

RACIAL/ETHNIC DIFFERENCES IN SCREENING FOR COLON CANCER: REPORT FROM THE NEW YORK CANCER PROJECT

Objective: To determine whether racial/ethnic differences in colon cancer screening are independent of socioeconomic and personal risk factors.

Design: Baseline cross-section for a prospective cohort.

Method: We recruited adults between 2000 and 2002 to undergo a questionnaire and venipuncture to study cancer risks.

Results: Among 5,595 adults over 50 years old, 40.3% reported sigmoidoscopy or colonoscopy within the prior five years; rates were 48.0% for Whites, 32.8% for Blacks, 27.9% for Hispanics, 30.3% for Asians, and 33.3% for others. Adjusting for age, gender, access to care (as income and insurance), and risk profile (as cancer in family, smoking, and obesity), Blacks and Hispanics were less likely to have been screened than Whites.

Conclusions: Screening for colon cancer is low, especially among racial/ethnic minorities. Sociocultural factors merit closer attention. (*Ethn Dis.* 2005;15:76–83)

Key Words: Colon Cancer, Colonoscopy, Disparities, Ethnicity, Race, Screening

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INTRODUCTION

Cancer is the second leading cause of death in the United States; despite advances in detection and treatment, cancer remains a major public health problem.¹ Screening that improves rates of early cancer detection is a crucial part of reducing morbidity and mortality from cancer. Analyses of the National Health Interview Surveys have shown that rates of screening for colon, breast, and cervical cancers improved between 1987 and 1998. However, colon cancer screening rates in 1998 were lower than levels observed for breast cancer in 1987.² Screening for colon cancer is particularly important since the removal of polyps during screening (colonoscopy or sigmoidoscopy) can prevent colon cancer.³ With this preventable cancer in fourth place for cancer incidence and second for mortality, efforts to improve screening in this area promise improved outcomes.

Screening tests for colon cancer include fecal occult blood testing, sigmoidoscopy, and colonoscopy. Because of its greater diagnostic ability and potential to prevent disease, recent recommendations have focused on colonoscopy.³ Factors that may differentiate likelihood of screening include insurance coverage, source of care, lower income, and age after accounting for sex, racial/ethnic group, and educational level.^{2,4,5} Other factors that should influence personal decision or provider referral for screening include personal risk factors for colon cancer, including family history, obesity and exercise, and smoking.⁶

Among other racial/ethnic and socioeconomic disparities in health, colon

cancer incidence, mortality, and survival have received close attention in recent years and merit further exploration.^{7,8} From a recent report, the age-adjusted incidence and mortality per 100,000, respectively, by racial ethnic categories was 62.6 and 28.5 for Blacks, 54.8 and 20.8 for Whites, 40.0 and 14.3 for Hispanics, and 46.9 and 13.1 for Asian/Pacific Islanders.⁷ The aims of this analysis were to assess rates of screening for colon cancer, relative to screening for other common cancers, to assess the rates of colon cancer screening by race/ethnicity; and to examine whether observed racial/ethnic disparities could be accounted for by differences in access to care, or by differences in personal risk profile. These questions were addressed within a pilot study for a cancer cohort being assembled in New York City metropolitan area.

METHODS

The organization, rationale, methods, and baseline characteristics have been described in detail elsewhere.⁹ In brief, the Academic Medical Development Corporation (AMDeC) Foundation, established started the New York Cancer Project consortium of 39 New York State institutions, including academic institutions, community hospitals, and research institutes, started the New York Cancer Project (NYCP) in 1998. The NYCP planned to recruit and follow 300,000 racially and ethnically diverse volunteers over 20 years to examine rates and risk factors for cancer incidence. The first phase of the project was a pilot study involving ≈18,000

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adults. The results presented here are based on this pilot cohort.

Enrollment for the first phase of the NYCP occurred between January of 2000 and December 2002. By using a venue based sampling scheme¹⁰ with demographic quotas to achieve racial/ethnic diversity described in detail elsewhere,⁹ 14 enrollment sites were set up across the five boroughs of New York City. The process was designed to recruit an ethnically and socioeconomically diverse cohort, a priori targeting individuals of African, Caribbean, Latino, Chinese, Russian, Irish, and Italian descent. The sites included six medical centers, two community hospitals, and six community-based health centers. In addition, the New York Blood Center enrolled individuals into the project during its routine donor blood drives. Enrollment sites were selected according to the demographics of the patient body and the location, ensuring diversity and enrollment from all boroughs of New York City. Recruitment modalities for the study included dissemination of promotional materials, community outreach, press conferences, advertising on the radio and in community newspapers, and celebrity press events. The promotional materials were used in two citywide advertising campaigns involving bus, subway, and convenience store displays. Community outreach included events held with prominent political and community leaders and organizations, as well as locally targeted recruitment including informational meetings with clinical and outreach staff at the enrollment institutions and presentations at local businesses, community centers, and community meetings. Other methods for recruitment were tailored to the needs of each target group. Participants were offered two out of three incentives for participation including a one-day subway pass, a \$10 phone card, and a t-shirt with the NYCP logo.

