

Primary Care Physicians' Decisions to Perform Flexible Sigmoidoscopy

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OBJECTIVE: This study was designed to identify factors that influence primary care physicians' willingness to perform flexible sigmoidoscopy.

MEASUREMENTS: Using a mailed questionnaire, we surveyed all 161 primary care physicians participating in a large health care system. We obtained information on training, current practice patterns, beliefs about screening for colorectal cancer, and the influence of various factors on their decision whether or not to perform flexible sigmoidoscopy in practice.

MAIN RESULTS: Of the 131 physicians included in the analysis, 68 (52%) reported training in flexible sigmoidoscopy, of whom 36 (53%) were currently performing flexible sigmoidoscopy in practice. Time required to perform flexible sigmoidoscopy, availability of adequately trained staff, and availability of flexible sigmoidoscopy services provided by other clinicians were identified most often as reasons not to perform the procedure in practice. Male physicians were more likely than female physicians to report either performing flexible sigmoidoscopy or desiring to train to perform flexible sigmoidoscopy (odds ratio 2.61; 95% confidence interval 1.10, 6.23). This observed difference appears to be mediated through different weighting of decision criteria by male and female physicians.

CONCLUSIONS: Approximately half of these primary care physicians trained in flexible sigmoidoscopy chose not to perform this procedure in practice. Self-perceived inefficiency in performing office-based flexible sigmoidoscopy deterred many of these physicians from providing this service for their patients.

KEY WORDS: cancer screening; sigmoidoscopy; sex factors; physicians' practice patterns

J GEN INTERN MED 1999;14:297-302.

Colorectal cancer is the third most commonly diagnosed cancer for both men and women in the United States and the second most common cause of cancer-related deaths.¹ Several studies have suggested that screening sigmoidoscopy reduces mortality from colorec-

tal cancer,²⁻⁴ and numerous medical societies recommend routine screening with flexible sigmoidoscopy.⁵⁻⁹ However, current estimates suggest that there are too few gastroenterologists in the United States to provide all of the recommended screening flexible sigmoidoscopies and follow-up colonoscopies.¹⁰ As a result, primary care physicians have been identified as a source of manpower to fill this gap.

Unfortunately, many primary care physicians are not trained to perform flexible sigmoidoscopy or do not perform flexible sigmoidoscopy despite being trained. Previous studies suggest that only 23% to 67% of primary care physicians routinely perform flexible sigmoidoscopy as part of their practice.¹¹⁻¹³ Furthermore, it is unclear how physicians choose whether or not to perform flexible sigmoidoscopy as part of their practice. The few studies addressing this issue suggest that the physicians' training, gender, and practice location influence this decision. A survey of members of the American Academy of Family Physicians demonstrated that physicians who were board certified, had more recently completed training, and practiced in smaller communities were more likely to perform flexible sigmoidoscopy.¹² In contrast, another study demonstrated that community size was not important, but that male gender was positively associated with performance of flexible sigmoidoscopy in practice.¹¹ This association between male gender and performance of flexible sigmoidoscopy in practice has also been observed by Eliason et al.¹⁴

Financial factors have been cited as reasons not to perform flexible sigmoidoscopy and could conceivably be more important in an era of increasing patient care requirements and decreasing reimbursement for medical procedures. Ballas et al. reported that a survey of 166 family physicians identified insurance reimbursement (56%) and difficult-to-clean equipment (37%) as reasons for failure to perform flexible sigmoidoscopy.¹⁵ Similarly, a recent survey of primary care physicians revealed that many physicians, particularly those not currently providing flexible sigmoidoscopy, believed that current reimbursement for screening flexible sigmoidoscopy was inadequate to cover the physicians' costs.¹⁶ However, this influence of financial factors on physicians' decisions to perform flexible sigmoidoscopy has not been uniformly observed.^{14,17}

If primary care physicians are to be the primary source for screening flexible sigmoidoscopy, perceived barriers to their adoption of this practice must be identified and overcome. Given the findings of previous studies, we hypothesized that physicians choosing to perform flexible sigmoidoscopy would more likely be men. We also

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expected that primary care physicians would perceive the time required to perform flexible sigmoidoscopy and the relatively low reimbursement rate for this procedure as barriers to performing flexible sigmoidoscopy. Therefore, this study was designed to identify factors that influence primary care physicians' willingness to perform screening flexible sigmoidoscopy and to determine whether these factors differ between male and female physicians.

