Promoting Use of Colorectal Cancer Screening Tests

Can We Change Physician Behavior?

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BACKGROUND: Colorectal cancer (CRC) screening is underutilized despite evidence that screening reduces mortality.

OBJECTIVE: To assess the effect of an intervention targeting physicians and their patients on rates of CRC screening.

DESIGN: A randomized clinical trial of community physicians and their patients.

PARTICIPANTS: Ninety-four community primary care physicians randomly assigned to an intervention consisting of academic detailing and direct mailings to patients or a control group. Patients aged 50 to 79 years in the intervention group physicians received a letter from their physician, a brochure on CRC screening, and a packet of fecal occult blood test (FOBT) cards.

MEASUREMENTS: After 1 year we measured receipt of the following: (1) FOBT in the past 2 years, (2) flexible sigmoidoscopy (SIG) or colonoscopy (COL) in the previous 5 years, and (3) any CRC screening. We report the percent change from baseline in both groups.

RESULTS: 9,652 patients were enrolled for 2 years, and 3,732 patients were enrolled for 5 years. There was no increase in any CRC screening that occurred in the intervention group for patients enrolled for 2 years (12.7 increase vs 12.5%, P=.51). Similar results were seen for any CRC screening among patients enrolled for 5 years (9.7% increase vs 8.6%, P=.45). The only outcome on which the intervention had an effect was on patient rates of screening SIG (7.4% increase vs 4.4%, P<.01).

CONCLUSION: With the exception of an increase in rates of SIG in the intervention group, the intervention had no effect on rates of CRC screening. Future interventions should assess innovative approaches to increase rates of CRC screening.

KEY WORDS: colorectal cancer; screening; prevention.
DOI: 10.1111/j.1525-1497.2005.0245.x
J GEN INTERN MED 2005; 20:1097–1101.

Screening for colorectal cancer (CRC) clearly reduces mortality.[1–3] In a recent systematic assessment of the value of clinical preventive services that are recommended for average-risk individuals by the United States Preventive Services Task Force (USPSTF), preventive services were ranked based on burden of disease prevented by the service and cost effectiveness. Screening for CRC was one of the highest ranked services with the lowest delivery rate (<50% nationally), and it was concluded that it should be a national priority to increase rates of CRC screening.[4]

The USPSTF recommends screening for CRC for all persons 50 years or older, but does not recommend a preferred screening strategy.[5] Potential strategies include fecal occult blood testing (FOBT) annually, sigmoidoscopy (SIG) every 5 years, annual FOBT and SIG every 5 years, colonoscopy (COL) every 10 years, or barium enema every 5 years.[6,7] Despite this recommendation, these screening guidelines have not been widely implemented by physicians. In 2001, only 23.5% of eligible patients had undergone FOBT within the preceding year, and only 38.7% of eligible patients had undergone SIG or COL in the preceding 5 years.[8]

Prior studies have revealed several reasons why physicians may not be performing CRC screening. These reasons included lack of knowledge of current recommendations, inconsistency of recommendations, lack of time, and concern about patient acceptance of the procedures.[9–13] Patient barriers must be addressed as well. Patient reminder interventions have been successful in increasing rates of cancer screening in some trials[14–17] but not in others.[18] Other patient barriers include not being aware of the need for the screening test, fear of discomfort, and embarrassment regarding CRC screening.[19]

Effective cancer screening requires the participation of both the patient and the physician.[20] The physician must first recommend the test and then the patient must adhere to the recommendation. The purpose of this study was to assess whether an intervention targeting both physicians and their patients resulted in higher rates of screening for CRC than usual care.

METHODS

Design and Setting

We performed a randomized clinical trial of primary care physicians and their patients. Primary care physicians (family practice or internal medicine) were recruited from a large individual practitioner association (IPA) providing managed care in San Francisco, Calif. Physicians practiced either in the community or an academic General Internal Medicine practice. There was no structured system for colon cancer screening. There was no open access endoscopy or readily available endoscopists. Those who agreed to participate were randomized to the intervention group or to usual care. To avoid contamination, and because physicians who practiced together were

The authors have no conflicts of interest to report.

This work was presented as an abstract at the 25th annual meeting of the Society of General Internal Medicine, May 2002, Atlanta, GA.

