Having a Personal Health Care Provider and Receipt of Colorectal Cancer Testing

Roberto Cardarelli, DO, MPH
Jennifer E. Thomas, BS
[1]University of North Texas Health Science Center at Fort Worth, Primary Care Research Institute, Fort Worth, Texas

ABSTRACT

PURPOSE We wanted to assess the relationship between having a personal health care provider and receiving colorectal cancer testing.

METHODS Self-reported data were obtained from the United States 2004 Behavioral Risk Factor Surveillance System. Men and women aged 50 years and older were included, and associations of having a personal health care provider, age, sex, race/ethnicity, education, income, and health insurance status with colorectal cancer testing were examined. Multiple logistic regression was performed on a final sample of 120,221 individuals.

RESULTS Having at least 1 personal health care provider significantly predicted up-to-date colorectal cancer testing in both the univariate (odds ratio [OR] = 3.96; 95% confidence interval [CI] 3.56-4.41) and multiple regression models (OR = 2.91; 95% CI 2.58-3.28). Age, sex, race/ethnicity, education, income, and health insurance were also significantly associated with up-to-date colorectal cancer testing.

CONCLUSIONS Having a personal health care provider was associated with up-to-date colorectal cancer testing. Efforts to increase and support the primary care workforce are needed to improve up-to-date colorectal cancer screening rates.

Ann Fam Med 2009;7:5-10. DOI: 10.1370/afm.904.

INTRODUCTION

Debate in the United States over health care reform is rampant, with many advocates claiming reform is a necessary step to revitalize a current nonfunctional health care system.[1] This debate has been a central focus for many Americans since reports ranked the US health care system last, or close to last, in satisfaction, health equity, access to care, and various health indicators, even though the United States is among the highest of all industrialized nations in spending for health care.[2] One component being promoted is universal health coverage in which a primary care workforce provides first-line health care services.

That primary care has a positive effect on population health has been shown in a landmark study by Starfield et al,[3] who found access to primary care prevents illness and death and results in more equitable health. In a preventive health care delivery system that some believe is fragmented and fundamentally flawed,[4] the Starfield et al findings lend support to improving rates of preventive health care screening. One such preventive screening test is for colorectal cancer. Colorectal cancer has garnered particular attention because it has low screening rates among men and women (approximately 50% in the United States) and accounts for 1 of the top 3 causes of cancer deaths.[5-7] Moreover, persistent colorectal cancer disparities exist, with African Americans suffering 15% and 40% higher incidence of and mortality from colorectal cancer, respectively, than whites.[8-13]

Further studies with a sample representative of the US population are needed to assess whether access to primary care clinicians improves colorec-

Conflict of interest: The authors declare no conflicts of interest related to the study or any of the related published material.

CORRESPONDING AUTHOR
Roberto Cardarelli, DO, MPH
UNTHSC, Primary Care Research Institute
855 Montgomery, 2nd Floor
Fort Worth, Texas 76107
rcardare@hsc.unt.edu

tal cancer screening rates beyond changes in socioeconomic factors and health insurance status. Hence, the purpose of our study was to assess the relationship between having a primary care clinician and up-to-date colorectal cancer testing after controlling for age, sex, race/ethnicity, education, income, and health insurance status using a national data set involving all 50 states.

METHODS

The Institutional Review Board of the University of North Texas Health Science Center approved this study. For purposes of data collection, we used the 2004 Behavioral Risk Factor Surveillance System (BRFSS) database. The BRFSS is a state-based surveillance system conducted by the Centers for Disease Control and Prevention (CDC). Trained interviewers collect self-reported data from a random sample of civilian, noninstitutionalized adults (1 per household) through a telephone interview. The questionnaire includes a core component, optional modules, and state-added questions. The core component is a standard set of 119 questions included by all states, and the optional modules contain questions on specific topics that states elect to include as part of their questionnaires. The 2004 median response rate was 52.7%.

Inclusion Criteria

The study included respondents from the 50 states that administered the 2004 BRFSS core module. Colorectal cancer screening starts at age 50 years, so we used data from respondents aged 50 years and older. Because we used 2004 BRFSS data, we followed the 2004 US Preventive Task Force recommendations. No maximum age was selected, as there were no definitive recommendations on this issue in 2004.