METHODS

Questionnaires were mailed to all 161 primary care physicians (excluding pediatricians and gynecologists) identified in the roster of physicians participating in the Clinical Care Associates Program of the University of Pennsylvania Health System. These physicians are all employees of the University of Pennsylvania Health System and practice in community settings in the areas surrounding Philadelphia.

The initial mailing included a letter inviting participation in the study, a questionnaire, a \$2 honorarium, a piece of candy, and a stamped return envelope. A second mailing was sent to all physicians who failed to return the original questionnaire within 3 weeks of the initial mailing. A third mailing was sent 4 weeks after the second mailing to all physicians who still had not returned the survey. The honorarium was included only in the first mailing.

The questionnaire contained 47 questions, including 3 questions focusing on the physicians' beliefs about the effectiveness of screening with flexible sigmoidoscopy and fecal occult blood testing and 16 questions focusing on what factors influenced the physicians' decisions about performing flexible sigmoidoscopy. These 19 questions used a 5-point Likert scale ranging from strongly disagree or not important to strongly agree or very important. In pilot testing, most physicians were able to complete the questionnaire in less than 10 minutes.

On the basis of expert opinion and our review of the literature, we hypothesized that respondents might be influenced by the following factors: the financial impact of the decision about performing flexible sigmoidoscopy, personal satisfaction from performing invasive procedures, logistical problems related to establishing a flexible sigmoidoscopy program or performing flexible sigmoidoscopy, liability concerns, and the strength of the physicians' belief in flexible sigmoidoscopy as a screening tool. We designed the questionnaire to contain at least two questions addressing each of these factors. We decided a priori to test the between-item correlation of the instrument using a correlation matrix.¹⁸ This test demonstrated stronger between-item correlations for questions addressing the same domain, and lower correlations between items in different domains (data not shown).

For the purpose of the analyses, respondents were divided into four categories: physicians currently perform-

ing flexible sigmoidoscopy, physicians trained to perform flexible sigmoidoscopy but not currently performing it, physicians interested in training to perform flexible sigmoidoscopy, and physicians with no training in flexible sigmoidoscopy and not interested in obtaining training.

Spearman rank correlations were used to measure the correlations between responses to Likert-scaled questions.¹⁹ To test for associations between professional and demographic characteristics and to test the importance of factors in the decision process of the respondents, responses to Likert-scaled questions were converted to dichotomous categories. Scores of less than 4 out of 5 were categorized as not important or not in agreement and scores of 4 or 5 out of 5 were categorized as above average importance or agreement. Comparisons of continuous and dichotomous variables between multiple groups were completed using the Kruskal Wallis test and Pearson's χ^2 squared test, respectively.¹⁹ Comparisons of continuous and dichotomous variables between two groups were completed using the Wilcoxon Rank-Sum Test and Fisher's Exact Test, respectively.¹⁹ Logistic regression analysis and the Mantel-Haenszel combined odds ratio and test for heterogeneity were used to adjust for confounding and to assess for effect modification.¹⁹ Only factors demonstrating significant confounding in stratified analyses were included in the multivariate model. Multiple confounding variables from the same theoretical domain were combined as a single variable representative of the domain as a whole. For the combined variables, emphasis on the domain was considered present for all subjects who reported emphasis on any of the individual factors included in the domain. All analyses used two-sided tests of statistical significance with a significance level of .05. Statistical analyses were performed using Stata 5.0 (Stata Corp., College Station, Tex).

RESULTS

Of the 161 physicians included in the original mailing, 140 (87%) returned the questionnaire. Nine physicians were excluded from further analysis because they were not trained in either family practice or internal medicine ($n = 1$), they no longer saw outpatients in practice ($n = 2$), they provided less than 5 hours per week of outpatient care ($n = 1$), they were no longer associated with the Clinical Care Associates Program ($n = 4$), or they had been trained in gastroenterology ($n = 1$).

Table 1 reports the characteristics of the physicians included in the analyses. Sixty-eight physicians (52%) reported training in flexible sigmoidoscopy, of whom 36 (53%) were currently performing flexible sigmoidoscopy in their practice. These physicians reported performing a median of 30 procedures in the preceding year (range 3–150). The median number of supervised flexible sigmoidoscopies performed by those physicians reporting training in the procedure was 10 (range 0–100). Five physicians

