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Improving colon cancer screening rates in primary care: a pilot study emphasising the role of the medical assistant

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ABSTRACT

Background: Colorectal cancer (CRC) is the third-leading cause of cancer death for both men and women in the USA. Despite consensus recommendations for screening, just over half of eligible adults nationally have undergone screening. We therefore implemented a programme to improve the rate of CRC screening.

Methods: This study was conducted in the Utah Health Research Network and the University of Utah Community Clinics, a 100 000 patient, seven-practice, university-owned system offering primary and secondary care and ancillary services including endoscopy. We focused on patients aged ≥50 who were seen between 1 January 2003 and 31 October 2006, and who were not current for CRC screening at the time of the visit. The study included a three-phase intervention: electronic medical record (EMR) reminders, physician and medical assistant (MA) education about CRC screening guidelines, and redesign of patient visit workflow with an expanded role for MAs to review patients’ CRC screening status and recommend testing when appropriate. With patient agreement, the MA entered a preliminary order in the EMR, and the physician confirmed or rejected the order. The primary outcome measure was the rate of screening colonoscopy ordered for eligible patients.

Results: The baseline colonoscopy referral rate was 6.0%. Provider education and electronic reminders had minimal immediate impact on screening rates. Addition of the expanded MA role was associated with a sustained increase in colonoscopy referral order rate to 13.4%, a relative improvement of 123%.

Conclusions: The MA can play a key role in improving CRC screening rates as part of a redesigned system of primary care.

Colorectal carcinoma (CRC), cancers of the colon and rectum combined, are the third most common cause of new cancer cases and deaths in the USA for both men and women.1 An individual’s lifetime risk of developing CRC in the USA is nearly 6%, with over 90% of cases occurring after age 50.2 Screening can decrease CRC mortality by enabling detection and removal of precancerous polyps and early cancers before they undergo malignant transformation or metastasise.3 If screening were universally applied, up to 90% of all CRC cases and deaths would be preventable.4 5 Consensus evidence-based recommendations call for screening of all persons beginning at age 50. High-risk individuals should begin screening at younger ages and/or more frequently than others.2 Screening options include the use of faecal occult blood testing, flexible sigmoidoscopy, contrast barium enema and colonoscopy, alone or in combination. Although the ideal screening test and protocol are yet to be determined, the US Preventive Services Task Force ranks colonoscopy as “the most sensitive and specific test for detecting cancer and large polyps.”6

The use of CRC screening tests in the USA is unacceptably low.4 7 In 2004, 57.3% of adults aged ≥50 years reported having been screened appropriately with either faecal occult blood testing or colonoscopy.3

Strategies to improve screening

Multiple strategies are used in primary care to improve CRC screening rates including patient counselling or education, provider education, medical record-based protocols and combinations of these.9 10 The advent of the electronic medical record (EMR) offers opportunities to provide patient-specific reminders and decision support to improve screening rates, often combining EMR functions with medical practice system changes.10–12 Increasingly, investigators are recognising that primary care practice improvement requires changes in physician and staff roles as part of effective teams, with medical assistants (MAs) serving a key role.12

Education

Physician education is commonly used in an effort to increase CRC screening. However, didactic education alone is relatively ineffective at changing physician behaviour.13 Low rates of ordering and completion of screening tests for eligible patients are likely related to multiple factors including: competing priorities during acute-care visits, management of chronic illnesses and comorbidities.10 CRC screening in particular may encounter added patient resistance due to discomfort, cost and perceived screening risks, although rates of patient refusal of recommended tests such as colonoscopy are not well known.

Reminders

Implementation of EMR-based reminders or prompts has been shown to improve CRC screening rates, although provider compliance with prompts is variable.15–17 For example, an early (1996) study found that more than half of electronic reminders did not lead to recommended...
testing. Reasons for non-compliance with electronic reminders include: lack of coordination between nursing staff and physicians, physician review of the prompt when the patient is absent, competing workload demands and lack of flexibility in implementation of the EMR prompt.

Teams: the MA role

Primary care is complex. Full implementation of all recommended evidence-based preventive care, acute care and chronic disease management to an average panel of primary care patients would require in excess of 15 h per day for a physician working in a traditional physician-centred practice model. Recognition of this reality and of the need to improve quality in primary care has led to the emergence of multiple models of team-based primary care, virtually all of which include significantly enhanced roles for non-physician team members, especially MAs.

