI). In order to simplify data entry and recovery, we created SmartLetter. It is a programming solution that links documentation with the database within the EHR. This standardized solution comes into play when the physician drafts the letter to the primary care provider or referring physician after the procedure. Discrete data are captured by the software while the letter is being drafted. The programming solution populates a recall registry that can be used to generate reminder letters to patients, all without any change to physician workflow, or decrease in efficiency. It also populates a registry for all colonoscopy findings that allows for quality improvement and research (eg, percentage of patients with poor

bowel preparation, adenoma detection rate, polyp detection rate) (Fig. 2).

SmartLetter data were recorded for patients undergoing screening or surveillance colonoscopies with 3 pilot physicians between September 2011 and May 2012. Patients were excluded if they had a history of colon conditions such as cancer, Crohn's disease or ulcerative colitis, colon surgery, incomplete polypectomy, or died before the recommended date of follow-up. The study was conducted to assess the feasibility of SmartLetter to capture discrete data without workflow disruption and to determine whether use of SmartLetter captured information on high-risk patients who failed to meet surveillance intervals within 3 months. This initiative was deemed exempt by the Institutional Review Board of Cleveland Clinic as a quality improvement project.

RESULTS

Figure 3 shows standardized provider documentation with SmartLetter that includes concepts that are mapped to concept unique identifiers within EHRs. A total of 535 patients underwent screening or surveillance colonoscopy with three pilot physicians between September 2011 and