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Contrasts in Rural and Urban Barriers to Colorectal Cancer Screening

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Abstract

Objectives—To contrast barriers to colon cancer (CRC) screening and Fecal Occult Blood Test (FOBT) completion between rural and urban safety-net patients.

Methods—Interviews were administered to 972 patients who were not up-to-date with screening.

Results—Rural patients were more likely to believe it was helpful to find CRC early (89.7% vs 66.1%, $p < .0001$), yet were less likely to have received a screening recommendation (36.4% vs. 45.8%, $p = .03$) or FOBT information (14.5% vs 32.3%, $p < .0001$) or to have completed an FOBT (22.0% vs 45.8%, $p < .0001$).

Conclusions—Interventions are needed to increase screening recommendation, education and completion, particularly in rural areas.

Keywords

colorectal cancer screening; low-income patients; Fecal Occult Blood Test; community health centers; barriers

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Human Subjects Statement

An Institutional Review Board approved the study procedures.

Conflict of Interest Statement

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According to a 2012 report from the American Cancer Society, more than half of the 51,000 deaths due to colorectal cancer (CRC) that occur each year in the United States could have been prevented by screening.^{1,2} Of notable concern, CRC screening rates remain persistently low among individuals of low socioeconomic status, those with Medicaid or no health insurance, those with fewer years of education, racial/ethnic minorities, and those living in rural areas.^{2–11} The National Health Disparities Report emphasized the importance of reducing disparities in colon cancer screening, particularly among adults living in inner city and rural areas.¹²

A number of studies have examined barriers to CRC screening among disadvantaged groups. Findings suggest that various patient-, provider-, and system-level factors influence screening behavior. Factors associated with low-income patients include less knowledge, poorer attitudes and misinformation regarding the purpose and need for CRC screening and limited self-efficacy and embarrassment about completing screening.^{7,9,13–23} Specific barriers to colonoscopy include cost, lack of health insurance coverage, inadequate transportation, not wanting to miss work, procrastination and fear of the procedure.^{24–26} Provider and health system factors include lack of screening recommendation,^{13,23–25,27,28} limited capacity for colonoscopy and health care provider shortages.^{28–30}

Research has shown that participants in rural areas have lower CRC screening rates compared to those in urban areas and present with a more advanced stage of disease.^{31,32} Unique barriers to preventive care and screening communication in rural areas include system barriers such as distance to primary care clinics, shortage of health care professionals and higher provider turnover.^{30,33–37} Factors unique to rural patients include fewer primary care visits per year and the independent and self-reliant nature of rural residents.³⁸ In a study of rural physicians in Iowa, Levy³⁵ found the 2 most common reasons physicians did not discuss CRC with patients were perceived lack of opportunity because patients came sporadically or only for acute health issues, and physicians' perception that patients would refuse due to cost or lack of interest.

To our knowledge, no studies have specifically compared barriers to CRC screening among patients cared for in rural versus urban Federally Qualified Health Centers (FQHCs). FQHCs are community clinics located in areas designated as medically underserved by the Department of Health and Human Services. They provide services to patients regardless of insurance status. Nationally, FQHCs provide primary care to 19 million people who are low income and commonly live in inner cities or rural areas of the country. FQHCs are therefore uniquely positioned to deliver CRC screening to vulnerable populations including minorities and those without health insurance (www.HRSA.gov). Our intervention intentionally focused on the use of fecal occult blood tests (FOBTs), which are considered the most feasible and cost-effective screening option for low-income, underinsured populations.^{28,39} Nationally, the use of screening colonoscopy and flexible sigmoidoscopy is limited with socioeconomically-disadvantaged patients due to cost, limited screening capacity and number of providers trained to do the procedures.^{20,28,39–42} For individuals not covered by insurance, out of pocket cost of screening colonoscopy range from \$2000 to \$3800. Those with insurance often have a co-payment of up to \$1000.⁴³ Medicaid does not pay for screening colonoscopy in most states⁴⁴ and in rural areas access to specialists and colonoscopy facilities adds additional barriers.

