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Underuse of Colorectal Cancer Screening Among Men Screened for Prostate Cancer:

A Teachable Moment?

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Abstract

BACKGROUND—Evidence suggests that colorectal cancer (CRC) screening reduces disease-specific mortality, whereas the utility of prostate cancer screening remains uncertain. However, adherence rates for prostate cancer screening and CRC screening are very similar, with population-based studies showing that approximately 50% of eligible US men are adherent to both tests. Among men scheduled to participate in a free prostate cancer screening program, the authors assessed the rates and correlates of CRC screening to determine the utility of this setting for addressing CRC screening nonadherence.

METHODS—Participants (N = 331) were 50 to 70 years old with no history of prostate cancer or CRC. Men registered for free prostate cancer screening and completed a telephone interview 1 to 2 weeks before undergoing prostate cancer screening.

RESULTS—One half of the participants who underwent free prostate cancer screening were eligible for but nonadherent to CRC screening. Importantly, 76% of the men who were nonadherent to CRC screening had a regular physician and/or health insurance, suggesting that CRC screening adherence was feasible in this group. Furthermore, multivariate analyses indicated that the only significant correlates of CRC screening adherence were having a regular physician, health insurance, and a history of prostate cancer screening.

CONCLUSIONS—Free prostate cancer screening programs may provide a teachable moment to increase CRC screening among men who may not have the usual systemic barriers to CRC screening, at a time when they may be very receptive to cancer screening messages. In the United States, a large number of men participate in annual free prostate cancer screening programs and represent an easily accessible and untapped group that can benefit from interventions to increase CRC screening rates.

Keywords

colorectal cancer; prostate cancer; cancer screening; teachable moment

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Prostate cancer (PCa) and colorectal cancer (CRC) are the second and third leading causes of cancer death, respectively.[1] Although substantial evidence suggests that CRC screening is effective in reducing disease-related mortality,[2-7] the effectiveness of PCa screening remains uncertain.[8,9] As a result, CRC screening is widely recommended by all major medical organizations.[4,6,10] However, for PCa screening, the US Preventive Services Task Force has stated that there is not enough evidence to make a recommendation for or against PCa screening for men younger than 75 years, and that physicians and patients should make a shared decision.[11] Despite these differences in evidence and in recommendations, adherence rates are very similar, with about ½ of age-eligible US men adherent to PCa screening[1] and to CRC screening.[12-15] The 2006 Behavioral Risk Factors Surveillance System reported that 61.5% of men aged 50 years or older in the United States were adherent to CRC screening,[13] and 55.4% of men aged 50 year and older had had a prostate-specific antigen (PSA) blood test in the past year.[4]

Several studies have assessed the predictors of CRC screening, reporting that higher education,[16-27] a usual source of care,[12,16,19-26] a physician recommendation,[17,23,28,29] being insured,[12,16,19,22-24,26-28,30] a higher income,[16,18,19,22,24,27,30] exercise and other positive health behaviors,[16,19,26,27] older age,[16,19,21,23,25-27] and a recent PSA test[12,21,23,25,31] are all positively associated with CRC screening. There have been conflicting results regarding CRC screening adherence and self-reported health status,[12,17,19,20] as well as among former smokers,[18,23,26] although current smoking has consistently predicted lower CRC screening adherence.[16,26,30]

There have also been conflicting findings regarding race differences for CRC screening, with some studies showing no race differences,[16,25,27] others showing lower adherence among African Americans,[20,32] and 1 study showing higher adherence among African American men.[12] Possible explanations for these conflicting findings include demographic differences in the samples studied, such as different ages[20] or socioeconomic status (SES) levels. Given the racial disparities in incidence and mortality of CRC,[33,34] it is particularly important to understand the impact of race and related factors on CRC screening behaviors.

Among a sample of men who had registered to undergo free PCa screening, we assessed the rates and sociodemographic correlates of prior CRC screening. The primary goal of this study was to determine whether free PCa screening programs, at which over 100,000 US men are screened each year,[35] might provide access to a large and easily accessible group of men who are aware of cancer early detection, but who are perhaps unaware of or nonadherent to CRC screening recommendations. Given the differences in cost, invasiveness, and preparation for screening of these 2 cancers, we evaluated whether a portion of men attending free PCa screening were eligible for but nonadherent to CRC screening, suggesting that PCa screening sites could serve as a teachable moment[12,36] for CRC screening education.