Enrollment was conducted using study-eligible volunteers either on-site at the enrollment centers or off-site in

community settings where mobile site staff conducted the enrollment protocol. To be eligible for the NYCP, participants had to be ≥ 30 years of age, reside in the New York City metropolitan area, and be able to complete a simple mail-out follow-up questionnaire (determined with a sample follow-up questionnaire). For the purposes of the work presented here, a subset of the NYCP who were over 50 and free of cancer by self-report at baseline were used. Institutional review boards of all participating institutions approved the protocol. All study requirements and procedures were explained to the subjects verbally and in writing, and their written informed consent was obtained.

Eligible and consenting participants completed locator forms and underwent screening and baseline questionnaires, anthropomorphic measures, and venipuncture for repository storage. Questionnaires were implemented in English, Spanish, Russian, and Chinese. Interview data were collected on laptop computers and sent on a daily basis via a secure Internet line to the Department of Medical Informatics at Columbia University. Each interviewer was trained to ensure the uniform collection of data. Further, to verify adherence to interview format, spot checks were performed by core study staff at each of the interview sites.

The interview included demographic information (date of birth, sex, and race) as well as income, insurance, self-reported diagnoses, and medical procedures for subjects and their family members. Other variables included substance use (usage of tobacco, alcohol, and medications), reproductive history (pregnancy, menstruation, and birth control). Respondents were asked about cancer screening practices within the prior five years, including breast (mammography), cervix (pap smear), prostate (digital examination), colon (fecal occult blood, and sigmoidoscopy or colonoscopy; the latter two were combined into a single question in this instrument). Body mea-

surements were collected, including height, weight, hip, and waist measures. Venipuncture was performed to collect 50 cc of whole blood in vacutainer tubes. The specimens were processed at a state-of-the-art central laboratory for DNA extraction and plasma separation for the study's biorepository housed at North Shore University Hospital.

We conducted this analysis in the population ≥ 50 years of age, as colon cancer screening is generally recommended for this age group. Five racial/ethnic groups were defined, first by Hispanic ethnicity, and among non-Hispanics, as White, Black, Asian, and other (defined below). Blacks included African Americans, West Indians, and other Blacks. Asians included Chinese, Filipino, Korean, Vietnamese, and other east and southeast Asian respondents. The other group included those reporting multiple races ($< 2\%$), Native Americans, Asian Indians, Hawaiians, Guamanians, Samoans, and other Pacific Islanders. Age was calculated from self-reported date of birth, and gender from self report. Income was examined in five reported categories of household income ($\geq \$100,000$, $\$99,999$ - $\$50,000$, $\$49,999$ - $\$30,000$, $\$29,999$ - $\$15,000$, $< \$15,000$), and health insurance was examined as any health coverage (employer insurance, Medicaid, Medicare, self insured, other insurance) compared with no health insurance. Cancer in the family was defined as self-report of any cancer in the mother, father, full sisters, or full brothers; smoking was examined as report of ever and past year smoking cigarettes; and obesity was defined as a body mass index (kg/m^2) ≥ 30 .

To assess the comparability of our sample to the 2000 Census, distributions of demographics were examined, using chi-square tests to guide interpretation. To assess differences in screening for various cancers, screening prevalences were calculated for colon, prostate, cervical, and breast cancers (in gender-specific groups where relevant). Bivariate differences in colonoscopy/sigmoid-