Dependent Variables

The outcome of interest was derived from responses to the colorectal cancer screening section. Respondents were asked 4 questions and were considered to be up-to-date if they had a fecal occult blood test within the previous year or had a sigmoidoscopy or colonoscopy within the previous 10 years. The BRFSS colorectal cancer screening questions did not allow sigmoidoscopy and colonoscopy to be separated as discrete tests, nor did it ask about double-contrast barium enema testing. The response was dichotomized as either "testing up-to-date" or "testing not up-to-date." The term *screening* was avoided in this study, because the BRFSS questions did not ask whether respondents received a colorectal cancer test for screening or diagnostic purposes. Nonetheless, a colorectal cancer test use was conceptualized as a proxy for screening.

Independent Variable

The primary independent variable was based on the question, "Do you have 1 person you think of as your personal doctor or health care provider?" Responses included "yes, only 1," "more than 1," or "no." It should be noted that the BRFSS did not differentiate among non–primary care clinician, primary care physician, or primary care mid-level clinician; hence, *personal health care provider* was the preferred term in this study to mirror the question that was asked in the BRFSS. Personal health care provider, however, is conceptualized as a proxy measure for primary care clinician in the current study, especially for responses that included "yes, only 1," because these responses reflect a more traditional primary care relationship. After missing data for personal health care providers were taken into account, there were 144,897 individuals remaining in study.

Covariates

The covariates included (1) age, (2) sex (male or female), (3) race/ethnicity (non-Hispanic white, non-Hispanic African American, non-Hispanic other, non-Hispanic multiracial, and Hispanic), (4) education level (not a high school graduate, high school graduate or greater), (5) annual household income level (less than $25,000, $25,000 or greater), and (6) having health insurance (yes or no).

Analysis

Descriptive statistics were calculated for the participants using weighted population percentages. χ^2 Statistics and analyses of variance were used to test for differences between having a personal health care provider and categorical and continuous variables, respectively. Univariate logistic regression analyses were conducted to determine the association between the dependent and independent variables. Next, multiple logistic regression analysis was conducted to control for confounding covariates. Covariates that were significantly associated with up-to-date colorectal cancer testing or known as independent predictors in previous studies were included in the multiple logistic regression model.

Unadjusted and adjusted odds ratios and 95% confidence intervals were calculated for the univariate and multiple logistic regression analyses, respectively. Tests for collinearity were conducted, and no collinear relationships were identified in the final model. Interactions terms using "having a personal health care provider" and each covariate were introduced into the final model, none of which were found to be statistically significant.

The final sample size used in the multiple logistic regression analysis included 120,221 individuals after missing data were taken into account. All analyses were

conducted using the Complex Sample Module, SPSS version 14.0 (SPSS, Inc, Chicago, Illinois, 2005), and the stratum, primary sampling units, and weights to take account of the complex sample design. Details of how weighting was calculated have been described in detail elsewhere.[14]

RESULTS

The final study population in the descriptive analyses included 144,897 respondents, of which 9.3% (n = 13,461) reported having no personal health care provider. Compared with those who had no personal health care provider, those with at least 1 personal health care provider were older, female, primarily non-Hispanic and white; they had a higher level of education and income and had health insurance; and they were more likely to have received up-to-date colorectal cancer testing (Table 1).

Results of the univariate and multivariate logistic regression analyses are displayed in Table 2. In the univariate analyses those who reported 1 or more than 1 personal health care provider were approximately 4 times more likely to be up-to-date for colorectal cancer testing compared with those without such a provider. In addition, for every 1-year increase in age, there was a 4% increase in up-to-date colorectal cancer testing. Moreover, non-Hispanic African Americans, non-Hispanic other, and Hispanics were 15%, 42%, and 49%, respectively, less likely to be up-to-date for colorectal cancer testing compared with non-Hispanic whites. Not graduating from high school and annual incomes of less than $25,000 were also significantly associated with not being up-to-date for colorectal cancer testing. Those with health insurance were more than 3 times more likely to be up-to-date for colorectal cancer testing. Non-Hispanic multiracial ethnicity and sex were the only variables not associated with up-to-date for colorectal cancer testing.

