Electronic Medical Records and Improving the Quality of the Screening Process

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"The human brain must continue to frame the problems for the electronic machine to solve."
David Sarnoff (1891–1971)

Although electronic medical records (EMR) are considered a key component to improving health care quality and, potentially, efficiency, only 1.5% of US hospitals surveyed in 2008 had a comprehensive EMR[1]. In contrast, the Veterans Health Administration (VHA) has had a comprehensive EMR since the 1990s. In this issue of the *Journal of General Internal Medicine* the article by Humphrey et al.[2] provides an interesting example of the promise and the unexpected lessons encountered while attempting to harness the power of the VHA EMR to improve the process of screening for colorectal cancer.

Primary care physicians are held responsible for a variety of screening tests in addition to providing chronic care and addressing acute complaints. Within the VHA, there are recommendations to screen for cancer (cervical, breast, colorectal), obesity, cardiovascular disease (abdominal aortic aneurysms, dyslipidemia) and sexually transmitted infections (chlamydia and gonorrheal infection)[3,4]. In the context of other duties competing for physician attention and human limitation in general, an EMR is broadly thought to assist in the implementation and quality assessment of such screening initiatives. For example, an EMR can facilitate identification of the target population for a particular test and can issue reminders that a screening test is due. The EMR will provide widely accessible documentation of the test and its results once completed. Finally, the EMR can improve the efficiency of auditing test performance for feedback to the stakeholders.

The VHA EMR has been successfully used to identify patients for whom one or more screening tests (or other services) are recommended and to post automated electronic reminders in the patient's EMR if that screening test (or other service) is due. In addition, for tests and services performed within the VHA system documentation of test completion and results is readily available to all providers at all VHA facilities.

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On the other hand, tests performed at non-VA facilities may not be documented within the VHA EMR, which could result in duplicate testing or potential delays in care. Furthermore, the audit process within the VHA is still based on manual chart review; however, there are plans for more automated auditing in the future.

Overall, the use of an integrated and comprehensive EMR has been cited as a key facilitator of VHA quality improvement and in better performance for a number of quality indicators, including screening, when compared to non-VHA care[5,6]. As good as this news is, it is essential to keep in mind that screening is not a one time event but a process[7]. Negative tests may need to be repeated at some interval and positive tests generally require additional intervention such as further diagnostic testing, patient counseling, and /or treatment. Without completing this process, the value of the initial screening is diminished. While the EMR has been used with success to initiate this screening process, it has not been tapped for more downstream steps in the screening process.

In the case of colorectal cancer screening, use of some screening strategies, e.g. fecal occult blood testing (FOBT), require that patients with positive tests undergo colonoscopy. This process is further complicated by communication between medical specialists and services. The provider who orders the FOBT is generally in primary care and the provider who performs colonoscopy is typically a gastroenterologist or surgeon. Not surprisingly, studies of FOBT follow-up in the VA in the early 2000s were disappointing in that only 44–59% of patients with a positive test had a complete colon evaluation within a year[8,9]. Failures at every step were noted: failure to refer, failure to schedule, failure of the patient to attend a scheduled appointment. An EMR could potentially be used to overcome barriers at each of these steps. Positive tests could generate automatic colonoscopy consults (as done in the Humphrey study) or additional reminders to the ordering physician to refer the patient for colonoscopy. In addition, information technology (IT) could be used to track the processing of colonoscopy consult requests to prevent any from being lost in the system and to enhance patient centered scheduling that might decrease "no show" rates and late cancellations.

A strength of the Humphrey study is that the authors were able not only to demonstrate a substantial improvement in colonoscopy referral but also an increase in colonoscopy completion. These improvements were only observed at the sites randomized to the intervention, indicating that differ-

ences at the intervention sites were most likely due to the intervention and not other trends in quality assessment and improvement that may have occurred at individual facilities. In 2007, after completion of the intervention, a VHA wide initiative began to systematically monitor colonoscopy after positive FOBT with a target of colonoscopy completion within 60 days.

There are some limitations to this intervention. There might be concerns that patients who are not screening candidates, but were nonetheless given an FOBT, would be automatically scheduled for colonoscopy. However, the study intervention was for an automated colonoscopy request and did not include automatic scheduling of the colonoscopy. In addition, the extracted data sent with the colonoscopy consult was designed to help the endoscopists determine whether the patient was eligible for colonoscopy. Further, the automated consult was also sent to the primary care provider. Another limitation is that the intervention only addresses one point in the process from positive FOBT to colonoscopy. It does not address other points such as failure to answer the colonoscopy request, lack of scheduling capacity to provide a timely colonoscopy appointment, failure of the patient to attend the scheduled appointment or to follow directions for the bowel preparation or to bring a driver. Nonetheless, the impact of the study intervention is particularly impressive given its relative simplicity. Anyone involved in implementing interventions for research or quality improvement will endorse that nothing is simple when you start looking at the all the minute details, but at the 30,000 foot level, an automated GI consult using a template of extracted information is more attractive and feasible from a resource view than interventions involving manual tracking of positive FOBT, manual reminders to ordering physicians, academic detailing, or patient educational outreach.

In addition to the success of the intervention, the most compelling outcome of the study by Humphrey et al. is a greater appreciation that an EMR does not exist as a stand alone product. Fully half of the originally enrolled sites were not in the final analyzed data set because of unforeseen IT resource issues. For an IT intervention to be implemented on a large scale, the EMR must be integrated into the system it serves and be supported by resources and communication among key stakeholders, including administrators, IT specialists, and clinicians. Only then will the EMR start to deliver on its promise.

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