MATERIALS AND METHODS

Overview

This paper is based on a secondary data analysis of the baseline data from a randomized clinical trial (RCT) of a PCa screening patient decision aid.[37] Participants were men who had registered for free annual PCa screening programs held at Georgetown University Medical Center during September 2004 and September 2005, and at the monthly screenings held at Howard University Cancer Center between October 2004 and October 2005.[37] This study was approved by the Georgetown University/Medstar Oncology Institutional Review Board, and informed consent was obtained from all study participants. This report presents baseline analyses of the CRC screening histories of men enrolled for free PCa screening.

Subjects

Eligibility criteria for the RCT included men who were 40 to 70 years old, had no history of PCa, and were English-speaking. The participation rate for the RCT was 71% (543 of 763). For the present analysis, we were interested in CRC screening behavior; therefore, we excluded men with a history of CRC (n = 3) and men younger than 50 years (n = 170) to include only those eligible for CRC screening. In addition, as we were interested in examining race and SES differences in CRC screening, we excluded the groups that were too small to analyze separately: all non-African American minorities from both sites (n = 34) and white men from Howard University Cancer Center (n = 5). Therefore, our final sample included 128 white men from Georgetown University Medical Center, 106 African American men from Georgetown University Medical Center, and 97 African American men from Howard University Cancer Center, for a total of 331 participants.

Procedure

When men called to register for the free PCa screening program at Georgetown University Medical Center or Howard University Cancer Center, they were asked for permission to be contacted about participating in the PCa screening decision aid trial. One to 2 weeks before the screening date, the study staff called men who agreed to be contacted. After assessing eligibility and obtaining verbal consent, 15- to 20-minute baseline telephone interviews were conducted. The baseline telephone assessment was completed before both study randomization and the scheduled screening.

Measures

Demographic and medical information—Demographic information included date of birth, marital status, education, ethnicity, race, income, employment status, health insurance status, and having a regular physician. Medical information included personal history of cancer (eg, skin, lung, and bladder), comorbid illnesses, and family history of PCa.

Screening history—We assessed participants' history of CRC screening and PCa screening. For CRC screening, adherence was defined as having had 1 or more of the following: fecal occult blood test within the past year, flexible sigmoidoscopy in the past 5 years, a double-contrast barium enema test in the past 5 years, or a colonoscopy in the past 10 years. Having had any of those tests within the recommended time frame was classified as adherent; men who had ever had any of those tests but who were not currently adherent were classified as having been ever screened. PCa screening adherence was defined as having had a PSA and/or digital rectal examination (DRE) in the past year. Men were not asked to distinguish which of these 2 tests they had had. Men who reported having ever had a PSA blood test or a DRE but who were not currently adherent were classified as ever screened.

Attendance at scheduled PCa screening program—We assessed the percentage of men who attended the free PCa screening for which they had registered. Attendance at the screening was not used to define PCa screening adherence, but was used to determine the percentage of eligible men to whom a CRC screening intervention could be targeted.

Tobacco use—We assessed tobacco use with the item, "How would you describe your cigarette smoking habits?" Responses included: never smoked, former smoker, or current smoker.

Health-related quality of life—Health-related quality of life (HRQL) was measured using the Medical Outcomes Study SF-12.[38] The SF-12[38] is a widely used, 12-item generic

measure of quality of life composed of 2 subscales, the Mental Component Summary (MCS) and the Physical Component Summary (PCS). The 2-week test-retest reliability was .76 for the MCS and .89 for the PCS.[38] Higher scores indicate better general HRQL.[38] On the basis of normative data, the average score for US men (all ages combined) is 50.7 for the MCS and 51.2 for the PCS, both with a standard deviation of 10.[38]