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Received for publication July 19, 2005
and in revised form July 27, 2005
Accepted for publication July 27, 2005

likely to be influenced by each other, we performed a block randomization, stratified by group size.

Physician Intervention

The physician component of the intervention consisted of educational seminars and "academic detailing." Educational seminars were presented within the context of medical grand rounds at the University of California San Francisco, California Pacific Medical Center Departments of Medicine and Family Practice. The sessions were offered to all physicians in the IPA, whether or not they were participating in the study and whether or not they were in the intervention or the control group. All physicians enrolled in the study received a summary of the presentation regardless of whether they attended the seminars. The recommendations for average-risk patients was annual FOBT and SIG every 5 years or COL every 10 years. Barium enema was not emphasized as a primary screening test, although individuals who had received barium enema in the preceding 5 years were considered to have been adequately screened.

Intervention group physicians completed a questionnaire, which described their practice and identified potential CRC screening issues for discussion. Academic detailing involved a 1-on-1 interaction with each physician in the intervention group. Principles of "academic detailing" include investigating knowledge and motivations, defining clear educational and behavioral objectives, presenting both sides of controversial issues, and stimulating active physician participation in interactions.[21] Three physicians who were considered "opinion leaders" in CRC screening and who were well known in their communities, met with each physician in the intervention group. In each 1-on-1 physician encounter, current screening guidelines were reviewed and the factors that a particular primary care physician described as his or her biggest barriers to cancer screening were addressed as were potential ways to overcome the barriers. During the study, at the time when 2 studies on screening COL were published, we sent letters that summarized those results to all study physicians.[22,23] We reemphasized the existing recommendations for CRC screening with a variety of screening methods.

Patient Intervention

The patient intervention included a personalized letter, an educational brochure, and an FOBT kit with instructions for completion, and a stamped return envelope. The letter was from the patient's individual physician and indicated that the patient was due for a CRC screening. The letter emphasized the importance of getting screened with some type of test, explained that the FOBT kit was enclosed, and encouraged interested patients to discuss SIG or COL with their physicians. The educational brochure was developed for the study and endorsed by the American Cancer Society and addressed commonly asked questions about CRC screening.

Sampling

Using claims data, all patients aged 50 to 79 years who were not up-to-date with CRC screening were identified. Being up-to-date was liberally defined as having a FOBT in the past 2 years, a SIG in the past 5 years, or a COL in the past 5 years. Although it is recommended that FOBT be performed every year,[6,7] we used FOBT in the past 2 years to allow for the "lag time" that may have occurred for the patient to turn the test in and for laboratory claims data to be processed. Colonoscopy in the past 5 years was used as an outcome as claims data were not available for the past 10 years.

Time Frame

Physicians were recruited from July to September 2000. The patient intervention began in October 2000. Patients were followed for 1 year after receipt of the intervention packet.

Data Analysis

Outcomes were measured after 1 year and included calculations of overall patient screening rates and physician screening rates. Data were analyzed using SAS version 8.2.[24]

Overall patient screening rates for FOBT were calculated for those patients continuously enrolled for 2 years, and rates of SIG and COL were calculated for those patients continuously enrolled for 5 years. Finally, rates of screening with any procedure were calculated for patients continuously enrolled for 2 and 5 years. The changes in screening rates among patients were also computed and compared using Cochran–Mantel–Haenszel chi-square tests, which adjusted for physician differences. A significance level of .05 was used for all statistical tests.

As physicians were the unit of randomization, we also conducted analyses with physicians as the unit of analysis. Physician screening rates were calculated as the number of a physician's patients who underwent screening divided by the number of patients eligible for screening. We also calculated physician screening rates for any CRC screening, which was defined as FOBT in the previous 2 years or flexible SIG in the preceding 5 years or COL in the preceding 5 years. Physician screening rates for any CRC screening in the previous 5 years were calculated using data for patients continuously enrolled for 2 years as well as those continuously enrolled for 5 years. To explore changes in the average physician screening rates between the control and the intervention groups, we used a Student's t test. All P values were adjusted for baseline differences in screening rates between physicians. Patients who were up-to-date with screening at baseline did not receive any intervention and were assumed to be up-to-date with screening at follow-up. Approval from the University of California, San Francisco Committee on Human Research was obtained, and all subjects provided informed consent.