Understanding the unique factors affecting low income, rural and inner city patients is essential to developing effective, tailored interventions to promote CRC screening in community clinics. The purpose of this paper is to examine and report upon the differences in CRC screening knowledge, beliefs, barriers and health system experiences among rural

and urban FQHC patients who were not up-to-date with CRC screening. This study specifically targeted patients in the safety net system, as such individuals are disproportionately affected by colorectal cancer and less likely to complete CRC screening.

METHODS

Study Design and Sites

A randomized clinical trial, sponsored by the National Cancer Institute (NCI), was conducted among 972 patients to test the effectiveness of 3 distinct strategies to improve initial and repeat use of CRC screening (R01-CA115869). This paper focuses on baseline data collected as part of this trial, before any intervention activities took place.

Eight FQHCs across 7 parishes in North Louisiana served as study sites. The FQHCs in this study were invited to participate due to their high patient volume; all invited FQHCs agreed to serve as study clinics. In Louisiana, a majority of the patients served by FQHCs have no private health insurance, are African American and are living at or below the poverty level. Six study clinics were located in rural towns, with populations ranging from 450 to 13,000.⁴⁵ The 2 urban clinics were located in low-income areas of cities with populations of 63,000 and 199,000.⁴⁵ At baseline, rates of CRC screening were extremely low, ranging from 1 to 2% for each clinic.

Recruitment and Study Population

Patient enrollment took place between August 2008 and June 2011. To recruit patients, clinic nurses asked patients who had a scheduled clinic appointment if they would be willing to talk to a research assistant (RA) about a cancer screening study. The clinic RA informed patients about the study and screened them for eligibility. Participants were eligible if they: (1) were 50 years old or older, (2) were English speaking, (3) were enrolled as a patient in a study clinic, (4) did not have a previous history of cancer other than melanoma or other skin cancer, (5) did not require screening at an earlier age according to American Cancer Society (ACS) guidelines,² were not up-to-date with United States Preventive (6) Services Task Force (USPSTF) CRC screening recommendations^{1,46} (ie, a FOBT every year, flexible sigmoidoscopy every 5 years, or colonoscopy every 10 years), and (7) did not have any severe impairment or illness that precluded their participation. In all, 1052 patients were identified, 33 (3.1%) refused to participate and 47 (4.5%) were found to be ineligible. Specifically in rural clinics 746 were identified, 19 refused and 27 were found ineligible which resulted in 700 eligible rural participants; in urban clinics 306 were identified, 14 refused and 20 were found ineligible which resulted in 272 urban participants. The clinic RA then engaged eligible patients in the informed consent process and administered a structured survey. Patients were given \$10 for their participation in the baseline survey.

Structured Survey

The study interview included demographic and basic health status questions as well as 46 colon cancer, colon cancer screening and specific FOBT questions designed utilizing the Health Belief Model and Social Cognitive Theory.^{47–51} These questions came from validated CRC questionnaires used in previous studies by the study team.^{18,52,53} The survey, which was administered orally, was written on a 4th grade reading level. Items assessed participants' CRC awareness (eg, *Have you ever seen or heard an advertisement that encouraged you to get tested for colon cancer?*), knowledge (eg, *At what age should a person start getting tested for colon cancer?*), beliefs about susceptibility to CRC (eg, *I feel I will get colon cancer sometime during my life.*) and physician recommendation for CRC screening (eg, *Has a doctor ever recommended that you get tested/screened for colon cancer?*). A series of items also assessed specific attitudes about Fecal Occult Blood Test

(FOBTs). As in other studies,²⁶ before questions concerning FOBTs were asked, participants were shown 2 kinds of FOBT kits as a visual aid to help ensure clarity about FOBT questions. FOBT questions included beliefs about the benefits of FOBTs (eg, *Having a FOBT stool test/tissue test will help me find colon and rectal problems early*), perceived barriers (eg, *Doing a FOBT test is embarrassing*), self-efficacy of screening behavior (eg, *I know for sure I can correctly complete the FOBT test at home*) and previous experience with screening (eg, *Have you ever done a FOBT stool/tissue test?*). Response options for knowledge, awareness, experience and one belief item were 'yes', 'no', 'don't know' or open-ended; barrier and 4 of the belief questions used a 5-point Likert scale to assess intensity of agreement.