After taking age, sex, race/ethnicity, education, income, and health insurance status into account, having a personal health care provider remained the most important predictor for being up-to-date for colorectal cancer testing in the multivariate model. That is, those with 1 or more than 1 personal health care provider were approximately 3 times more likely to be up-to-date for colorectal cancer testing. Although other covariates remained, or became, significant predictors,

Table 1. Population Characteristics, 2004 United States BRFSS

Variables	1 PHP (n = 116,349)[a]	>1 PHP (n = 15,087)	No PHP (n = 13,461)	*P* Value	Total (N = 144,897)
Age, mean (SD), y	64.7 (10.5)	66.2 (10.6)	61.6 (9.9)	<.001	4.6 (10.5)
Sex, %				<.001	
Female	55.8	54.3	43.6		54.5
Male	44.2	45.7	56.4		45.5
Race/ethnicity, %				<.001	
Non-Hispanic white	80.2	77.3	65.6		78.5
Non-Hispanic African American	8.0	8.6	10.2		8.3
Non-Hispanic Other	3.0	3.2	3.9		3.1
Non-Hispanic multiracial	1.2	1.7	1.5		1.2
Hispanic	7.6	9.1	18.8		8.8
Education level, %				<.001	
Not graduate high school	12.4	15.2	21.8		13.5
High school graduate or greater	87.6	84.8	78.2		86.5
Income, %				<.001	
<$25,000	30.6	35.7	47.2		32.7
≥$25,000	69.4	64.3	52.8		67.3
Health Insurance, %				<.001	
Yes	94.6	95.2	67.1		92.1
No	5.4	4.8	32.9		7.9
Up-to-date colorectal cancer testing,[b] %				<.001	
Yes	59.3	62.5	26.9		56.6
No	40.7	37.5	73.1		43.4

BRFSS = Behavioral Risk Factor Surveillance System; PHP = personal health care provider.

Note: χ^2 Statistics and analyses of variance were used for categorical and continuous variables, respectively.

[a] Percentages in this column are weighted.

[b] Up-to-date colorectal cancer testing defined as fecal occult blood test within the last 1 year or sigmoidoscopy or colonoscopy in the past 10 years.

Table 2. Logistic Regression Analyses of Predictors of Up-to-Date Colorectal Cancer Testing (2004 United States BRFSS)

	Unadjusted N = 144,897		Adjusted n = 120,221[a]	
Variables	**OR**	**95% CI**	**OR**	**95% CI**
Personal health care provider				
None (reference group)	1.00	1.00	1.00	1.00
1	3.96	3.56-4.41	2.91	2.58-3.28
More than 1	4.52	3.96-5.16	3.26	2.80-3.79
Age	1.04	1.03-1.04	1.04	1.04-1.04
Sex				
Female (reference group)	1.00	1.00	1.00	1.00
Male	1.04	0.99-1.10	1.13	1.06-1.20
Race/ethnicity				
Non-Hispanic white (reference group)	1.00	1.00	1.00	1.00
Non-Hispanic African American	0.85	0.77-0.95	1.17	1.04-1.32
Non-Hispanic other	0.58	0.47-0.72	0.71	0.57-0.90
Non-Hispanic multiracial	0.89	0.68-1.16	1.14	0.85-1.55
Hispanic	0.51	0.44-0.58	0.75	0.64-0.88
Education level				
High school or greater (reference group)	1.00	1.00	1.00	1.00
Not graduate high school	0.61	0.56-0.67	0.72	0.65-0.81
Income				
≥$25,000 (reference group)	1.00	1.00	1.00	1.00
<$25,000	0.70	0.66-0.74	0.69	0.64-0.74
Health Insurance				
No (reference group)	1.00	1.00	1.00	1.00
Yes	3.49	3.13-3.89	1.84	1.62-2.08

BRFSS = Behavioral Risk Factor Surveillance System; CI = confidence interval; OR = odds ratio.

Note: Up-to-date colorectal cancer testing defined as fecal occult blood test within the last 1 year or, sigmoidoscopy or colonoscopy in the past 10 years.

[a] Based on missing data for the entire adjusted model.

having a personal health care provider had the highest odds of predicting being up-to-date for colorectal cancer testing. In fact, in the multivariate analysis, the odds of being up-to-date for colorectal cancer testing among those with health insurance status decreased to 1.84 (compared with an odds ratio of 3.49 in the univariate analysis). Other noteworthy changes from the univariate analyses include non-Hispanic African Americans and males are now 17% and 13% more likely to receive up-to-date colorectal cancer tests compared with non-Hispanic whites and females, respectively.