According to the Bureau of Labor Statistics, the medical assistant occupation is projected to be one of the fastest-growing occupations in the 2004–2014 period. Some MAs are trained on the job. Many complete 1- to 2-year programmes in high schools, postsecondary vocational schools, and community and junior colleges. MAs usually work under their supervising physician’s license and are “not licensed to make independent medical assessments or give advice.” An MA’s greatest value may be to help providers optimise office workflow, allowing providers to see more patients and accomplish more during encounters. In their guide to delivering clinical preventive services, the Agency for Healthcare Research and Quality emphasises the need to involve all levels of staff in preventive services and spread out tasks among staff. However, many physicians underassign tasks and do not allow MAs to work to their fullest potential. In addition, although many medical practices are implementing enhanced MA roles, research demonstrating improved quality of care specifically linked to these enhanced roles is limited.

We therefore report here results of a study designed to increase CRC screening rates. The three-phase study intervention included physician and MA education about CRC screening, advanced EMR reminder features and redesigned clinical team roles. This last phase of the intervention included expanded MA responsibility to review patients’ CRC screening status, initiate discussion of recommended tests and prepare preliminary orders for patients agreeing to colonoscopy.

METHODS

Setting

This study was conducted in the University of Utah Community Clinics (UUCCs) and its research arm, the Utah Health Research Network (a practice-based research network (PBRN)). At the time of this study, the UUCCs were a 100 000-patient, seven-practice, multispecialty, primary care network with sites in and around the Salt Lake valley and linked by an electronic medical record, EpicCare® (Epic).

Intervention

Phase I: EMR prompt for CRC screening

The UUCCs began using Epic on 1 July 2001. On 15 March 2002, a computerised reminder suggesting colonoscopy—for all patients 50 years or older without previously documented colonoscopies—was added to the system. Prior to initiating the EMR prompt for the present study, we developed a detailed flow chart to describe how this reminder was used in practice to identify and refer patients due for CRC screening. Direct observations of 30 clinical visits for patients 50 years or older in three of the UUCCs revealed that physicians were systematically bypassing and ignoring the EMR reminder. The prompt appeared at an inopportune time early in the doctor–patient encounter, when patients and physicians were focused on the patient’s reason for the visit, and did not readily lead to action by the clinician. As the first intervention for the present study, a refined prompt was implemented in October 2004.

Phase II: physician and MA education

Beginning in December 2004, we conducted physician education sessions for all UUCC primary care physicians who cared for adults (family medicine, internal medicine and obstetrics/gynecology). We also identified physician and MA opinion leaders. These leaders attended additional education sessions, contributed to clinic workflow redesign and served as liaisons for our study, providing feedback to peers and encouraging them to make CRC screening a priority.

Phase III: redesigned clinical workflow

Beginning in February 2005, we worked with physician opinion leaders to alter clinical workflow, assigning MAs the responsibility to initiate discussion of CRC screening with the patient before being seen by the physician, as the MA was completing preliminary patient evaluation. This change took advantage of the fact the EMR prompt appeared early in the encounter sequence, and separated this discussion from the physician’s assessment of the primary reason(s) for the visit. We provided a script—written by one of the clinic doctors who was also a member of our research team—for MAs to use when using CRC screening (see table 1). If the patient requested colonoscopy, the MA placed a preliminary order for scheduling the test in the medical record. This served as a convenient prompt to physician–patient discussion of screening at an appropriate point in the visit, after assessment of the patient’s reason(s) for the visit. Physicians then chose to order or not order the test as a routine and efficient part of the visit workflow.

For a limited period of time after initiation of the new workflow, and as a way to help all involved develop the habit of following the new process, MAs were asked to keep a daily log of patients over the age of 50. The logs were meant to document compliance with the process and serve as an additional reminder to ask patients about screening (see table 2). Completed logs were submitted weekly from February through May 2005. We published cumulative results of these logs in a newsletter sent to the MA–physician teams. We presented small rewards to teams of MAs and physicians with the highest CRC screening rates.

Data analysis

Colonoscopy referral rates were calculated using data from the UUCC Epic clinical data warehouse. Referral rates were calculated for each month, beginning 1 January 2003, through 31 October 2006. Patients were included in the study population for a given month if: (1) they had an encounter with a primary care physician in one of the seven clinics as identified by current procedural terminology (CPT) code, and (2) they were age 50 years or older at the time of the encounter. Patients were excluded if they had a documented history of colectomy or comorbidities that contraindicated colonoscopy.