Literacy was assessed using the Rapid Estimate of Adult Literacy in Medicine (REALM), the most commonly used test of patient literacy in healthcare research.^{54,55} The REALM is a 66-word reading recognition test that includes words commonly used in health materials. It is highly correlated (.80) with the Test of Functional Health Literacy in Adults (TOFHLA) and is an indicator of functional health literacy. Raw REALM scores (0–66) can be converted into reading grade levels that correlate with literacy skills.

Statistical Analysis

Descriptive statistics were calculated for all variables and rural/urban differences were examined using the chi-square test for univariate analyses. Multivariate analyses, specifically logistic regression with the cumulative log-log link, were used to determine the relationship between each measure and rural/urban status adjusting for age, race, and literacy. These covariates were selected based on the literature.^{11,14–16,17,21,56} Statistical significance was indicated when $p < .05$, and no adjustment for multiple testing was made, since actual p-values are reported.

RESULTS

The sociodemographic characteristics of the sample are detailed in Table 1. Subjects ranged in age from 50 to 89, with a median age of 57. Most (88.2%) participants had seen a doctor in the last 12 months. The majority were female (77.3%) and African American (67.2%). A third (33%) lacked a high school diploma and 51.5% had a less than a ninth-grade reading ability (low literacy). There were 700 participants from rural FQHCs (70.8%) and 272 participants from urban FQHCs (29.2%). The percentage of African American participants was higher in urban clinics compared to rural clinics (89.2% vs 60%, $p < .0001$). Participants in urban clinics were also more likely to have low literacy (61.9% vs 47.5%, $p = .0002$).

Knowledge and Awareness

Awareness of CRC was high among these FQHC participants. Almost all had heard of colon cancer (96.1%) and approximately half knew someone who had had CRC (48.8%). Almost two-thirds (67.3%) of patients had seen or heard an advertisement that encouraged CRC testing, with rural participants being more likely to report having this experience (69.4% vs 61.4%, $p = .0097$). Rural patients were also more likely to think it was very helpful to find CRC early (89% vs 66.5%, $p < .0001$). Even though awareness was high and participants had been asked about FOBTs and colonoscopy in eligibility interviews, only 56.3% reported they had heard of a test to find CRC. Of participants who could name a test, urban participants were more likely than rural participants to have heard of an FOBT (63.1% vs 33.4%, $p < .0001$) and rural participants were more likely than urban participants to identify a colonoscopy as a type of CRC screening (91.3% vs 70.9%, $p < .0001$). Overall, specific knowledge about what age CRC screening should begin was limited, with 71.6% indicating screening should begin before age 50.

In multivariate analysis controlling for age, race, and literacy, urban/rural differences were significant in awareness of advertisement ($p = .05$), for thinking that it is very helpful to find CRC early ($p < .0001$) and for type of test named ($p < .0001$ for FOBT and $p < .0001$ for colonoscopy).

Beliefs

Almost all participants had positive beliefs about the benefits of screening and most indicated they would want to know if they had cancer, with rural participants being more likely to want to know (91.3% vs 87.7%, $p = .006$, Table 2). Participants had some concern that screening would find they had cancer; rural participants were more likely than urban patients to report they were very worried that a screening test might find they had CRC (5.7% vs 2%, $p < .0001$). In multivariate analysis adjusting for age, race, and literacy, urban/rural differences were not significant for participants being more likely to want to know if they had cancer, but were significant ($p < .0001$) for being more likely to report that they were worried they might find out they had CRC.

With regard to FOBTs, rural participants were more likely to strongly agree that FOBT will help find colon and rectal problems early (25.9% vs 5.6%, $p < .0001$) and this remained significant in multivariate analysis ($p < .001$). Rural participants were also more likely to strongly agree that having an FOBT would decrease their chances of dying from CRC (16.7 vs 7.2%, $p = .002$), but this difference was not significant in multivariate analysis after adjusting for relevant covariates.