Table 1. Characteristics of 131 Physicians Included in the Analyses

Characteristic	
Age, median years (range)	44 (29–70)
Male, <i>n</i> (%)	86 (66)
Internal medicine, <i>n</i> (%)	83 (63)
Family practice, <i>n</i> (%)	48 (37)
Subspecialty training, <i>n</i> (%)	30 (23)
Years since completing training, median (range)	14 (1–42)
Hours per week caring for outpatients, median (range)	35 (6–60)
Currently performing flexible sigmoidoscopy, <i>n</i> (%)	36 (27)
Trained but not currently performing flexible sigmoidoscopy, <i>n</i> (%)	32 (24)
Not trained and not interested in training to perform flexible sigmoidoscopy, <i>n</i> (%)	40 (31)
Interested in training to perform flexible sigmoidoscopy, <i>n</i> (%)	23 (18)

reported receiving training in flexible sigmoidoscopy that did not include the performance of supervised procedures; three of these five were currently performing flexible sigmoidoscopy in practice.

The physicians in the four groups were similar in age, subspecialty training, and amount of clinical activity (data not shown). Overall, 77% of the physicians believed that screening with flexible sigmoidoscopy should be included in routine health care. This proportion did not dif-

fer between groups ($p = .31$). Similarly, more than 70% of the physicians in each group believed that screening flexible sigmoidoscopy reduces mortality from colorectal cancer (score of 4 or 5 on a 5-point Likert scale).

Table 2 summarizes the physicians' rating of the importance of various decision factors. Three factors appeared to be more influential regarding the decisions of physicians trained in flexible sigmoidoscopy but not performing this procedure (group 2). These factors were the time required to perform flexible sigmoidoscopy (median score 5/5), the availability of flexible sigmoidoscopy from other clinicians (median score 4/5), and the availability of adequately trained support staff (median score 4/5). No other factors were rated as above average in importance by more than half of the respondents.

The physicians' rating of the importance of the time required to perform flexible sigmoidoscopy was most strongly correlated with their rating of the importance of the availability of adequately trained support staff (Spearman's $\rho = 0.809$, $p < .001$). The group of physicians not trained in flexible sigmoidoscopy and reporting no interest in training to perform flexible sigmoidoscopy (group 4) also emphasized the importance of the time required to perform flexible sigmoidoscopy (median score 5/5) and the availability of flexible sigmoidoscopy from other clinicians (median score 5/5). In contrast, physicians currently performing flexible sigmoidoscopy (group 1) emphasized their belief in the importance of flexible sigmoidoscopy in routine health care and its effectiveness in reducing mortality from colorectal cancer, the availability of equipment, their confidence in their ability to perform flexible sigmoidoscopy, and their enjoyment from performing procedures.

Table 2. Ratings of Importance of Factors in Physicians' Decision to Train and Perform Flexible Sigmoidoscopy (FS)*

Decision Factor	Trained in FS		Not Trained in FS		Groups 1–4 (<i>n</i> = 131)
	Group 1 Performs FS (<i>n</i> = 36)	Group 2 Does Not Perform FS (<i>n</i> = 32)	Group 3 Desires Training (<i>n</i> = 23)	Group 4 Does Not Desire Training (<i>n</i> = 40)	
Time required to perform FS	3	5	4	5	4
Availability of FS from other clinicians	2	4	3	5	4
Availability of trained support staff	3	4	4	3	3
Start-up and maintenance costs	3	3	4	3	3
Confidence in ability to perform FS	4	3	4	3	4
Fear of complications	2	3	3	3	3
Enjoyment of performing procedures	4	3	4	3	3
Liability concerns	2	3	3	3	3
Availability of equipment	4	3	4	3	3
Sense of duty	4	3	4	2	4
Reimbursement rate by insurance companies	3	3	3	1	3
Effectiveness of FS in reducing mortality	4.5	2	4	2	3
Impact of performing FS on practice revenue	3	2	4	2	3
Desire not to perform procedures uncomfortable to patients	2	2	2	2	2
Importance of FS in routine health care	5	2	5	2	4
Poor patient compliance	3	2	2.5	1	2

*Median ratings on a scale from 1 to 5.

Among the physicians interested in training to perform flexible sigmoidoscopy, 14 (61%) of 23 reported lack of time and 7 (30%) of 23 reported lack of a training course in their area as reasons for not having trained.

Male and female physicians were equally likely to report having been trained to perform flexible sigmoidoscopy (55% vs 47%, $p = .46$). However, in unadjusted analyses, male gender was strongly associated with the performance of flexible sigmoidoscopy after training (odds ratio [OR] 4.41; 95% confidence interval [CI] 1.47, 13.1; $p = .01$). Similarly, male physicians were more likely to report either currently performing flexible sigmoidoscopy or being interested in training to perform flexible sigmoidoscopy than female physicians (53% vs 29%; OR 2.61; 95% CI 1.10, 6.23).

