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Racial and Ethnic Trends of Colorectal Cancer Screening Among Medicare Enrollees

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Abstract

Background—Colorectal cancer (CRC) screening rates have remained lower than the Healthy People 2010 goal particularly among minority populations. This study examined racial–ethnic trends in CRC screening and the continued impact of healthcare access indicators on screening differences after Medicare expanded coverage.

Methods—The study used data from the Medicare Current Beneficiary Survey for 2000, 2003 and 2005. The sample was restricted to non-Hispanic whites, non-Hispanic blacks, and Hispanics. The primary outcome was the proportion of enrollees who underwent lower-gastrointestinal endoscopy within 5 years and/or home fecal occult blood test within 1 year.

Results—Over the 6-year period under study, the proportion screened increased among each of the 3 racial–ethnic groups, but lower proportions of blacks and Hispanics underwent screening compared with whites at each time point. Hispanic–white differences persisted but black–white differences narrowed in 2003 and widened in 2005. In each survey year, racial differences attenuated after adjustment for type of supplemental health insurance, and disappeared after further adjustment for educational and income levels.

Conclusions—Despite expanding benefits for CRC screening, which would be expected to disproportionately benefit racial and ethnic minorities, racial disparities in use of screening persist due in part to differences in the types of health insurance coverage, education and income. There was a slight reversal of the initial attenuation of the black–white difference after the Medicare policy change. Efforts are needed to increase the reach of CRC screening to minority populations, particularly those lacking adequate health insurance coverage or with less education or income.

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Introduction

In the U.S., racial disparities in colorectal cancer (CRC) incidence and mortality have persisted, particularly for blacks.¹ Lower screening rates among some minority populations,^{2,3} are believed to be an important contributor to CRC disparities.^{1,4,5} The cost of medical care, lack of adequate health insurance coverage or lack of a usual source of health care impede CRC screening.^{6–13} However, few studies have addressed the influence of these factors on racial–ethnic differences in CRC screening over time.¹⁴

Medicare's policy change in July 2001 to expand CRC screening coverage for average-risk enrollees by reimbursing up to 80% of Medicare-allowed cost of colonoscopy provides an opportunity to conduct such a study.¹⁵ This policy change has likely contributed to an increase in use of CRC screening.^{3,6,10,12,16–18} This additional coverage primarily benefits those with previously limited coverage (i.e., fee-for-service plan holders)^{19,20} and would be expected to increase use of CRC screening among racial minorities and low-income enrollees as they are more likely to be on Medicare without supplemental insurance.²¹

A previous study by Shih et al. found narrowing of black–white differences in screening in 2003, but a widening of the Hispanic–white differences.¹² In contrast, Fenton et al. found a more rapid uptake of colonoscopy among whites and a widening racial gap in use of colonoscopy over the 1995–2003 period.¹⁶ Therefore, it is currently unclear whether racial–ethnic gaps in screening prior to 2001 continued to exist after the Medicare policy change.²² There are also limited data on the impact of healthcare access factors on racial–ethnic differences in the period before and after Medicare policy change.

This study examined: (1) racial and ethnic trends in CRC screening; and (2) the impact of healthcare access indicators on racial–ethnic differences in the period before and after Medicare expanded coverage for screening.

Methods

Study Participants and Data Collection

Data for this study were obtained from the Medicare Current Beneficiary Survey (MCBS),²³ an ongoing in-person interview of nationally representative samples of Medicare enrollees since 1991. The sampling scheme and methods for data collection in the MCBS have been described in detail.²³ This study used the MCBS Access to Care files on non-institutionalized beneficiaries who did not report a history of end-stage renal disease and CRC during 2000, 2003 and 2005 when questions on CRC were included in the survey. The samples were restricted to non-Hispanic whites (whites), non-Hispanic blacks (blacks), and Hispanics. The analyses were further restricted to those aged 65 to 80 years to exclude those receiving Medicare due to disability as has been described previously,²⁴ and to provide estimates for the population of enrollees likely to benefit from CRC screening.²⁵