Data Analyses

We conducted the data analyses in several steps. First, we conducted descriptive analyses of the sociodemographics, health-related variables, and screening variables. Next, we evaluated the relationship between the sociodemographics, health-related variables, and CRC screening behavior variables (both ever screened and screening adherence) using chi-square analyses. Third, variables that had a significant bivariate association with the screening behavior variables were included in a series of 2 logistic regression analyses. Because of a race by site confound (ie, African American men were accrued from 2 sites, of which 1 site was predominantly lower SES men [Howard University Cancer Center] and the other was predominantly middle to higher SES men [Georgetown University Medical Center], and a socioeconomically homogenous group of middle to upper-middle SES white men accrued from 1 site [Georgetown University Medical Center]), we created a race by site 3-level dummy-coded variable for use in the logistic regression analyses. Finally, because of the association between income and several other demographic variables (eg, education: chi-square [1, n = 295] = 43.9, $P < .01$; regular physician: chi-square [1, n = 296] = 3.8, $P = .051$; and health insurance: chi-square [1, n = 296] = 29.1, $P < .001$) and the amount of missing data on income (10.6%), we elected to include the above variables as proxies for income and to leave income out of the models to maintain the full sample size.

RESULTS

Descriptive Information

Table 1 presents the demographic, medical history, and quality of life variables for the entire sample (N = 331) and stratified by the 2 CRC screening behavior variables. Overall, participants were well educated (49.4% had a college degree or higher), and the majority were insured (77.3%) and had a regular physician (65.9%). About half (51.4%) were married and more than half (61.3%) were African American.

Utilization of CRC and PCa Screening Tests

Of the overall sample, 56.1% (n = 185) had ever been screened for CRC, and 50.9% (n = 168) were adherent to CRC screening (Table 1). CRC screening adherence was largely because of having had a colonoscopy in the past 10 years (88.1%; n = 148 of 168). Men were significantly more adherent to CRC screening (50.9%) than to PCa screening (45.0%; $P < .01$), although 82% of men had ever been screened for PCa, whereas only 56% had ever been screened for CRC ($P < .001$).

Table 1 presents the correlates of both CRC screening behaviors. Older age, higher education, higher income, having health insurance, having a regular physician, having a personal history of cancer, and self-reported mental health were all positively associated with both screening behaviors. Current smoking was negatively associated with both screening behaviors. Race and site were highly correlated with both screening behaviors, suggesting that both African American participants and participants from Howard University Cancer Center were less likely to have been screened. However, the 3-level race/site dummy-coded variable revealed that the 2 Georgetown University Medical Center groups had very similar rates of screening, whereas the Howard University Cancer Center

African American men had significantly lower rates of screening for both screening variables (Table 1).

Ever Screening and Adherence to Both PCa Screening and CRC Screening Exams

To determine the overlap of CRC screening and PCa screening utilization, we calculated the percentage of men who had been screened for both cancers versus only 1 cancer. Approximately one half (n = 175; 53.0%) of the overall sample had ever been screened for both CRC and PCa, whereas 14.8% (n = 50) had never been screened for either cancer. Very few men (n = 10; 3%) reported having ever been screened for CRC but never screened for PCa, whereas almost ⅓ (n = 96; 29.1%) had only been screened for PCa. Regarding the extent to which men were adherent to both PCa screening and CRC screening, almost ⅓ (n = 102; 30.6%) were adherent for both cancers, whereas another ⅓ (n = 114; 34.5%) were not adherent for either. Another 20.3% (n = 67) were adherent to CRC screening but not to PCa screening, and 14.5% (n = 48) were adherent to PCa screening but not CRC screening. This description of the overlap between CRC screening and PCa screening utilization suggests that although the overall rates of utilization are similar, there is substantial underutilization of CRC screening, even among those who have ever had or are adherent to PCa screening.

Of the sample of 331 men, 79.2% (n = 262) attended the free PCa screening program as scheduled, and of those, almost half (46.6%; n = 122 of 262) were nonadherent to CRC screening. We assessed whether the usual systemic barriers to CRC screening adherence may have been a factor in this sample. Importantly, 76% (93 of 122) of men nonadherent to CRC screening had either a regular physician (49.2%, n = 60) and/or health insurance (68.9%, n = 84), suggesting that CRC screening adherence was feasible for the men who attended the PCa screening program.

Colorectal Cancer Screening Behaviors: Correlates of Ever Screening and Adherence

To predict ever versus never screening for CRC, we entered the significant bivariate predictors of CRC screening (Table 1) into a logistic regression model. Having health insurance, having a regular physician, and having ever been screened for PCa all significantly increased the odds of having ever been screened for CRC (Table 2). The other significant bivariates did not remain in the model.