Self-Efficacy

Self efficacy for completing FOBTs was higher among participants in the rural clinics than urban clinics. Rural participants were more confident in their ability to mail an FOBT card back to the clinic (23.2% vs 6%, $p < .0001$). Overall, 14.1% of rural patients versus 5.6% of urban patients were very confident they could get an FOBT ($p = .0006$) and find out how to correctly complete it at home (15.5% vs 4% ($p < .0001$)). None of these relationships were significant in multivariate analyses.

Barriers

Few participants reported barriers to completing an FOBT (Table 3). Rural participants were more likely to “strongly disagree” that FOBT instructions would be confusing (12.2% vs 4%, $p = .0005$), and to “strongly disagree” that doing an FOBT would be embarrassing (11.5% vs 3.6 %, $p = .003$), a lot of trouble 11.6 % vs 4%, $p < .0001$), or messy (8.7 % vs 1.6%, $p < .001$). These relationships remained in multivariate analysis (confusing instructions: $p = .0016$, embarrassing: $p = .003$, a lot of trouble: $p < .0001$, and messy: $p < .0001$).

Screening Recommendation

Less than half of FQHC participants in this study had ever received a recommendation for CRC screening from a physician or had ever been given an FOBT kit. Less than one in 3 recalled ever receiving information or education on FOBT (Table 4). Urban participants were more likely than rural participants to have received a physician recommendation (45% vs 36.4% $p = .03$), received any FOBT information (32.3% vs 14.5%, $p < .0001$), seen a FOBT kit (61% vs 32.5%, $p < .0001$), been given an FOBT kit (48.2% vs 22.6% $p < .0001$), or completed an FOBT (45.8% vs 22% $p < .0001$). When participants were asked what screening tests physicians had recommended, there was a significant difference by location. More urban participants reported receiving a recommendation for an FOBT (76.8% vs 49% $p < .001$) and more rural participants had received a recommendation for a colonoscopy

(59% vs 42%, $p = .003$). Only 9 patients (2%) had ever received a recommendation for sigmoidoscopy; this did not vary by location. The 2 most common reasons participants gave for not completing an FOBT test in the last 2 years were: (1) they did not know they needed screening (36.6% urban vs 26.7% rural $p = .005$) and (2) they had put it off (18.9% urban vs 26.9% rural $p = .02$). In multivariate analysis adjusting for age, race, and literacy, rural patients were less likely to have been given ($p = .002$) or completed ($p = .001$) a FOBT kit previously.

DISCUSSION

This study of inner city and rural FQHC patients who were not up-to-date with CRC screening adds important detail to the CRC screening literature. Specifically, our focus on low income patients from multiple rural and inner-city areas is unique and further extends the literature by revealing distinct attitude and healthcare differences across these settings. Previous community clinic-based studies have predominantly been qualitative in nature and have involved only a single clinic or multiple clinics in one community.^{15,16,23,26,57,58}

Our results indicate that both rural and urban participants had positive perceptions about FOBTs being an effective screening method. Rural individuals were much more likely to report stronger positive beliefs about FOBTs as well as stronger disagreement that FOBTs would be embarrassing, a lot of trouble and messy. Previous studies have reported a lack of physician recommendation as the primary barrier to screening.^{13,15,24,26,59–61} In our study, less than half of participants in either setting reported ever receiving a physician recommendation for screening, information on FOBTs or an actual FOBT kit. Rural participants were significantly less likely to have received any of these. These differences may be influenced by rural cultural factors and current limitations in rural healthcare.^{35,38} Increasing our understanding of these unique determinants to CRC screening will be essential to developing effective, tailored interventions to increase CRC screening in community clinics.