Data elements

The survey collected information on participants' census division, residence in metropolitan service areas (MSA), age, gender, and marital status (never married, currently married, widowed, or divorced/separated), educational level (less than high school graduate, high school graduate and more than high school), annual household income (<\$25,000 vs ≥\$25,000), language of the interview (English or other languages), type of health insurance coverage (Medicare only, Medicare+Medicaid, Medicare HMO (HMO), or Medicare with employer-sponsored or self-purchased private supplemental insurance);²⁰ and the specialty of the physician that usually provides the care (primary care physicians (PCP), other physicians, or no usual place of health care). A variable on delayed medical care due to cost was derived

based on endorsement of any of the questions that asked whether a beneficiary delayed care in the previous year, did not have a usual place of care, did not see a doctor for a medical problem, or did not fill a prescription, due to cost. Participants were asked if they had a history of non-skin cancers and how they rated their general health compared to others in their age group.

Measures of CRC screening

Data on the use of CRC screening were derived from several items in the survey including questions on the “most recent sigmoidoscopy or colonoscopy” (endoscopy) or home fecal occult blood test (FOBT).^{22,24} The times of the most recent endoscopy and/or FOBT were recorded by the survey as <1 year ago, 1–2 years ago, 2–3 years ago, 3–5 years ago, or ≥5 years ago.

Data Analyses

Single predictor and multivariable logistic regression models were used to examine trends and racial–ethnic differences in CRC screening over the 2000–2005 period. CRC screening was defined as endoscopy within 5 years and/or FOBT within 1 year as has been described previously.²² The MCBS did not distinguish between sigmoidoscopy and colonoscopy, and did not include questions on use of barium enema or CT colonography. Trends in CRC screening were derived using pooled data from the 2000, 2003 and 2005 survey years.²⁶ The significance of changes over time was tested using the Wald test. Multivariable analyses, stratified by study year, were focused on understanding the degree to which factors related to access to health care (delay in seeking care due to cost, usual place of health care and type of health insurance coverage) explained racial–ethnic differences in CRC screening. Therefore, a base model was constructed comprising selected demographic and geographic variables followed by the sequential addition of predetermined sets of variables. Covariates considered for the base model included those listed in Table 1 as well as age, gender, marital status, language of interview, place of residence (MSA and census region), BMI, self-rated health, and history of non-skin cancers. *A priori* and model fit considerations were used in choosing variables for the multivariable model. Using this approach, BMI and census division were excluded from the final model. Plausible two-way interactions between covariates were carefully studied but they were neither significant, nor did they improve model fit.

A screening colonoscopy is recommended every 10 years and sigmoidoscopy every 5 years among people at average risk for CRC.^{27,28} In recent years, only a small proportion of Medicare beneficiaries underwent sigmoidoscopy.²⁹ Since the majority of those who had endoscopy more than 5 years prior to the interview date may have undergone colonoscopy, additional analyses were performed using a less conservative CRC screening variable defined as undergoing endoscopy anytime previously and/or FOBT within 1 year of the interview date. Cross-sectional survey weights and variance estimation procedures for complex survey design were used in the analyses, which were performed using STATA version.¹⁰ Missing values on education ($n=52$), income ($n=13$) and general health status ($n=79$) for eligible patients were replaced with dummy variables.

Results

Characteristics

The sample consisted of 8,025 enrollees who were interviewed in 2000, 7,545 in 2003 and 7,248 in 2005. Compared to whites, there was a higher proportion of women among blacks and Hispanics. Table 1 shows selected characteristics of the study population stratified by race–ethnicity. Blacks and Hispanics were less educated, had lower household incomes, and were less likely to have private or HMO insurance, or to have a PCP for usual health care.

In 2000, 36% of the enrollees with less than a high school education were on Medicare only or Medicare+Medicaid; but only 13% of high school graduates or 8% of those with more than high school education were on Medicare only or Medicare+Medicaid. About 64% of those on Medicare only and 73% on Medicare+Medicaid reported having PCPs compared to 85% of those in HMOs and 79% of those with private insurance. There were similar differences in 2003 and 2005 (data not shown).