DISCUSSION

The results of this nationally representative study contribute to the published literature about the impact of primary care on colorectal cancer screening. In fact, having a personal health care provider was found to be the greatest predictor of being up-to-date for colorectal cancer testing regardless of race/ethnicity, education, income, and health insurance status. These findings suggest that policy-driven initiatives to ensure all people, regardless of socioeconomic and health insurance status, have access to a primary care clinician may be a strategic method to improving colorectal cancer screening rates and other health service outcomes. Studies have found physicians' recommendation is one of the greatest predictors of colorectal cancer screening.[15-22] Our findings also support that most people in the United States want a medical home, even though a medical home was not specifically addressed in the 2004 BRFSS.[23] Although having a personal health care provider (or medical home) and a physician recommendation may be closely related factors, they may function as 2 distinct constructs. That is, one may function as a system factor, whereas the other may function as a physician-related factor. For example, physician recommendation becomes a moot issue if the patient does not have a medical home or someone he or she considers as a primary care clinician.

Nonetheless, the findings of this study do not diminish that being up-to-date in cancer screening is a multifaceted problem, because this study does not account for patient-level, clinician-level, and environmental-level factors.[24-33] The purpose of our study was to assess system-level factors that are known to contribute to health care delivery outcomes, such as cancer screening. Previous studies have found patient-level factors (ie, lack of knowledge),[24,25] clinician-level factors (ie, offering colorectal cancer screening),[22,26-28] socioeconomic factors (ie, education, income),[29-31] and system-level factors (ie, health insurance status)[32,33] to be barriers and facilitators to colorectal cancer screening. Ross et al found lack of health insurance to be associated with a significant decrease in use of preventive services.[34] Their study, however, did not assess whether having a primary care clinician moderated the results. In fact, an assumption is often made in most health service studies that health insurance status and having a primary care clinician are proxy measures of a similar construct. Another study by Etzoni et al concluded that insurance coverage and having a usual source of care were the most important predictors of colorectal cancer testing.[32] They used a composite measure that included both variables in their study, however, which made it difficult to assess the independent effects of

each factor on colorectal cancer screening. A study of more than 55,000 women enrolled in the Women's Health Initiative Observational Study found having a usual source of care to be one of the strongest predictors in colorectal cancer screening after accounting for multiple variables, including insurance status and type.[30] The present study corroborates these findings in that health insurance status and having a personal health care provider function as 2 independent factors affecting up-to-date colorectal cancer testing.

Eradicating health disparities is a primary Healthy People 2010 objective, and creating evidence about contributing factors may result in health-policy-driven solutions.[35] Shi et al conducted an ecologic study that found primary care had an impact on health indicators by modifying the adverse effect of income inequality.[36] The results of our study support this conclusion as well. Non-Hispanic African Americans were significantly less likely to be up-to-date for colorectal cancer testing in the univariate analysis; however, non-Hispanic African Americans were significantly more likely to be up-to-date for colorectal cancer testing compared with non-Hispanic whites after controlling for having a personal health care provider, education, income, age, sex, and health insurance status. A study by Coughlin et al found that differences between whites and blacks in having a fecal occult blood test within the past year in the southern United States no longer existed after accounting for the study's covariates, including health insurance status and seeing a physician within the past year.[37] In fact, seeing the physician was the greatest predictor of having the screening test.

There are several limitations to this study. As with any self-reported survey, the data are subject to recall and other biases, including overreporting cancer screening status.[38] The possibility exists for incorrect interpretation of questions, variations in interview techniques, nonresponses, and data-coding errors. In addition, although telephone surveys are easy to conduct and cost-effective, they may introduce potential biases. Those households without a home telephone are more likely to include persons who have lower incomes and less education, who live in rural areas, and who are in poor health, which casts doubt on the generalizability of the findings to the national population. The BRFSS accounts for such variance by poststratification and weighting adjustments to the data. It also attempts to minimize such errors by using a large sample size, as well as imposing quality assurance measures. In addition, as mentioned earlier, personal health care provider does not differentiate primary care from non–primary care or physician from mid-level clinicians. The authors stratified the response of having a personal health care provider as "1," "more than 1," and "no" to identify a more traditional primary care relationship (ie, having 1 primary care clinician). Another consideration is that selecting "more than 1" may indicate 2 primary care clinicians working in the same clinic or 1 being a specialist, especially among older responders. Although we do not feel this factor affects the overall findings or conclusions of the study, it is worth noting.