Patients were classified as up to date on referral for colonoscopy if they had: (1) evidence of a colonoscopy
completed within 10 years prior to the indexed encounter, (2) evidence in the health maintenance section of their Epic record of refusal of colonoscopy within a 12-month period preceding the encounter date or (3) evidence of referral for colonoscopy in the 6-month period preceding the encounter date. The remaining patients were considered not to be current for CRC screening and therefore eligible for a CRC screening referral.

We used an X moving Range (XmR) chart to follow colonoscopy referral rates over time, and interrupted time series methods to determine if the intervention impacted those rates. For the baseline period of January 2003 through September 2004, the mean monthly referral rate and its upper and lower control limits were calculated from the median absolute value of the range of differences between successive monthly values, scaled by a factor of 3.27. The control limits define the boundaries of random, month-to-month variation in referral rates in the absence of external influences or other special causes. The baseline control limits and mean monthly referral rate are projected through the postintervention period of October 2004 through September 2005. To determine if postintervention referral rates are consistently elevated above the baseline we used a simple run test, with the baseline mean as the threshold, to test for non-randomness in the postintervention referral rates.26

RESULTS

During the study period, 25 651 patients 50 years of age or older were seen by primary care physicians in the UUCCs. Of these, 169 were identified as having had colectomies or comorbidities that precluded colonoscopy. The remaining 25 482 patients generated a total of 152 271 encounters. There were 77 849 encounters, representing 18 702 unique patients, where the patient was determined to be eligible for CRC screening. The mean number of such encounters per month was 1692 (range: 1235 to 2232).

Figure 1 shows the rate of colonoscopy referrals by month. Baseline rates for colonoscopy referrals for unscreened patients in the UUCCs were stable, with a mean monthly referral rate of 6.0% (range: 4.9 to 7.4%). For the postintervention period, the mean rate was 11.1% (range: 5.6 to 15.9%); an absolute improvement of 5.1% and a relative improvement of 85%.

Three major interventions are shown in fig 1 to illustrate the temporal relationship between the interventions and the colonoscopy referral rates. First, an upgrade to the EMR that changed the display of the CRC screening reminder was installed beginning 12 October 2004. This upgrade appeared to have no immediate effect on CRC screening referral rates. Second, physician education was completed in December 2004. This was followed by an increase in referral rates to 7.5%. Third, in February 2005, MAs were educated about CRC screening, instructed to initiate discussions of CRC screening (see table 1), and use the logs to report the discussions (see table 2). This third intervention was followed by a large and sustained increase in colonoscopy referral rates. Following this intervention, the mean monthly referral rate increased to 13.4%, a relative improvement of 125%, and all values exceeded the baseline upper control limit of 7.3%. The probability of observing such a run of points by random chance is extremely small (p<0.01).

DISCUSSION

This study demonstrated a statistically significant and clinically meaningful increase in rates of referral for screening colonoscopy in a group of primary care practices. Improvement did not appear to be temporally related to changes in the computerised reminder system. A modest referral rate increase was seen shortly after physician education, but a large increase was seen after instituting an expanded role for MAs using the reminder as a prompt to review CRC screening status with patients and encourage referral for colonoscopy. We believe this system, especially the enhanced MA role, was responsible for increased rates of colonoscopies ordered in accord with recommended CRC screening guidelines.

Primary care visits have multiple competing priorities including acute care, chronic disease management, attention to psychosocial needs and prevention. The latter includes multisystem cancer and metabolic screenings, patient education and immunisations. Many patients have multiple comorbidities that limit attention to preventive interventions such as CRC screening. Even during visits scheduled specifically for preventive care, providers frequently address multiple problems. In addition, although prevalence of neoplasia increases with age, screening colonoscopy in very elderly persons (age 80 years) results in only 15% of the expected gain in life expectancy in younger patients. Guideline-based recommendations may need adjustment for individual patient circumstances.

Table 1  Medical assistant screening script

<table>
<thead>
<tr>
<th>Review activity</th>
<th>Order activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>No pop-up (no screening needed)</td>
<td>Had colonoscopy (records in EpicCare®, but need to update Health Maintenance section of the record)</td>
</tr>
</tbody>
</table>

Table 2  Manual colon cancer screening log

I notice that you may be due for colon cancer screening. Have you had a colonoscopy?