Trends in CRC screening

Use of CRC screening increased significantly among all beneficiaries over the 6-year period (47% in 2000, 52% in 2003, and 55% in 2005, p -value for trend<0.01) and for each of the three racial/ethnic groups (Figure 1 and Table 1). However, Hispanics and blacks had lower screening rates than whites, and these differences persisted over the study period (Figure 1). Among blacks, there was a significant increase in the rate of screening from 2000 to 2003 (p -value=0.001) but not between 2003 and 2005 (p -value=0.46) (Figure 1). Thus, the white–black gap narrowed in 2003 but widened in 2005.

Factors contributing to differences

Table 2 shows sequentially adjusted estimates of racial–ethnic differences in CRC screening for the 3 study years. Compared to whites, blacks and Hispanics were less likely to undergo CRC screening and these differences were robust to adjustment for geo-demographic factors, delay in seeking care and usual place of health care. In 2000, the difference between blacks and whites was attenuated and no longer significant after further adjustment for type of health insurance in the model. With further adjustment for educational achievement and income in the model, blacks were equally as likely as whites to have undergone CRC screening. Compared to the relative black–white difference in 2000, the differences were reduced in 2003 and 2005 (Table 2), and were not significant even in unadjusted analyses. However, the difference was slightly larger in 2005 than in 2003.

Compared to whites, Hispanics were less likely to undergo CRC screening during each of the years studied and the differences were stable to adjustment for geo-demographic factors. The relative differences between Hispanics and whites were similar in each of the 3 survey years (Table 2), but the estimates were more stable in the latter years. During each of the study years, the differences were further attenuated with the addition of access to care indicators to the models and there were no differences after further adjustment for education and income.

Sensitivity analyses

In sensitivity analyses with CRC screening defined as ever undergoing endoscopy and/or FOBT within 1 year, the trends over the 6-year period were similar to those for the recent screening outcome. The overall screening rates were: 56% in 2000, 61% in 2003 and 65% by 2005. Racial–ethnic differences were similar to those described for the stricter definition of CRC screening, and they were attenuated after adjustment for geo-demographic variables and access to care indicators. The differences were not significant in the full model. Compared to whites, the AORs (95% CIs) for CRC screening among blacks was 0.90 (0.73, 1.10) in 2000, 0.98 (0.80, 1.21) in 2003 and 0.99 (0.79, 1.25) in 2005; and among Hispanics was 0.96 (0.73, 1.27) in 2000, 0.88 (0.69, 1.13) in 2003 and 0.83 (0.65, 1.05) in 2005.

Discussion

This study found that use of CRC screening among the Medicare beneficiaries studied has continued to increase from 2000 to 2005. However, the rates of increase varied by race and ethnicity resulting in complex patterns of disparities over time. Compared to whites, blacks had a greater increase in use of CRC screening between 2000 and 2003, resulting in a smaller

black–white difference in 2003 as has been reported in previous studies.¹² However, the gap widened slightly in 2005: among blacks, there was no significant increase in use of CRC screening between 2003 and 2005, while rates among whites continued to increase. This apparent slow down in the use of CRC screening among blacks between 2003 and 2005 is of concern, and suggests that the increasing trends observed in some previous studies¹⁶ may not continue. The Hispanic–white difference remained unchanged in 2005.

Previous studies have found CRC screening disparities by race,^{6,22} SES, and healthcare access.^{8,14} This study shows that the black–white differences changed over time, and most of the racial differences were explained by socioeconomic inequalities and differences in healthcare access. In contrast to previous studies,^{3,6,10,12,16–18} these findings highlight the need for continued attention to blacks and Hispanics. There are no clear explanations for the observed pattern of change in use of CRC screening among blacks between 2000 and 2005. It is plausible that the initial sharp increase in use of CRC screening was due in part to the Medicare policy change, which may have been augmented by celebrity promotion (such as Katie Couric)³⁰ and increasing recommendation by healthcare providers. “Wear-out”³¹ of effects of celebrity endorsements of screening colonoscopy may be a possible explanation for the slowdown in the rate of increase of CRC screening among blacks in the later study period. However, other factors including socioeconomic disadvantage may have contributed to the patterns observed.^{32,33} It is possible that these various factors differentially affected blacks compared to Hispanics, whose rates of screening were lower but increased steadily during the study period. Additional studies are needed to understand the underlying reasons for the observed differences and to determine if the trends continue.