Similarly, we entered the significant bivariate predictors into a logistic regression model predicting CRC screening adherence. As found for the CRC ever screening model, this analysis also revealed that having health insurance, having a regular physician, and being adherent to PCa screening significantly increased the likelihood of being adherent to CRC screening (Table 2).

DISCUSSION

Mass screening programs for PCa attract large numbers of men who are concerned about their health,[39] thereby providing an opportunity to address adherence to other cancer-related behaviors. In the present study, ½ of the PCa screening participants were nonadherent to CRC screening, and 45% had never been screened for CRC, despite a large portion having access to care. This represents a missed opportunity for capitalizing on men's cancer-related health concerns, at a time when they may be primed to undergo CRC screening if presented with the opportunity and/or encouragement to do so. At the very least, they may be willing to participate in an intervention designed to address knowledge-based as well as psychological barriers to CRC screening.[12] Psychosocial and behavioral interventions have been shown to increase rates of CRC screening,[40-45] and it has been suggested that such

interventions, in conjunction with risk-factor modification and treatment interventions, can reduce mortality.[46]

This study confirmed prior findings regarding the underutilization of CRC screening, and extended these findings to a subgroup of men who were aware of the potential benefit of the early detection of cancer. Also consistent with previous research, we found that having a regular physician,[12,16,19-26] having health insurance,[12,16,19,22-28,46] and PCa screening adherence[12,21,23,25,31] were significant predictors of CRC screening adherence. Race was not significant in the multivariate models, which confirmed prior research suggesting that CRC screening and race are not related,[16,25,27] although it contradicted other studies that have found this relationship.[20,32] Importantly, race was significant in the multivariate model predicting adherence when we removed the SES-related variables from the analysis (ie, screening site, education, regular physician, and health insurance [data not shown]). These findings underscore the importance of including both race and SES within a given model, and may partially explain the contradictory findings regarding the association between race and CRC screening in the literature.

Several limitations should be considered in the interpretation of these results. As in many other cancer screening studies,[12,23] men were not asked to distinguish between tests given for screening purposes versus diagnostic purposes, and self-report data are not always reliable. Furthermore, a lack of generalizability would be a usual limitation of a study conducted with men who had attended a free PCa screening program and who had participated in a randomized trial. However, these limitations are a strength in this case, as we have identified that men who attend free PCa screening are in fact a population of interest for future studies of CRC screening interventions. Furthermore, the screening rates and the correlates of prior CRC screening were almost identical to several studies that used nationally representative samples,[12-15,21,23,24] suggesting that given the prevalence of PCa screening in the United States, men who undergo PCa screening are quite comparable to the general population.

The finding that the majority of the men who were nonadherent to CRC screening actually had access to screening (ie, health insurance and/or a regular physician), along with the finding that these same variables were highly significant correlates of CRC screening, is a potentially very important set of findings. These results indicate that CRC screening adherence was not limited by the usual systemic barriers, which opens the door for testing already proven CRC screening behavioral and psychosocial interventions in this population. As the number of US men who participate in free PCa screening programs exceeds 100,000 men annually,[35] they are a large and easily accessible group of men who could benefit from such programs.

Utilization of free PCa screening programs as a teachable moment to increase awareness and encourage CRC screening among men attending free PCa screening programs has not been explored to date. However, it is worth pursuing given the large number of men who are eligible and who could benefit from such an intervention. For example, free PCa screening programs provide the opportunity for men to receive 1 of the simplest yet most effective screening interventions for CRC screening, a physician recommendation to be screened.[17,26,47,48] Thus, utilization of the teachable moment should include the distribution of CRC screening educational materials at PCa screening programs, which would include addressing commonly reported barriers to receiving CRC screening, such as a lack of knowledge and awareness about the proven usefulness of the test[49] and embarrassment about the test.[47] Finally, the most practical use of the PCa screening setting as a teachable moment would be to provide information about local facilities that provide CRC screening, including phone numbers, websites, and information about insurance requirements as well as

sites for low-cost screening. As has been suggested for breast and cervical cancer screening settings,[12,50,51] using the PCa screening setting to provide such interventions could significantly improve CRC screening rates among this group and could provide a model for providing such interventions in other settings.