RESULTS

Demographics

Ninety-four physicians participated in the study; 50 were in the intervention group and 44 were in the control group. Because of the block randomization, the groups were of somewhat unequal size. Approximately two-thirds of the physicians in each group were male. The majority of physicians in each group practiced in a community setting and individually (Table 1).

Patient mean age was similar for both groups (64.5 vs 63.6 years for the control and intervention group, respectively). More than half of the patients in both groups were female.

Table 1. Characteristics of 94 Physicians Participating in a Trial to Increase Rates of Colorectal Cancer Screening, San Francisco, Calif, 2000

	Control, *N*=44	Intervention, *N*=50
Men, *N* (%)	30 (68)	33 (66)
Practice setting:		
Academic, *N* (%)	5 (11)	12 (24)
Community, *N* (%)	39 (89)	38 (76)
MD group size*:		
1	19	19
2	3	4
3	2	2
4 or more	3	2

**Because many groups had more than one MD, the number of groups does not equal the number of MDs.*

Although ethnicity data were not available for all patients, participating physicians estimated that approximately 59% of patients were Caucasian, 10% African American, 12% Hispanic, 19% Asian, and 12% other (Table 2).

Patient CRC Screening Rates. Patient colorectal screening rates are presented in Table 3. Screening rates were calculated for 7,993 patients continuously enrolled for 2 years, who were eligible for FOBT. No difference in screening rates for ANY CRC screening for patients continuously followed for 2 years was found in the intervention group (12.7 vs 12.5, P=.51). For FOBT, the change in screening rate was greater in the control group (13.1 vs 11.4, P=.05).

Screening rates were calculated for 2,665 patients continuously enrolled for 5 years, who were eligible for SIG or COL. There was a greater increase in the percentage of patients in the intervention group who had a SIG at follow-up when compared with the control group (7.4 vs 4.4, $P<.01$). There were no significant increases in rates of COL (9.5 vs 8.9, P=.46) or ANY CRC screening (9.7 vs 8.6, P=.45) for patients continuously enrolled for 5 years.

Physician Screening Rates

Physician screening rates were calculated as the number of a physician's patients who underwent screening divided by the number of patients eligible for screening. There was no change in physician screening rates in the intervention group for FOBT compared with the control group; in fact, there was a greater increase in screening rates in the control group (15.9 vs 12.7, P=.25). A similar finding was observed when assessing for differences between the control and intervention group in compliance rates for ANY CRC screening in the previous 2 years (13.7 vs 12.6, P=.47).

There was a slightly greater increase in rates of SIG in the control group when compared with the intervention group, although the results were not statistically significant (7.7 vs 6.1, P=.61). Rates were adjusted for differences in baseline screening rates between physicians. A non-significant increase in physician screening rates was observed in the intervention group when evaluating rates of COL (10.6 vs 7.5, P=.32). Finally, for any CRC screening in the previous 5 years, physician screening rates were similar between the intervention and the control groups (9.7 vs 9.3, P=.47) (Table 4).

Table 2. Characteristics of 7,993 Patients Included in a Trial to Increase Rates of Colorectal Cancer Screening

	Control, *N*=3,717	Intervention, *N*=4,276
Mean age (y) (SD)	64.5 (8.21)	63.6 (8.11)
Gender		
Female *N* (%)	2123 (57.1)	2412 (56.4)

Table 3. Colorectal Cancer Screening Rates Among Patients Continuously Enrolled for 2 (*N*=7,993) and 5 (*N*=2,665) Years

	Baseline, *N* (%)	Follow-up, *N* (%)	Change (%)	*P**
FOBT†				
Control	1921 (51.7)	2408 (64.8)	13.1	.05
Intervention	2031 (47.5)	2518 (58.9)	11.4	
ANY†				
Control	2421 (65.1)	2886 (77.6)	12.5	.51
Intervention	2758 (64.5)	3301 (77.2)	12.7	
SIG‡				
Control	302 (23.4)	358 (27.8)	4.4	<.01
Intervention	422 (30.6)	523 (38.0)	7.4	
COLON‡				
Control	257 (19.9)	371 (28.8)	8.9	.46
Intervention	295 (21.4)	426 (30.9)	9.5	
ANY‡				
Control	919 (71.3)	1029 (79.9)	8.6	.45
Intervention	1025 (74.4)	1158 (84.1)	9.7	

**P value for differences between 2 groups calculated using the Cochran–Mantel–Haenszel test while adjusting for physician clusters.*
†Calculated for those patients continuously enrolled for 2 years.
‡Calculated for those patients continuously enrolled for 5 years.
FOBT, fecal occult blood test; SIG, sigmoidoscopy; COLON, colonoscopy.