Our findings of facilitators to screening in both rural and urban areas are consistent with previous studies.^{16,26} O'Malley and colleagues found low-income, uninsured patients in urban safety-net clinics had positive attitudes about screening via FOBT, and found it appealing that the test could be performed at home. This is in contrast to providers' perceptions that patients would refuse CRC screening, would be unwilling to take stool samples at home or return FOBT cards.²⁶

Despite positive attitudes about screening, low income participants in our study and others have limited knowledge of screening tests.^{16,20,23,34,62} About half of our participants could not name a test to find CRC and less than a third knew at what age screening should begin. Similarly in a study of urban, working class men and women in New York City, Wolf found more than half were unable to name a CRC screening test and that misconceptions were common.¹⁷ In focus groups in rural and urban community settings in Alabama, Holt and colleagues found that participants had limited CRC screening knowledge, with few participants realizing that screening should begin at age 50 for persons at average risk.⁵⁷ Focus groups with low income African Americans in an urban Midwestern community health center found patients uniformly desired more CRC screening information and interestingly suggested that increased education would not only improve understanding but help mitigate fear of cancer detection.¹⁶

Several previous studies^{16,26,58} suggest that low income patients would be receptive to education and provider recommendation for FOBTs. In our study, less than one in 3 participants had received education or information on FOBTs and rural participants were

less than half as likely to report having receiving FOBTs. In focus groups in rural Michigan, Holmes-Rovner and colleagues found patients eligible for CRC screening wanted more explicit instructions on using FOBTs and a clear explanation of why the test should be performed.⁵⁸

The literature overwhelmingly indicates that lack of physician recommendation and cost/lack of insurance are the most significant barriers to CRC screening completion in both urban and rural community clinics.^{5,7,13,15,25,26,58,59} In the current study, less than half of participants recalled ever receiving a physician recommendation for CRC screening, with significant disparities in rural clinics. In a study that directly observed primary care physicians in rural practice, Ellerbeck⁶⁰ found CRC was discussed in only 14% of visits but was more common in offices that used flow sheets. Holmes-Rovner⁵⁸ found lack of recommendation in rural community clinics was compounded by high physician turnover and patients' lack of confidence in providers. Although our study did not survey physicians, it is possible that high physician turnover and physician shortages influenced noted disparities.

In studying rural physicians' reasons for not having CRC screening discussions with patients', Levy found the main reasons were lack of time or opportunity, patients coming in sporadically or only for acute, more pressing health issues, or a perception that patients would refuse due to cost or lack of interest in screening.³⁵ Nationally, rural residents report fewer primary care visits during the year.³⁸ Larson speculates this may be because rural clinics are often located a long distance from patients' homes or because rural individuals may have a higher threshold for seeking care, they may be more independent, self reliant and not likely to seek care unless they have a serious illness.³⁸ Although rural individuals may seek care less often, a good relationship with a physician may be particularly important in rural areas. Focus groups with rural African American church members in North Carolina found that those that rated their communication with their primary care provider as 'good' were twice as likely to have been screened (36%) as those who rated it as 'poor' (17%).³⁴

Our findings, which identify significant disparities in rural and urban FQHCs patients' FOBT screening experiences, have important policy implications. FOBTs are a practical method of CRC screening for low income and uninsured patients in community clinics, particularly for those individuals living in isolated, rural areas without easy access to colonoscopy services.^{28,39,41} However, previous studies of rural physicians found they more commonly recommended colonoscopy over FOBT for CRC screening.^{35,37} In our study, rural participants who had received a physician recommendation were more likely to report it was for colonoscopy whereas in urban clinics participants more commonly reported a recommendation for FOBT. While our study did not interview physicians, previous studies have found family physicians particularly those in rural areas may not be well informed about screening guidelines, proper use of FOBTs or communication strategies to increase likelihood patients will perform and return the tests.²⁸ In Louisiana, rural FQHC physicians' recommendation for screening colonoscopy may be not be actionable. Public hospital colonoscopy facilities are located in cities commonly 100 miles from rural clinics. Moreover, the waiting time for a screening colonoscopy for uninsured patients in these hospitals is over a year and rarely do community hospitals provide these tests at no cost.

This study has several limitations. The majority of patients were female and African American; however, this is quite typical of FQHC populations, particularly in the southern United States. FQHCs in the study were in one state and all patients were English speaking. Therefore, caution must be exhibited if results were to be generalized to FQHCs serving Hispanic and other minority patients in other states. Data on previous CRC education, physician recommendation, and FOBT completion were self-reported and not confirmed

with chart review. It is possible that participants in rural clinics may have been more inclined to answer the “belief” and “barrier” questions in a positive light because they knew the clinic research assistant conducting the structured survey. However this is unlikely as rural participants did not always portray the clinic or their provider in a positive light; in fact, they were more likely to report they had never received a physician recommendation, screening education or FOBT kit.