Multiple logistic regression revealed that the association between male gender and interest in performing flexible sigmoidoscopy was largely attributable to differences in the ways that male and female physicians made their decisions (Table 3). The association between male gender and interest in performing flexible sigmoidoscopy was independent of having been trained in flexible sigmoidoscopy, belief in the effectiveness of flexible sigmoidoscopy to reduce mortality, belief that flexible sigmoidoscopy should be included in routine health care, and the physicians' perception of the level of discomfort experienced by patients undergoing flexible sigmoidoscopy (data not shown). After adjusting for age and medical specialty, the strength of the association appeared stronger (OR 2.78). However, after adjusting for factors influencing the decision process of the physician, the strength of the association between male gender and interest in performing flexible sigmoidoscopy was substantially weaker than the estimate adjusted only for age and medical specialty, and no longer remained statistically significant (OR 0.94; 95% CI 0.25, 3.59). Thus, the observed difference between male and female physicians regarding interest in performing flexible sigmoidoscopy appears to be largely mediated through different weighting of decision criteria, including emphasis on a sense of duty, availability of other clini-

cians to perform flexible sigmoidoscopy, availability of equipment, and liability concerns.

DISCUSSION

In this study of primary care physicians in one U.S. city, most believed that screening flexible sigmoidoscopy reduces mortality from colorectal cancer and should be included in routine health care, but only 45% wanted to perform screening flexible sigmoidoscopy as part of their practice. Furthermore, only 53% of the physicians trained in flexible sigmoidoscopy were performing this procedure. These findings are consistent with previous estimates of the proportion of physicians performing flexible sigmoidoscopy in practice.¹¹⁻¹³

Two thirds of the physicians interested in training to perform flexible sigmoidoscopy reported that lack of time prevented them from obtaining training. Similarly, the physicians not interested in performing flexible sigmoidoscopy reported that the time required to perform flexible sigmoidoscopy, the availability of other clinicians to perform flexible sigmoidoscopy, and the lack of availability of adequately trained support staff were the major factors influencing this decision. A strong correlation between these variables was expected, as each is associated with the operational structure that physicians employ in their practices. Physicians who believed that performing flexible sigmoidoscopy required excessive time also emphasized the importance of having other clinicians available to perform the procedure. In addition, physicians who emphasized the importance of time also emphasized the importance of adequately trained support staff who, for example, could clean the equipment between uses and free up more of the physician's time. We believe that these correlations mean that physicians' emphasis on the time required to perform flexible sigmoidoscopy reflects their concern over the inefficiency of performing this procedure in office-based settings.

Office-based sigmoidoscopy is estimated to require less than 20 minutes to perform.^{9,20} Furthermore, we

Table 3. Multivariate Model of the Association Between Male Gender and Interest in Performing Flexible Sigmoidoscopy (FS)

Characteristic	Crude ORs from Bivariate Analyses (95% CI)	OR Adjusted for Demographic Variables (95% CI)	Fully Adjusted OR (95% CI)
Male gender	2.61 (1.10, 6.23)	2.78 (1.06, 7.25)	0.94 (0.25, 3.58)
Age	0.99 (0.95, 1.03)	0.97 (0.92, 1.01)	0.93 (0.92, 1.04)
Training in internal medicine	2.23 (1.00, 4.96)	1.83 (0.80, 4.22)	1.83 (0.60, 5.57)
Factor emphasized in decision process			
Sense of duty, effectiveness of FS, or importance of FS in routine health care	18.39 (5.84, 57.9)	—	18.0 (4.82, 67.5)
Availability of other clinicians to perform FS or time required to perform FS	0.18 (0.07, 0.47)	—	0.17 (0.04, 0.66)
Liability concerns	0.38 (0.16, 0.91)	—	0.30 (0.09, 0.96)
Availability of equipment	2.80 (1.29, 6.09)	—	2.46 (0.79, 7.67)