This study attempted to mirror the 2004 US Preventive Services Task Force recommendations (because the 2004 BRFSS was used) for colorectal cancer screening,[39] but the BRFSS questions did not include barium enema testing and did not distinguish sigmoidoscopy from colonoscopy testing, because recommended screening intervals differ (5 years vs 10 years, respectively). A common limitation to research using secondary cross-sectional data is the inability to correctly assess up-to-date vs adequacy of colorectal cancer screening. For example, a 70-year-old man who had a fecal occult test within the last year would be classified as up-to-date but not necessarily adequately screened. If this screening test was his first for colorectal cancer (by any modality), he technically would have been inadequately screened, because testing should have commenced at the age of 50 years with appropriate follow-up intervals. In addition, as discussed earlier, the BRFSS colorectal cancer questions asked about test use but did not differentiate the purpose of having the test(s) (screening or diagnostic). Further studies are needed that investigate colorectal cancer screening and diagnostic testing separately. Finally, the cross-sectional nature of this study precludes any determinations of causality.

To read or post commentaries in response to this article, see it online at http://www.annfammed.org/cgi/content/full/7/1/5.

Key words: Health care delivery; health services research; primary health care; access to health care; health services accessibility; colorectal cancer; health promotion; screening

Submitted February 19, 2008; submitted revised May 27, 2008; accepted June 30, 2008.

Disclaimer: The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Center on Minority Health and Health Disparities or the National Institutes of Health.

Funding support: The project described was supported in part by grant number P20MD001633 from the National Center on Minority Health and Health Disparities.

References

1. Halvorson G. *Health Care Reform Now: A Prescription for Change*. San Francisco, CA: Jossey-Bass Publications; 2007.
2. Starfield B. Is US health really the best in the world? *JAMA*. 2000; 284(4):483-485.