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CONFLICT OF INTEREST DISCLOSURES

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References

1. American Cancer Society. [July 17, 2009] Recent prostate-specific antigen (PSA) test prevalence (%), by educational attainment and health insurance status, men 50 years and older, US, 2001-2006. Cancer Statistics 2009: A Presentation From the American Cancer Society. [slide]. Available at: http://www.cancer.org/downloads/PRO/Cancer_Statistics_Slides_2009.ppt
2. Hardcastle JD, Chamberlain JO, Robinson MH, et al. Randomised controlled trial of faecal-occult-blood screening for colorectal cancer. Lancet. 1996; 348:1472–1477. [PubMed: 8942775]
3. Mandel, JS. [July 17, 2009] Screening for colon and rectal cancer. Available at: http://www.moffitt.org/moffittapps/ccj/v3n2/dept7.html
4. Smith RA, Cokkinides V, Eyre HJ. American Cancer Society guidelines for the early detection of cancer, 2009. CA Cancer J Clin. 2009; 59:27–41. [PubMed: 19147867]
5. U.S. Preventive Services Task Force. Guide to Clinical Preventive Services. 2. Baltimore, MD: Williams & Wilkins; 1996.
6. U.S. Preventive Services Task Force. Screening for colorectal cancer: recommendation and rationale. Ann Intern Med. 2002; 137:129–131. [PubMed: 12118971]
7. Winawer SJ, Flehinger BJ, Schottenfeld D, Miller DG. Screening for colorectal cancer with fecal occult blood testing and sigmoidoscopy. J Natl Cancer Inst. 1993; 85:1311–1318. [PubMed: 8340943]
8. Andriole GL, Crawford ED, Grubb RLI, et al. Mortality results from a randomized prostate-cancer screening trial. N Engl J Med. 2009; 360:1310–1319. [PubMed: 19297565]
9. Schroder FH, Hugosson J, Roobol MJ, et al. Screening and prostate-cancer mortality in a randomized European study. N Engl J Med. 2009; 360:1320–1328. [PubMed: 19297566]
10. Pignone M, Rich M, Teutsch SM, Berg AO, Lohr KN. Screening for colorectal cancer in adults at average risk: a summary of the evidence for the U.S. Preventive Services Task Force. Ann Intern Med. 2002; 137:132–141. [PubMed: 12118972]
11. U.S. Preventive Services Task Force. Screening for prostate cancer: U.S. Preventative Services Task Force Recommendation Statement. Ann Intern Med. 2008; 149:185–191. [PubMed: 18678845]
12. Carlos RC, Underwood W III, Fendrick AM, Bernstein SJ. Behavioral associations between prostate and colon cancer screening. J Am Coll Surg. 2005; 200:216–223. [PubMed: 15664097]
13. Centers for Disease Control and Prevention. Use of colorectal cancer tests—United States, 2002, 2004, and 2006. MMWR Morb Mortal Wkly Rep. 2008; 57:253–258. [PubMed: 18340331]
14. Sirovich BE, Schwartz LM, Woloshin S. Screening men for prostate and colorectal cancer in the United States: does practice reflect the evidence? JAMA. 2003; 289:1414–1420. [PubMed: 12636464]
15. Yeazel MW, Church TR, Jones RM, et al. Colorectal cancer screening adherence in a general population. Cancer Epidemiol Biomarkers Prev. 2004; 13:654–657. [PubMed: 15066933]
16. Ata A, Elzey JD, Insaf TZ, Grau AM, Stain SC, Ahmed NU. Colorectal cancer prevention: adherence patterns and correlates of tests done for screening purposes within United States populations. Cancer Detect Prev. 2006; 30:134–143. [PubMed: 16638628]