have found that when physicians are able to perform flexible sigmoidoscopy without biopsies in under 21 minutes, the current Medicare reimbursement rate is comparable to the physicians' costs, including the opportunity cost of the time required to perform the procedure.²¹ Given that time can be translated into opportunity costs, one might have expected that physicians who emphasized the importance of time would also emphasize the importance of financial factors in their decisions. However, the physicians in our study who chose not to perform flexible sigmoidoscopy did not emphasize the importance of financial factors in their decision, unlike those in the study by Ballas et al.¹⁵ Few physicians reported that either the insurance reimbursement rate or the financial impact of performing flexible sigmoidoscopy was important in the decision not to perform flexible sigmoidoscopy. These results are similar to those of Eliason et al., who demonstrated that perceived profitability of a procedure was marginally correlated with interest in learning the procedure and was not correlated with performance of the procedure.¹⁴ These findings may reflect either the small proportion of physicians' total salary that is determined by productivity or physicians' lack of knowledge about the effect of performing flexible sigmoidoscopy on total revenue.²² Alternatively, the emphasis on time rather than financial issues may reflect a general sense that physicians must see more patients and complete more documentation than previously.^{23,24} Whatever the explanation, we believe that the strong correlation between the importance of time and the availability of adequately trained support staff supports our hypothesis that these physicians perceive inefficiency in their practice to be the major barrier to performing this procedure. Therefore, this finding suggests that better training of support personnel might increase the proportion of primary care physicians trained in flexible sigmoidoscopy who would be willing to perform the procedure in practice.

We identified the physicians' perception of the availability of other clinicians to perform flexible sigmoidoscopy as an important factor in their decision process. In a survey of members of the American Academy of Family Physicians, physicians in smaller communities were more likely to perform flexible sigmoidoscopy.¹² Very likely, the availability of other clinicians to perform flexible sigmoidoscopy is greater in larger communities, which may explain the association between community size and practice patterns observed in the previous study.¹²

The unadjusted results of our study appear to confirm the finding of previous studies that male physicians are more likely than female physicians to perform flexible sigmoidoscopy in practice after receiving training and more interested in performing flexible sigmoidoscopy.^{11,14} However, we provide further evidence that the association between interest in performing flexible sigmoidoscopy and male gender may be mediated through different weighting of decision criteria in the decision process. In our multivariate model, emphasis on a sense of duty, the availability of other clinicians to perform flexible sigmoidoscopy,

the availability of equipment, and liability concerns proved to be important predictors of interest in performing flexible sigmoidoscopy.

The reasons for these differences are not clear; however, several explanations are possible. Female physicians may be more influenced by nonmedical factors such as child care responsibilities, and these responsibilities may limit their desire or ability to take on more work, particularly if it is time-consuming.²⁵ Alternatively, men and women physicians may have different ideas about procedures in general. Other studies have found that female graduates of family medicine training programs do fewer complex procedures in their practice than do male graduates.^{14,26} Similarly, women cardiologists are less likely to be involved in interventional procedures than their male counterparts.²⁷

Two potential limitations of this study should be noted. First, the physicians surveyed are all employees of a large health system in a single urban area. As such, they may have enhanced access to consultants who perform flexible sigmoidoscopy and colonoscopy. Similarly, their practice decisions may have less of a personal financial impact than if they were in private practice. Nonetheless, all of these physicians are reimbursed in part according to productivity. Furthermore, given that an increasing proportion of U.S. physicians are employees, and that 27% of U.S. physicians are employed by institutions,²⁸ our cohort is likely to be representative of many primary care physicians in major U.S. cities. In addition, these results should be widely generalizable to large institutions that employ primary care physicians to maintain community-based practices. Nonetheless, confirmation of these results in other health systems and other geographic areas is needed to ensure the generalizability of these findings.

Second, nonrespondents may have answered the questionnaire differently. However, our response rate was over 85%, which likely reflects the substantial interest of primary care physicians in this topic, and makes it unlikely that our results would change significantly if all of the physicians had responded.

This study has demonstrated that although most primary care physicians believe that flexible sigmoidoscopy is effective in reducing cancer-related mortality, many primary care physicians are not interested in performing screening flexible sigmoidoscopy in their practice, regardless of whether they have been trained to do so. The major factors influencing this decision appear related to process issues limiting the ability to efficiently perform office-based flexible sigmoidoscopy in primary care practices. Future efforts to improve colorectal cancer screening by primary care physicians should focus on methods to improve the delivery system. Comparing the operational structure of practices of physicians currently performing office-based flexible sigmoidoscopy with that of physicians trained in flexible sigmoidoscopy yet choosing not to perform this procedure might provide further insight into this issue.

The authors thank Jeffrey L. Carson, MD, for his thoughtful review of the study protocol and earlier versions of the manuscript. This study was funded by a grant from the Office of the Associate Dean for Health Services Research of the University of Pennsylvania. Dr. Lewis was supported in part by National Institutes of Health training grant 1-T32-DK07740-0. Dr. Asch is a Department of Veterans Affairs Health Service Research and Development Senior Research Associate.

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