Our finding that the majority of FQHC patients have positive beliefs about FOBTs and perceive few barriers to their use provides a strong incentive for community clinics to incorporate a clinic system of recommending and providing FOBTs annually. Because rural participants’ FOBT beliefs were more positive, such interventions might be particularly effective in rural clinics. A previous paper⁶¹ by our team found that patients who had been given an FOBT kit were significantly more likely to report completing at least one FOBT. This provides further evidence that interventions should seek ways to ensure physicians or community clinic staff give patients a kit annually. Of note, given the limited knowledge of CRC tests by our participants and those in other studies, every effort should be made to also give patients information about FOBTs along with the kit.

Practical interventions that take into consideration the unique differences in culture and resources among rural and urban FQHC settings are needed. Such clinical and public health interventions should be tailored to be acceptable to community clinic patients and providers and should acknowledge facilitators and barriers to screening. These interventions need to better inform patients and provide them with the tools they need to complete CRC screening. Such interventions, particularly in resource poor, rural areas might help mitigate health disparities to CRC screening found in rural populations nationally. Future research is needed to determine which providers or clinic staff can consistently provide the screening recommendation, education and FOBT kit, especially given the current workload of FQHC clinics. In addition, more research on the effectiveness of outreach strategies, such as mailed educational pamphlets and FOBT kits, is needed to determine if these strategies assist in overcoming patient and health system barriers, particularly in rural areas.

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Table 1

Demographics

	Rural N (%)	Urban N (%)
Gender (p = .98)		
Female	541 (77.3%)	210 (77.2%)
Male	159 (22.7%)	62 (22.8%)
Race (p < .0001)		
African American	412 (58.9%)	242 (89.0%)
White	285 (40.7%)	30 (11.0%)
Hispanic	3 (0.4%)	0 (0.0%)
Age (p = .023)		
50–59	464 (66.2%)	156 (56.9%)
60–69	180 (25.7%)	87 (31.8%)
70+	57 (8.1%)	31 (11.3%)
Marital Status (p < .0001)		
Single	179 (25.6%)	103 (37.9%)
Married	279 (39.9%)	54 (19.9%)
Separated	42 (6.0%)	24 (8.8%)
Divorced	107 (15.3%)	50 (18.4%)
Widowed	93 (13.3%)	41 (15.1%)
Last Grade Completed (p = .76)		
Less than high school	236 (33.7%)	82 (30.2%)
High school graduate	311 (44.4%)	128 (47.1%)
Some college	115 (16.4%)	46 (16.9%)
College graduate and above	38 (5.4%)	16 (5.9%)
Literacy Level (p = .0002)		
< 9th grade	332 (47.7%)	166 (61.2%)
> 9th grade	364 (52.3%)	105 (38.8%)
Have you seen a doctor in last 12 months? (p = .463)		
Yes	622 (88.9%)	239 (87.9%)
No	75 (10.7%)	33 (12.1%)

Table 2

Beliefs

	Rural N (%)	Urban N (%)
If you had CRC, would you want to know about it? (p = .006, multivariate p = .81)		
Yes	630 (91.3%)	220 (87.7%)
No	32 (4.6%)	25 (10.0%)
Don't know	28 (4.1%)	6 (2.4%)
How worried are you that you might find out you have CRC? (p < .0001, multivariate p = .016)		
Very worried	39 (5.7%)	5 (2.0%)
Somewhat worried	140 (20.3%)	31 (12.4%)
Not worried	269 (39.0%)	86 (34.3%)
Not worried at all	221 (32.0%)	124 (49.4%)
Don't know	21 (3.0%)	5 (2.0%)
I feel I will get CRC sometime during my life. (p = .038, multivariate p = .98)		
Strongly agree	13 (1.9%)	1 (0.4%)
Agree	184 (26.7%)	66 (26.3%)
Disagree	292 (42.3%)	117 (46.6%)
Strongly disagree	83 (12.0%)	16 (6.4%)
Don't know	118 (17.1%)	51 (20.3%)
Having an FOBT will help me find colon and rectal problems early. (p < .0001, multivariate p = .0002)		
Strongly agree	179 (25.9%)	14 (5.6%)
Agree	485 (70.3%)	223 (88.8%)
Disagree	5 (0.7%)	3 (1.2%)
Strongly disagree	0 (0.0%)	2 (0.8%)
Don't know	21 (3.0%)	9 (3.6%)
Having an FOBT will decrease my chances of dying from CRC. (p = .002, multivariate p = .29)		
Strongly agree	115 (16.7%)	18 (7.2%)
Agree	443 (64.2%)	180 (71.7%)
Disagree	75 (10.9%)	23 (9.3%)
Strongly disagree	7 (1.0%)	4 (1.6%)
Don't know	50 (7.3%)	26 (10.4%)