17. Farmer MM, Bastani R, Kwan L, Belman M, Ganz PA. Predictors of colorectal cancer screening from patients enrolled in a managed care health plan. Cancer. 2008; 112:1230–1238. [PubMed: 18266204]
18. Haque R, Quinn VP, Habel LA, et al. Correlates of screening sigmoidoscopy use among men in a large nonprofit health plan. Cancer. 2007; 110:275–281. [PubMed: 17559138]
19. Ioannou GN, Chapko MK, Dominitz JA. Predictors of colorectal cancer screening participation in the United States. Am J Gastroenterol. 2003; 98:2082–2091. [PubMed: 14499792]
20. Klabunde CN, Meissner HI, Wooten KG, Breen N, Singleton JA. Comparing colorectal cancer screening and immunization status in older Americans. Am J Prev Med. 2007; 33:1–8. [PubMed: 17572304]
21. Lemon S, Zapka J, Puleo E, Luckmann R, Chasan-Taber L. Colorectal cancer screening participation: comparisons with mammography and prostate-specific antigen screening. Am J Public Health. 2001; 91:1264–1272. [PubMed: 11499116]
22. Liang SY, Phillips KA, Nagamine M, Ladabaum U, Haas JS. Rates and predictors of colorectal cancer screening. Prev Chronic Dis. 2006; 3:A117. [PubMed: 16978492]
23. Meissner HI, Breen N, Klabunde CN, Vernon SW. Patterns of colorectal cancer screening uptake among men and women in the United States. Cancer Epidemiol Biomarkers Prev. 2006; 15:389–394. [PubMed: 16492934]
24. Nadel MR, Blackman DK, Shapiro JA, Seeff LC. Are people being screened for colorectal cancer as recommended? Results from the National Health Interview Survey. Prev Med. 2002; 35:199–206. [PubMed: 12202061]
25. Peterson NB, Murff HJ, Ness RM, Dittus RS. Colorectal cancer screening among men and women in the United States. J Womens Health (Larchmt). 2007; 16:57–65. [PubMed: 17324097]
26. Seeff LC, Nadel MR, Klabunde CN, et al. Patterns and predictors of colorectal cancer test use in the adult U.S. population. Cancer. 2004; 100:2093–2103. [PubMed: 15139050]
27. Shapiro JA, Seeff LC, Nadel MR. Colorectal cancer-screening tests and associated health behaviors. Am J Prev Med. 2001; 21:132–137. [PubMed: 11457633]
28. Matthews BA, Anderson RC, Nattinger AB. Colorectal cancer screening behavior and health insurance status (United States). Cancer Causes Control. 2005; 16:735–742. [PubMed: 16049812]
29. Shokar NK, Carlson CA, Weller SC. Factors associated with racial/ethnic differences in colorectal cancer screening. J Am Board Fam Med. 2008; 21:414–426. [PubMed: 18772296]
30. Thorpe LE, Mostashari F, Hajat A, et al. Colon cancer screening practices in New York City, 2003: results of a large random-digit dialed telephone survey. Cancer. 2005; 104:1075–1082. [PubMed: 16044401]
31. Griffith KA, McGuire DB, Royak-Schaler R, Plowden KO, Steinberger EK. Influence of family history and preventive health behaviors on colorectal cancer screening in African Americans. Cancer. 2008; 113:276–285. [PubMed: 18543276]
32. James TM, Greiner KA, Ellerbeck EF, Feng C, Ahluwalia JS. Disparities in colorectal cancer screening: a guideline-based analysis of adherence. Ethn Dis. 2006; 16:228–233. [PubMed: 16599375]
33. Cooper GS, Doug KT. Underuse of colorectal cancer screening in a cohort of Medicare beneficiaries. Cancer. 2008; 112:293–299. [PubMed: 18072273]
34. Rim SH, Seeff L, Ahmed F, King JB, Coughlin SS. Colorectal cancer incidence in the United States, 1999-2004: an updated analysis of data from the National Program of Cancer Registries and the Surveillance, Epidemiology, and End Results Program. Cancer. 2009; 115:1967–1976. [PubMed: 19235249]
35. Prostate Conditions Education Council. [July 17, 2009] About PCEC, History Page. Available at: http://www.prostateconditions.org/about-pcec#history
36. McBride CM, Ostroff JS. Teachable moments for promoting smoking cessation: the context of cancer care and survivorship. Cancer Control. 2003; 10:325–333. [PubMed: 12915811]
37. Taylor KL, Schwartz MD, Davis KM, et al. Prostate cancer screening: fostering informed decisions [abstract]. Ann Behav Med. 2007; 33:S012. Abstract 2033.
38. Ware J Jr, Kosinski M, Keller SD. A 12-Item Short-Form Health Survey: construction of scales and preliminary tests of reliability and validity. Med Care. 1996; 34:220–233. [PubMed: 8628042]