Academic Versus Community Physicians

We hypothesized that screening rates might differ between community and academic physicians. An analysis that only

Table 4. Physician Screening Rates Pre- and Post-Intervention for Patients Continuously Enrolled for 2 and 5 years

	PRE Mean (SD)	POST Mean (SD)	Change Mean (se)	*P**
FOBT†				
Control (*N*=44)	48.6 (19.5)	63.7 (17.5)	15.9 (.02)	.25
Intervention (*N*=50)	42.7 (21.6)	56.2 (22.0)	12.7 (1.9)	
ANY†				
Control (*N*=44)	66.1 (15.7)	79.1 (12.7)	13.7 (1.0)	.47
Intervention (*N*=50)	61.7 (17.3)	74.9 (14.2)	12.6 (1.0)	
SIG‡				
Control (*N*=38)	32.1 (30.8)	39.5 (31.4)	7.7 (2.3)	.61
Intervention (*N*=44)	25.8 (25.1)	32.2 (26.2)	6.1 (2.2)	
COLON‡				
Control (*N*=38)	28.0 (29.1)	34.9 (19.9)	7.5 (2.2)	.32
Intervention (*N*=44)	18.6 (22.4)	76.8 (26.3)	10.6 (2.1)	
ANY‡				
Control (*N*=38)	79.0 (22.4)	86.6 (19.9)	9.3 (2.0)	.91
Intervention (*N*=44)	65.6 (30.0)	76.8 (26.3)	9.7 (1.9)	

**P calculated using Student's t tests comparing differences in compliance scores pre- and post-intervention between groups and adjusting for baseline differences in compliance rates between physicians.*
†Calculated for those patients continuously enrolled for 2 years.
‡Calculated for those patients continuously enrolled for 5 years.
FOBT, fecal occult blood test; SIG, sigmoidoscopy; COLON, colonoscopy.

included community physicians revealed rates of baseline and follow-up screening that were similar to overall rates, with no significant effect of the intervention (data not shown).

DISCUSSION

Colorectal cancer screening should be a national priority.[4] Despite established guidelines and evidence that screening clearly reduces mortality,[1–3] rates of CRC screening remain low.[25]

Interventions to increase rates of CRC screening that target the physician or the patient alone may not be enough; thus, we developed an intensive intervention that targeted both. Our combined intervention resulted in a modest increase in SIG but no effect on other screening outcomes. In a negative study, it is always important to ensure that there was adequate power. Assuming a type I error of 0.05, we had 80% power to detect a 4% difference in FOBT screening rates and a 5.2% difference in COL screening rates; thus, the power in this study was adequate, and yet no differences were seen.

The effect of our intervention may have been minimized owing to an increasing national awareness of the importance of CRC screening, which occurred during the time period of our study. In the spring of 2000, a major television network ran a weeklong CRC awareness campaign. This included television celebrity, Katie Couric, undergoing an actual COL, which was televised. A nationwide increase in COL use was seen after this campaign.[26] Such awareness could have minimized the effect of our intervention by increasing awareness and changing practice habits in our control group.

There may also have been an increased awareness of CRC screening in the medical community. In the summer of 2000, CRC screening received attention in the medical literature.[22,23] Two observational studies on the impact of COL brought considerable attention to the issue of colon cancer screening, and there was media suggestion that COL was superior to other screening modalities.[27] At the time of these publications, we sent letters to all physicians participating in our study, summarizing the study results and re-emphasized the existing recommendations. The attention given to CRC screening during this time may have led to an increase in provider awareness and change in practice habits. In addition, Medicare began paying for COL screening in July 2001, which also might have contributed to increases in screening rates in both groups. Finally, providers in both the control and the intervention groups were invited to informative seminars about CRC screening, which could have diluted the effect. All of these reasons could have potentially influenced our results and contributed to a minimal effect.