“Yes”

Let me see if I have a copy of that report

If you have a copy of that report, update health maintenance tab or make a note of date on progress note

If you do not have a copy, ask when/where it was done and give patient a record release to send for report

“No”

The American Cancer Society recommends colon cancer screening for everyone over age 50. Have you thought about having a colonoscopy?

Enter preliminary order for physician review and decision or give patient information, depending on their response

If patient has had a flexible sigmoidoscopy or completed stool cards, make a note...
The advent of EMRs offers a unique opportunity to improve preventive healthcare. However, the ability of computerised reminders to affect physician behaviour is limited. This study reaffirms that electronic prompts alone do not markedly improve rates of referral for CRC screening. It also confirms that provider education, a much-used method for improving clinical outcomes, has, at best, a limited effect on referral rates.

This study is consistent with Bodenheimer’s observation that MAs “often play the key role of managing the flow of activity in primary care” and can “become the engine of improvement in primary care”. MA and other non-physician office staff reliably facilitate preventive and chronic care. MA phone calls to patients proved a reliable and cost-effective way to encourage mammography adherence. O’Brien et al found that clinical support staff are effective in routinely asking patients with diabetes to remove their shoes before seeing the provider as a way to increase the likelihood the physician will complete a foot examination (although these authors attributed the increase in foot exams to physician education more than to change in support staff roles). A clinical trial funded by the Robert Wood Johnson Foundation is under way to determine whether a screening and intervention programme carried out by MAs in primary care practices can help patients improve health behaviours.

Our results are also consistent with the findings of Kirkman et al, regarding common elements of successful clinical quality improvement (CQI) interventions in outpatient practices. These elements include four factors: (1) the CQI efforts “occur in ‘closed’ systems with standard processes for scheduling, recordkeeping, and carrying out orders;” (2) “… physicians are influenced by mandates or incentive for improvement;” (3) routine aspects of care are removed from the physician, making nurses or others (e.g., MAs) responsible for these behaviours; (4) information systems are used to track data, identify high-risk patients, provide screening prompts, generate orders and track results. Workflow redesign helps overcome the barriers to consistently translating knowledge and intent into practice. In accord with others, we found that medical assistants armed with an electronic reminder more consistently facilitated orders about CRC screening than did physicians acting independently.

Limitations
Our results may have underestimated the true rate of colonoscopy referral or, more broadly, CRC screening. This is because we only queried specific fields in our EMR for presence of colonoscopy results. We did not review free text progress notes, and we did not assess performance of other acceptable forms of CRC screening. Such documentation would be necessary to more accurately assess MA and physician response to the interventions and to identify the true rate of completed screening.

Thus, this study may not provide an accurate estimate of “true” CRC screening rates in our population. However, our focus in this study was on change in rates of colonoscopy referral for CRC screening, and we believe the methodology was equally accurate before and after our intervention, thus a valid indicator of relative change in referral rates.

Providers tend to overestimate the number of patients they recommend for CRC screening. Nonetheless, the acknowledged limitations of these data sources contributed to some provider skepticism about the data and may have reduced their motivation to participate in this project.

Because the three phases of our intervention (provider education, alteration of EMR reminder and clinical workflow redesign) occurred in rapid sequence, it is impossible to isolate the effects of any one phase. While we identified the greatest increase in CRC screening rates after the third phase, clinical workflow redesign, attributing the increase exclusively to the expanded MA role could underestimate delayed or interacting effects of provider education and EMR reminder alterations.

Our research team is unusual in its ability to implement change like this because we are a university-owned and operated practice group. This contrasts with most PBRNs, which rely on more arm’s-length relationships. The unified management and EMR implementation across all practices in this project may have increased compliance compared with studies in other settings.

CONCLUSION
Electronic decision support tools alone do not increase CRC screening referral rates. Facilitators, IT support staff and system changes were all necessary to effect change. The greatest barrier to CRC screening for providers seemed to be competing demands during a short patient visit. Adding redesigned clinical workflow, particularly an expanded role for the MA, appeared to increase referrals for CRC screening. These results are consistent with the literature on prevention and chronic care, suggesting that this approach may be useful to enhance other disease-prevention and health-promotion
interventions. Further work will be necessary to assess the relative impacts of individual components of such multifactorial system changes.

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