39. Taylor KL, Shelby R, Kerner J, Redd W, Lynch J. Impact of undergoing prostate carcinoma screening on prostate carcinoma-related knowledge and distress. Cancer. 2002; 95:1037–1044. [PubMed: 12209688]
40. Khankari K, Eder M, Osborn CY, et al. Improving colorectal cancer screening among the medically underserved: a pilot study within a federally qualified health center. J Gen Intern Med. 2007; 22:1410–1414. [PubMed: 17653808]
41. Lasser KE, Murillo J, Medlin E, et al. A multilevel intervention to promote colorectal cancer screening among community health center patients: results of a pilot study. BMC Fam Pract. 2009; 10:37. [PubMed: 19480698]
42. Marcus AC, Mason M, Wolfe P, et al. The efficacy of tailored print materials in promoting colorectal cancer screening: results from a randomized trial involving callers to the National Cancer Institute's Cancer Information Service. J Health Commun. 2005; 10(suppl 1):83–104. [PubMed: 16377602]
43. Myers RE, Sifri R, Hyslop T, et al. A randomized controlled trial of the impact of targeted and tailored interventions on colorectal cancer screening. Cancer. 2007; 110:2083–2091. [PubMed: 17893869]
44. Rutledge W, Gibson R, Siegel E, et al. Arkansas Special Populations Access Network perception versus reality—cancer screening in primary care clinics. Cancer. 2006; 107:2052–2060. [PubMed: 16977601]
45. Vogelaar I, van Ballegooijen M, Schrag D, et al. How much can current interventions reduce colorectal cancer mortality in the U.S.? Mortality projections for scenarios of risk-factor modification, screening, and treatment. Cancer. 2006; 107:1624–1633. [PubMed: 16933324]
46. Cokkinides VE, Chao A, Smith RA, Vernon SW, Thun MJ. Correlates of underutilization of colorectal cancer screening among U.S. adults, age 50 years and older. Prev Med. 2003; 36:85–91. [PubMed: 12473428]
47. O'Malley AS, Beaton E, Yabroff KR, Abramson R, Mandelblatt J. Patient and provider barriers to colorectal cancer screening in the primary care safety-net. Prev Med. 2004; 39:56–63. [PubMed: 15207986]
48. Stone EG, Morton SC, Hulscher ME, et al. Interventions that increase use of adult immunization and cancer screening services: a meta-analysis. Ann Intern Med. 2002; 136:641–651. [PubMed: 11992299]
49. Klabunde CN, Schenck AP, Davis WW. Barriers to colorectal cancer screening among Medicare consumers. Am J Prev Med. 2006; 30:313–319. [PubMed: 16530618]
50. Carlos RC, Fendrick AM, Ellis J, Bernstein SJ. Can breast and cervical cancer screening visits be used to enhance colorectal cancer screening? J Am Coll Radiol. 2004; 1:769–776. [PubMed: 17411698]
51. Carlos RC, Fendrick AM, Patterson SK, Bernstein SJ. Associations in breast and colon cancer screening behavior in women. Acad Radiol. 2005; 12:451–458. [PubMed: 15831418]

Table 1

Demographic Characteristics, Medical History, and Quality of Life Stratified by Colorectal Cancer Screening Behaviors

Variables	Categories	N	Overall %	CRCS Ever % Yes[a]	CRCS Adherent % Yes
Demographics					
Age, y	50-59	186	56.2	48.6[b]	42.7[c]
	60-70	145	43.8	65.5	61.4
Education	College degree+	167	50.6	50.0[d]	45.2[d]
	College degree	163	49.4	62.0	57.1
Race	White	128	38.7	63.8[d]	61.4[b]
	AA	203	61.3	51.2	44.3
Site	GUMC	234	70.7	61.8[c]	58.4[c]
	HUCC	97	29.3	42.3	33.0
3-level race by site dummy-coded variable	GUMC AA	106	32.0	59.4[b]	54.7[c]
	GUMC W	128	38.7	63.8	61.4
	HUCC AA	97	29.3	42.3	33.0
Married	Yes	170	51.4	65.1[c]	60.4[c]
	No	161	48.6	46.6	41.0
Employed	Yes	208	63.0	53.4	47.1
	No	122	37.0	60.3	57.0
Insured	Yes	256	77.3	63.5[c]	58.0[c]
	No	75	22.7	30.7	26.7
Regular doctor	Yes	218	65.9	68.7[c]	65.0[c]
	No	113	34.1	31.9	23.9
Income	<50 k	135	45.6	48.1[b]	43.0[d]
	>50 k	160	54.4	63.1	56.9
Medical history					
Family history PCa	Yes	64	19.3	57.1	55.6
	No	267	80.7	55.8	49.8
Personal history of other cancer	Yes	15	4.5	85.7[d]	85.7[b]
	No	316	95.5	54.7	49.4