This study also builds on previous reports.^{8,14} A study among Medicare beneficiaries in North and South Carolina found that racial differences were attenuated after adjusting for sociodemographic and healthcare access factors including health insurance.¹⁴ Data from the Behavioral Risk Factor Surveillance System, also showed persistent racial disparities in CRC screening from 2000 to 2006.⁶ Although similar findings were observed, this study provides a clearer picture of CRC screening disparities among Medicare beneficiaries than previous analyses.^{6,14,22} This study analyzed screening trends over time on a nationally representative sample and used more detailed data on healthcare access indicators.

This study found that black and Hispanic Medicare enrollees earned less and had lower educational levels and were less likely to have supplemental health insurance than whites. Therefore, they are more likely to benefit from Medicare’s expansion of CRC screening benefits. For each of the study years, black–white and Hispanic–white differences in screening were attenuated or disappeared after adjustment for health insurance coverage and having a usual place of medical care. This suggests that the combination of socioeconomic disadvantage and limited access to health care²¹ reduces the potential that expansion of coverage will close the racial gaps in use of CRC screening. As more physicians and patients choose colonoscopy over FOBT,^{34–37} the resulting higher cost of screening may pose a bigger barrier to screening for minority populations. Beneficiaries pay up to 25% of Medicare-allowed costs for colonoscopy,¹⁵ which was about \$625 (in 2007 dollars) for the procedure alone, but was \$812 if polypectomy was performed.³⁸ Thus, cost-sharing policies that are not based on ability to pay may have only a limited impact on disparities.^{7,39} To eliminate disparities in CRC screening among Medicare enrollees, there is a potential benefit of a policy of targeted expansion of screening coverage to those most at risk, particularly those with less education and income. There is also a potential benefit of more aggressive promotion of stool-based screening tests which are effective in reducing incidence and mortality for CRC^{40,41} and are fully covered by Medicare.¹⁵

There was an encouraging 17% increase in the use of screening among those aged 65–80 years over the 6-year study period. It is likely that increasing awareness of screening due to promotion by celebrities³⁰ and professional medical organizations,²⁷ and increasing recommendation by healthcare providers^{42,43} augmented the impact of Medicare's policy change. However, even if the current increasing trend is sustained, the U.S. public health goal of increasing the use of CRC screening to 70% by 2010 among eligible adults will not be achieved for this population for whom CRC screening is a covered benefit.

A limitation of this study is the inability to distinguish between use of sigmoidoscopy and colonoscopy. Therefore, the primary analyses used a definition of CRC screening that did not include colonoscopies done more than 5 years prior to the interview date. However, analyses using a more inclusive definition of CRC screening did not materially change these findings.

This study was based on self-report and study participants may not have accurately recalled the type of or indication for screening examination, resulting in misclassification of study participants with respect to the outcome studied. However, previous studies have confirmed the accuracy of self-reported CRC screening, particularly endoscopy.⁴⁴ Any potential misclassifications likely affected the 3 racial ethnic groups equally in a nondifferential manner and may have attenuated the differences in use of screening.

Reducing cancer health disparities and deaths from CRC through increased use of screening is a U.S. public health priority.⁴⁵ This study found that despite the expansion of benefits for CRC screening, which would be expected to disproportionately benefit racial and ethnic minorities, racial differences in screening persist due in part to differences in health insurance coverage, education and income. The study also found a possible reversal of the initial attenuation of black–white difference that occurred after Medicare implemented its CRC screening policy change in 2001. Given the benefits to be derived from increasing rates of screening among minority populations, greater attention needs to be paid to improving access to CRC screening if disparities are to be eliminated. This may be accomplished through targeted expansion of coverage for screening to people in lower socioeconomic groups who have the highest burden for CRC combined with community-based programs and effective interventions in physicians' offices to consider all CRC screening. Attention should also be given to ongoing promotion of available Medicare benefits for screening.