Using a definition of "any CRC screening" (which was liberal with respect to FOBT but conservative with respect to COL), between 61.7% and 79% of individuals had been screened at baseline, which is higher than national rates. However, national data that indicate 53% of patients have had either FOBT in the past 12 months or lower endoscopy in the past 10 years are based on telephone surveys, where patients may or may not have doctors.[8] All of the patients in our study had a primary care doctor, and so screening rates higher than those reported by telephone surveys would be expected. In addition, prior studies have shown that patients who have managed care insurance receive more preventive services.[28–30] Finally, it is also possible that there is a "ceiling effect," an upper rate of screening, which is unlikely to increase more with additional interventions.[31]

Most of the existing work on increasing rates of CRC screening has focused on interventions aimed primarily at patients.[32–38] An intervention using a brochure created to address patient barriers (a "psychoeducational" intervention) increased screening attendance for flexible SIG.[37] Other intensive interventions targeting patients have also proved successful. Powe and colleagues demonstrated that an intensive 5-phase intervention (which included the use of a 20-minute videotape, a 12-month calendar, a wall-sized poster, a culturally appropriate brochure, and a 1-page color handout) targeting patients led to higher rates of FOBT participation than the video alone.[38] Our intervention included an educational brochure, but did not include additional reinforcements. Perhaps, the inclusion of additional interventions or reinforcements along with the educational brochure may have resulted in a greater impact on rates of CRC screening in our population.

Despite evidence suggesting that patient-centered interventions are effective, other studies have suggested that intensive patient-centered interventions do not result in a significant increase in rates of CRC screening. A recently published study utilizing a video intervention only showed modest improvements in SIG screening rates, but no effects on other outcomes among patients in primary care practices.[39]

Physician-focused interventions include during-visit interventions, such as reminders and flow charts, and outside-visit interventions, such as education, and have had mixed results.[40] Intensive educational interventions targeted at providers as well as support staff have resulted in increases in flexible SIG use.[32] A recent meta-analysis of interventions to increase cancer screening showed that a combination of during- *and* outside-visit physician interventions is more effective than either alone at increasing cancer screening.[40] Our intervention was an outside-visit type of intervention, and perhaps a combination of this with a during-visit type of intervention, such as reminders, would have resulted in a greater increase in physician compliance rates.

One limitation of our study was that it included patients who were cared for by physicians in one geographic location; however, as the physicians were in multiple sites, it was representative of community practice. A second limitation is that as patient information was obtained from the IPA, information on patient socioeconomic status and education was not available. All patients had managed care insurance and had primary care providers, which limits generalizability to patients without insurance and without doctors. Another limitation is that follow-up occurred 12 months after our intervention. Patients often delay getting the test or have problems scheduling the test and claims data lag, both of which could have affected our study, and it is possible that a longer follow-up may result in higher observed rates of screening. We chose this 12-month follow-up to provide patients with enough time to follow through with testing; selection of a shorter interval for follow-up may have overlooked those patients who were delayed in the process or arranging testing. Finally, although COL in the past 10 years would be an ideal outcome, claims data were only available for COL in the preceding 5 years.

In theory, work on overcoming the barriers to CRC screening should include interventions focused on both providers and patients. It seems reasonable that focusing on both would

result in improved outcomes; however, our intensive intervention only had a minimal impact. Interestingly, in a meta-analysis of interventions to increase cancer screening, studies targeting both physicians and patients, had less of an impact on cancer screening rates than did studies of either one alone.[40] A potential explanation for this finding is a difference in the quality of the combined physicians and patients interventions compared with interventions only targeting one or the other. This suggests that interventions targeting both physician and patient may not be a indicative of a good use of limited resources. Perhaps, the physician and the patient should be targeted within the context of changing the system to facilitate CRC screening practices. Future innovative interventions should carefully assess the impact of interventions targeting physicians and patients within the context of system changes to determine which interventions are most effective.

The authors would like to thank Dr. John Fletcher for his help with the academic detailing. We would also like to thank Amy Truong, B.A. for assistance with manuscript preparation.

Grant support: Dr Walsh was funded by an American Cancer Society Cancer Control Career Development Award, and also received funding from the UCSF Comprehensive Cancer Center. Drs. Gildengorin, Salazar, and Pérez-Stable were supported by a grant from the UCSF Center for Aging in Diverse Communities.

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