Variables	Categories	N	Overall %	CRCS Ever % Yes[a]	CRCS Adherent % Yes
Comorbidities	0	228	71.9	54.4	50.0
	1+	89	28.1	56.8	48.9
Tobacco use	Never	139	42.0	54.3[b]	50.0[c]
	Former	123	37.2	66.7	61.8
	Current	69	20.8	40.6	33.3
Prior screening behavior					
CRCS ever	Yes	185	56.1	—	90.8[c]
	No	145	43.9	—	0.0
CRCS adherent[e]	Yes	168	50.9	—	—
	No	162	49.1	—	—
PCa screening ever	Yes	272	82.2	64.6[c]	59.4[c]
	No	59	17.8	16.9	11.9
PCa screening adherent	Yes	149	45.0	70.5[c]	67.8[c]
	No	182	55.0	44.2	37.0
Quality of life					
SF-12 PCS	≤53.9	159	48.0	57.0	53.8
	>53.9	172	52.0	55.2	48.3
SF-12 MCS	≤55.8	156	47.1	50.0[d]	44.2[d]
	>55.8	175	52.9	61.5	56.9

CRCS indicates colorectal cancer screening; AA, African American; GUMC, Georgetown University Medical Center; HUCC, Howard University Cancer Center; PCa, prostate cancer; SF-12, Medical Outcomes Study; PCS, Physical Component Summary; MCS, Mental Component Summary.

[a] Significance levels refer to significance testing for each of the 2 screening variables (ie, comparisons are within columns).

[b] $P < .01$.

[c] $P < .001$.

[d] $P < .05$.

[e] Total does not equal 331 due to missing data.

Table 2

Multivariate Analyses Predicting Ever Screening and Adherence for Colorectal Cancer Screening

	Ever (n = 329)		Adherence (n = 329)	
	OR	**95% CI**	**OR**	**95% CI**
Age (ref = 50-59 years)	1.19	0.69, 2.06	1.35	0.79, 2.30
Marital status (ref = not married)	1.28	0.74, 2.20	1.56	0.91, 2.66
Education (ref = lower)	1.26	0.69, 2.30	1.13	0.62, 2.05
Regular doctor (ref = no)	3.30[a]	1.89, 5.77	3.86[a]	2.18, 6.83
Health insurance (ref = no)	2.07[a]	1.09, 3.95	1.95[a]	1.01, 3.76
Race by site variables (ref = GUMC AA)	1.00		1.00	
Race by site (GUMC whites)	1.30	0.67, 2.55	1.68	0.86, 3.27
Race by site (HUCC AA)	0.94	0.48, 1.86	0.92	0.46, 1.86
Smoking (ref = never smokers)	1.00		1.00	
Smoking, former smoker	1.76[b]	0.99, 3.14	1.56	0.88, 2.75
Smoking, current smoker	1.41	0.65, 3.05	1.43	0.66, 3.12
MCS SF-12 (ref = low)	1.09	0.64, 1.86	0.88	0.52, 1.50
Prostate Cancer Screening adherence (ref = no)	7.73[a]	3.52, 16.93	2.97[a]	1.73, 5.08

CRCS indicates colorectal cancer screening; OR, odds ratio; CI, confidence interval; GUMC, Georgetown University Medical Center; AA, African American; HUCC, Howard University Cancer Center; MCS, Mental Component Summary; SF-12, Medical Outcomes Study.

[a] $P \leq .05$.

[b] $P \leq .10$.