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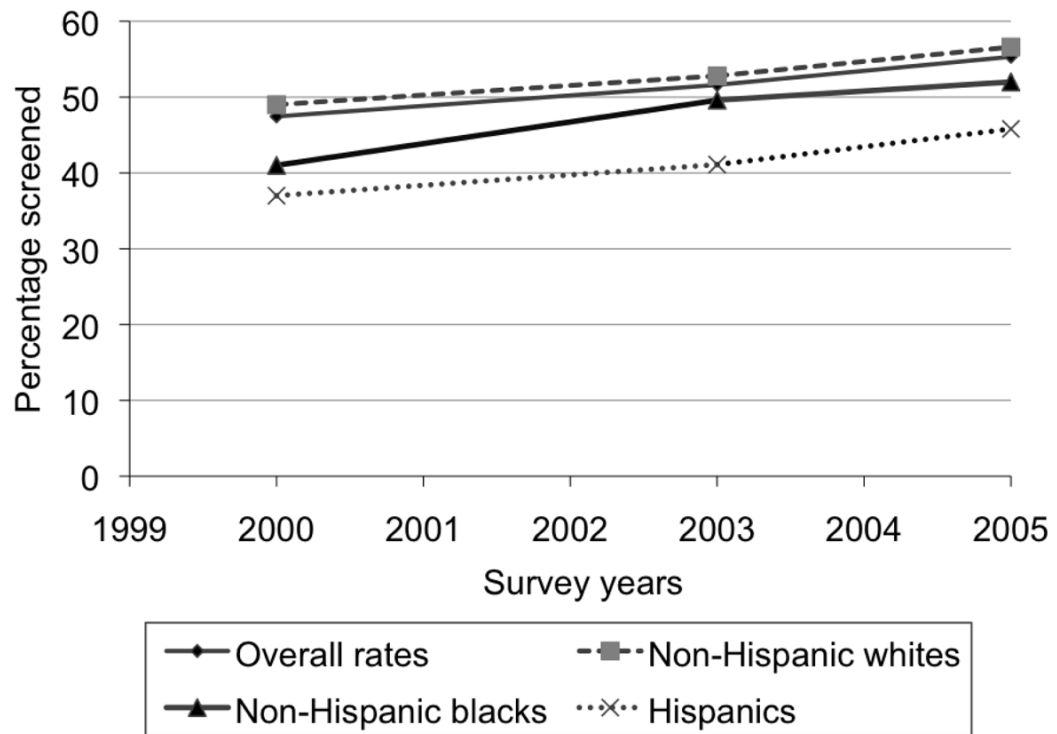


Figure 1. Percentage of Medicare enrollees aged 65–80 years who had undergone recent CRC screening: MCBS 2000–2005

The Wald test showed a significant linear trend for overall rates ($p < 0.01$); whites ($p < 0.01$); blacks ($p < 0.01$); and Hispanics (p value < 0.055).

CRC, colorectal cancer; MCBS, Medicare Current Beneficiary Survey

Table 1

Characteristics of the study population by race-ethnicity, MCBS 2000–2005*

Race-ethnicity												
Characteristics, %	Whites					Blacks					Hispanics	
	2000 n=6,696	2003 n=6,292	2005 n=6,012	** p-value	2000 n=747	2003 n=645	2005 n=626	** p-value	2000 n=582	2003 n=608	2005 n=610	** p-value
1. Highest level of education completed												
<High school	24.7	21.4	19.2	<0.01	54.7	50.2	44.5	0.01	60.3	58.9	54.4	0.12
High school graduate	38.5	40.4	40.2	0.09	26.2	24.8	30.7	0.18	21.6	23.2	24.7	0.32
>High school	36.6	38.1	40.5	0.004	19.2	24.6	24.0	0.07	17.1	17.9	20.6	0.22
Missing	0.2	0.1	0.2	—	0.0	0.5	0.8	—	1.0	0.0	0.3	—
Annual Household Income <\$25,000	52.6	47.0	43.1	<0.01	81.5	73.8	73.4	0.01	81.7	75.8	76.0	0.11
2. Insurance type												
Medicare only	7.4	11.5	11.0	<0.01	21.2	18.5	21.3	0.93	15.9	14.7	12.2	0.21
Medicare+Medicaid	5.4	6.6	6.7	0.01	25.0	30.7	24.9	0.81	30.9	30.9	33.7	0.44
Medicare-HMO	22.4	15.6	14.8	<0.01	25.2	16.4	15.1	<0.01	27.0	25.1	25.1	0.57
Employer-sponsored	38.4	38.9	40.2	0.26	21.3	26.0	29.2	0.01	16.1	17.1	18.6	0.39
Self-purchased	26.5	27.4	27.4	0.49	7.4	8.4	9.6	0.24	10.1	12.3	10.5	0.78
3. Physician that usually provides medical care												
Primary care physician	79.8	83.6	83.4	<0.01	74.9	80.2	80.0	0.05	66.3	72.3	70.8	0.18
Other physician	13.3	11.1	11.6	0.03	19.4	15.4	14.3	0.03	23.2	17.5	18.7	0.18
No usual place	6.8	5.3	5.0	<0.01	5.7	4.3	5.8	0.93	10.6	10.2	10.5	0.96
Delayed medical due to cost	6.5	7.6	6.8	0.44	11.1	10.3	10.7	0.81	11.3	10.7	10.9	0.86
CRC Screening	49.0	52.8	56.6	<0.01	41.0	49.6	52.0	<0.01	37.0	41.1	45.8	0.06