3. Starfield B, Shi L, Macinko J. Contribution of primary care to health systems and health. *Milbank Q*. 2005;83(3):457-502.
4. Wender RC. Barriers to screening for colorectal cancer. *Gastrointest Endosc Clin N Am*. 2002;12(1):145-170.
5. Jemal A, Murray T, Ward E, et al. Cancer statistics, 2005. *CA Cancer J Clin*. 2005;55(1):10-30.
6. *Colorectal Facts and Figures*. Atlanta, GA: American Cancer Society; 2005.
7. Cooper GS, Doug KT. Underuse of colorectal cancer screening in a cohort of Medicare beneficiaries. *Cancer*. 2008;112(2):293-299.
8. Ghafoor A, Jemal A, Cokkinides V, et al. Cancer statistics for African Americans. *CA Cancer J Clin*. 2002;52(6):326-341.
9. Troisi RJ, Freedman AN, Devesa SS. Incidence of colorectal carcinoma in the US: an update of trends by gender, race, age, subsite, and stage, 1975-1994. *Cancer*. 1999;85(8):1670-1676.
10. Theuer CP, Wagner JL, Taylor TH, et al. Racial and ethnic colorectal cancer patterns affect the cost-effectiveness of colorectal cancer screening in the United States. *Gastroenterology*. 2001;120(4):848-856.
11. Parker SL, Davis KJ, Wingo PA, Ries LA, Heath CW Jr. Cancer statistics by race and ethnicity. *CA Cancer J Clin*. 1998;48(1):31-48.
12. *Cancer Facts & Figures for African Americans 2005-2006*. Atlanta, GA: American Cancer Society; 2005.
13. *Cancer Prevention & Early Detection Facts and Figures*. Atlanta, GA: American Cancer Society; 2005.
14. National Center for Chronic Disease Prevention and Health Promotion. BRFSS Annual Survey Data Survey Data and Documentation: BRFSS Weighting Formula. 2008. http://www.cdc.gov/brfss/technical_infodata/weighting.htm.
15. Klabunde CN, Frame PS, Meadow A, Jones E, Nadel M, Vernon SW. A national survey of primary care physicians' colorectal cancer screening recommendations and practices. *Prev Med*. 2003;36(3):352-362.
16. Levy BT, Dawson J, Hartz AJ, James PA. Colorectal cancer testing among patients cared for by Iowa family physicians. *Am J Prev Med*. 2006;31(3):193-201.
17. Janz NK, Wren PA, Schottenfeld D, Guire KE. Colorectal cancer screening attitudes and behavior: a population-based study. *Prev Med*. 2003;37(6 Pt 1):627-634.
18. Mandelson MT, Curry SJ, Anderson LA, et al. Colorectal cancer screening participation by older women. *Am J Prev Med*. 2000;19(3):149-154.
19. Yepes-Rios M, Reimann JO, Talavera AC. Ruiz de EA, Talavera GA. Colorectal cancer screening among Mexican Americans at a community clinic. *Am J Prev Med*. 2006;30(3):204-210.
20. Klabunde CN, Schenck AP, Davis WW. Barriers to colorectal cancer screening among Medicare consumers. *Am J Prev Med*. 2006;30(4):313-319.
21. 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(10):2093-2103.
22. Brawarsky P, Brooks DR, Mucci LA, Wood PA. Effect of physician recommendation and patient adherence on rates of colorectal cancer testing. *Cancer Detect Prev*. 2004;28(4):260-268.
23. Grumbach K, Bodenheimer T. A primary care home for Americans: putting the house in order. *JAMA*. 2002;288(7):889-893.
24. Freeman HP, Chu KC. Determinants of cancer disparities: barriers to cancer screening, diagnosis, and treatment. *Surg Oncol Clin N Am*. 2005;14(4):655-669.
25. Friedman LC, Webb JA, Everett TE. Psychosocial and medical predictors of colorectal cancer screening among low-income medical outpatients. *J Cancer Educ*. 2004;19(3):180-186.
26. O'Malley AS, Forrest CB, Feng S, Mandelblatt J. Disparities despite coverage: gaps in colorectal cancer screening among Medicare beneficiaries. *Arch Intern Med*. 2005;165(18):2129-2135.
27. Christie J, Hooper C, Redd WH, et al. Predictors of endoscopy in minority women. *J Natl Med Assoc*. 2005;97(10):1361-1368.
28. Gilbert A, Kanarek N. Colorectal cancer screening: physician recommendation is influential advice to Marylanders. *Prev Med*. 2005;41(2):367-379.
29. Adams EK, Thorpe KE, Becker ER, Joski PJ, Flome J. Colorectal cancer screening, 1997-1999: role of income, insurance and policy. *Prev Med*. 2004;38(5):551-557.
30. Hsia J, Kemper E, Kiefe C, et al. The importance of health insurance as a determinant of cancer screening: evidence from the Women's Health Initiative. *Prev Med*. 2000;31(3):261-270.
31. 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(1):85-91.
32. Etzioni DA, Ponce NA, Babey SH, et al. A population-based study of colorectal cancer test use: results from the 2001 California Health Interview Survey. *Cancer*. 2004;101(11):2523-2532.
33. Subramanian S, Amonkar MM, Hunt TL. Use of colonoscopy for colorectal cancer screening: evidence from the 2000 National Health Interview Survey. *Cancer Epidemiol Biomarkers Prev*. 2005;14(2):409-416.
34. Ross JS, Bradley EH, Busch SH. Use of health care services by lower-income and higher-income uninsured adults. *JAMA*. 2006;295(17):2027-2036.
35. United States Department of Health and Human Services. *Healthy People 2010: Understanding and Improving Health*. Washington DC: US Government Printing Office; 2000.
36. Shi L, Starfield B, Kennedy B, Kawachi I. Income inequality, primary care, and health indicators. *J Fam Pract*. 1999;48(4):275-284.
37. Coughlin SS, Thompson TD, Seeff L, Richards T, Stallings F. Breast, cervical, and colorectal carcinoma screening in a demographically defined region of the southern U.S. *Cancer*. 2002;95(10):2211-2222.
38. Hall HI, Van Den Eeden SK, Tolsma DD, et al. Testing for prostate and colorectal cancer: comparison of self-report and medical record audit. *Prev Med*. 2004;39(1):27-35.
39. Agency for Healthcare Research and Quality. *Guide to Clinical Preventive Services, 2001-2004*. Rockville, MD: AHRQ; 2004.