Table 3**Barriers**

	Rural N (%)	Urban N (%)
I am afraid the FOBT instructions will be confusing. (p = .0005, multi-variate p = .002)		
Strongly agree	3 (0.4%)	0 (0.0%)
Agree	58 (8.4%)	20 (8.0%)
Disagree	496 (71.9%)	211 (84.1%)
Strongly disagree	84 (12.2%)	10 (4.0%)
Don't know	49 (7.1%)	10 (3.9%)
Doing FOBT is embarrassing. (p = .003, multivariate p = .003)		
Strongly agree	3 (0.4%)	2 (0.8%)
Agree	78 (11.3%)	36 (14.3%)
Disagree	504 (73.0%)	198 (78.9%)
Strongly disagree	79 (11.5%)	9 (3.6%)
Don't know	26 (3.8%)	6 (2.4%)
Doing an FOBT is a lot of trouble. (p < .0001, multivariate p < .0001)		
Strongly agree	3 (0.4%)	1 (0.4%)
Agree	45 (6.5%)	27 (10.8%)
Disagree	494 (71.6%)	205 (81.7%)
Strongly disagree	80 (11.6%)	10 (4.0%)
Don't know	68 (9.9%)	8 (3.2%)
Doing an FOBT is messy. (p < .0001, multivariate p < .0001)		
Strongly agree	8 (1.2%)	2 (0.8%)
Agree	118 (17.1%)	68 (27.1%)
Disagree	392 (56.8%)	158 (63.0%)
Strongly disagree	60 (8.7%)	4 (1.6%)
Don't know	112 (16.2%)	19 (7.6%)

Table 4

Receipt of Recommendation/Education/FOBT Kit and FOBT Completion

	Rural N (%)	Urban N (%)
Has a doctor ever recommended that you get tested/screened for colon cancer? (p = .033, multivariate p = .21)		
Yes	251 (36.4%)	113 (45.0%)
No	430 (62.3%)	133 (53.0%)
Don't know	9 (1.3%)	5 (2.0%)
Have you ever been given information or education on either of the FOBT tests? (p < .0001, multivariate p = .002)		
Yes	100 (14.5%)	81 (32.3%)
No	579 (83.9%)	163 (65.0%)
Don't know	11 (1.6%)	7 (2.8%)
Has a doctor ever given you one of the FOBT kits or stool tests? (p < .0001, multivariate p < .0001)		
Yes	156 (22.6%)	121 (48.2%)
No	525 (76.1%)	127 (50.6%)
Don't know	9 (1.3%)	3 (1.2%)
Have you ever seen an FOBT kit or stool test? (p < .0001, multivariate p < .0001)		
Yes	224 (32.5%)	153 (61.0%)
No	460 (66.8%)	95 (37.9%)
Don't know	6 (0.9%)	3 (1.2%)
Have you ever done an FOBT kit or stool test? (p < .0001, multivariate p = .001)		
Yes	152 (22.0%)	115 (45.8%)
No	534 (77.4%)	131 (52.2%)
Don't know	4 (0.6%)	5 (2.0%)

Note.

Univariate p-values in parentheses are by Fisher exact test

Multivariate p-values are by logistic regression and adjust for age, race, and literacy