* Weighted population estimates for those included in the analyses were: whites: 2000, n=18,075,332; 2003, n=17,992,464; 2005, n=17,333,699; blacks: 2000, n=1,831,110; 2003, n=1,842,386; 2005, n=1,845,531; Hispanics: 2000, n=1,569,246; 2003, n=1,743,048; 2005, n=1,733,236. Shown are column percentages; some may not sum up to 100% due to rounding errors.

** p-values are for trend over the 3 survey years

Table 2

Unadjusted and adjusted relationship between race–ethnicity and recent colorectal cancer (CRC) screening* among Medicare enrollees aged 65–80 years: MCBS 2000–2005

OR with 95% CI Study years			
Race–ethnicity groups	2000	2003	2005
Unadjusted estimates			
White (ref)	—	—	—
Blacks	0.72 (0.61, 0.86)	0.88 (0.72, 1.08)	0.83 (0.66, 1.04)
Hispanics	0.61 (0.46, 0.81)	0.62 (0.52, 0.75)	0.65 (0.53, 0.79)
Adjusted for demographic and geographic factors**			
White (ref)	—	—	—
Blacks	0.71 (0.60, 0.84)	0.87 (0.71, 1.05)	0.81 (0.65, 0.99)
Hispanics	0.73 (0.54, 0.99)	0.67 (0.53, 0.85)	0.68 (0.54, 0.85)
Further adjustment for delay in seeking care due to cost			
White (ref)	—	—	—
Blacks	0.72 (0.61, 0.85)	0.87 (0.71, 1.06)	0.81 (0.66, 1.00)
Hispanics	0.74 (0.55, 1.01)	0.68 (0.54, 0.86)	0.69 (0.55, 0.86)
Further adjustment for usual place of medical care			
White (ref)	—	—	—
Blacks	0.71 (0.60, 0.85)	0.87 (0.71, 1.06)	0.82 (0.67, 1.02)
Hispanics	0.77 (0.57, 1.06)	0.71 (0.56, 0.90)	0.73 (0.58, 0.92)
Further adjustment for type of health insurance			
White (ref)	—	—	—
Blacks	0.87 (0.74, 1.03)	1.05 (0.86, 1.27)	0.98 (0.79, 1.21)
Hispanics	0.89 (0.65, 1.21)	0.78 (0.61, 0.99)	0.80 (0.64, 1.01)
Full model†			
White (ref)	—	—	—
Blacks	0.96 (0.81, 1.15)	1.17 (0.95, 1.43)	1.13 (0.91, 1.40)
Hispanics	1.02 (0.76, 1.37)	0.93 (0.72, 1.18)	0.94 (0.74, 1.20)

* CRC screening was defined as home fecal occult blood testing within 1 year and/or lower-gastrointestinal endoscopy within 5 years.

** Demographic and geographic variables were gender, age, language of the interview, census division and residence in a metropolitan area.

† Full models were adjusted for demographic and geographic variables, delay in seeking care due to cost, usual place of health care (coded as primary care physician, non–primary care physician, or no regular place of care), type of health insurance coverage, highest level of educational achievement, income (less vs greater than \$25,000), and self-rated health status (fair–poor vs others)