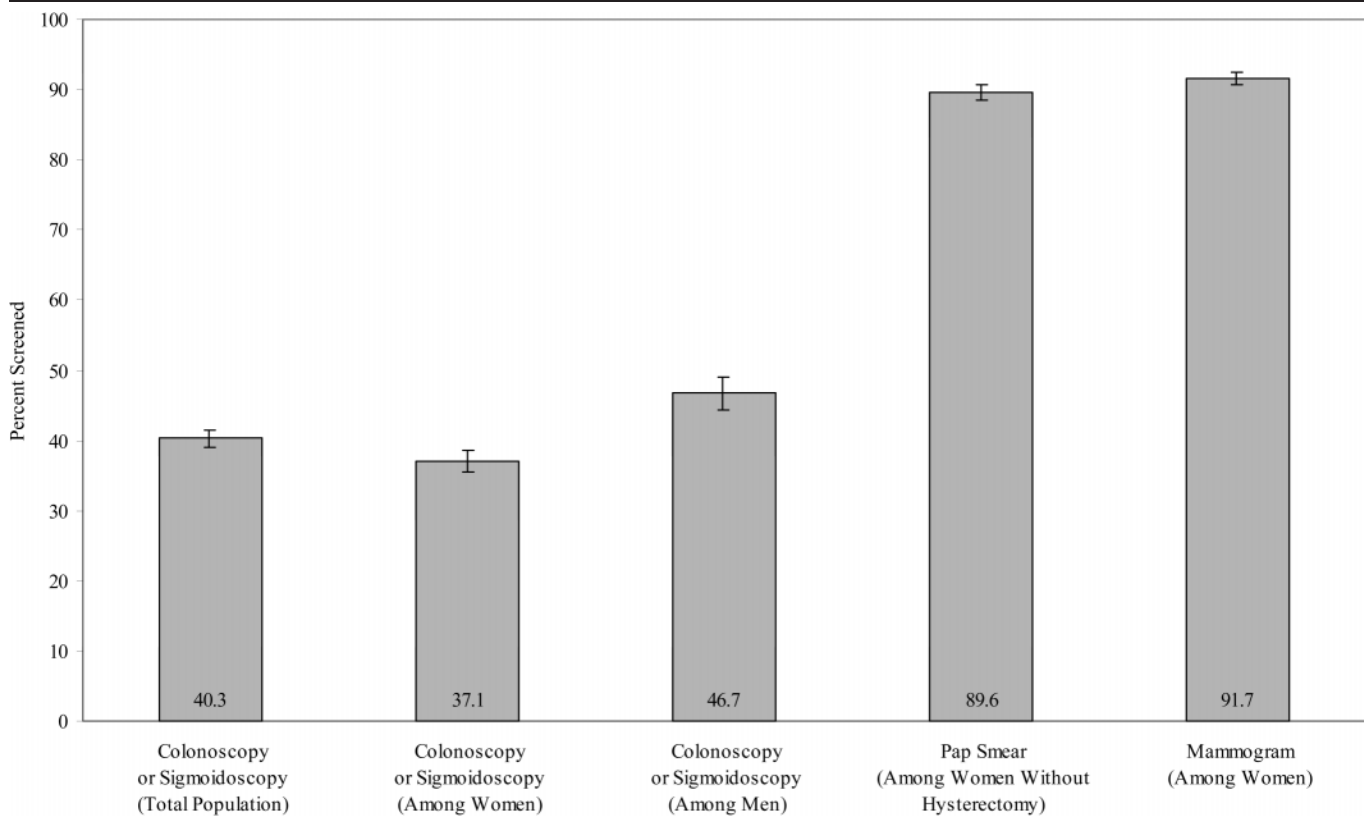


Fig. 1. Screening for selected cancers among persons 50 years and older, New York Cancer Project, 2000–2002 (N = 5595)

oscopy by race were assessed using chi-square tests. Colon cancer screening was also examined by ethnic subgroups, including subgroups of Hispanics (Puerto Rican, Dominican, other Hispanic) and Blacks (African Americans, West Indians, other Black) to ensure the broader race categories were not obscuring important screening differences. To assess the role of demographic characteristics (age and gender), access to care (as income and insurance), and risk profile (as cancer in the immediate family, history of smoking and obesity) in relation to cancer screening, we examined the relation between each of these factors and rates of colon cancer screening by race/ethnicity, using chi-square tests to guide interpretation. Finally, a multivariable logistic regression model was used to examine differences between racial/ethnic groups after accounting for putative confounders.

RESULTS

Of the 18,187 participants enrolled in the study with complete information, 5,595 were ≥ 50 years of age. Of the 5,595 included in this analysis, 55.9% were White, 15.2% were Hispanic, 14.7% were Black, 10.3% were Asian, and 3.8% were of other racial/ethnic background. The majority of respondents were 50–59 years of age (69.9%), and female (66.6%). Overall, 29.1% had a household income $< \$30,000$ annually, 9.4% were uninsured, 44.2% had a history of smoking, 50.9% reported cancer in the immediate family, and 27.7% were obese.

Rates of screening during the past five years were 91.7% for breast cancer (mammography) in women, 89.6% for cervical cancer (Pap smear) in women without a history of hysterectomy, and 40.3% for colon cancer (sigmoidoscopy

or colonoscopy) overall (Figure 1). Rates of colon cancer screening were 46.7% for men and 37.1% for women. By race/ethnicity, rates of colon cancer screening were 48.0% for Whites, 32.8% for Blacks, 27.9% for Hispanics, 30.3% for Asians, and 33.3% for others ($P < .001$) (Figure 2). Among Hispanics, rates did not vary by heritage (Puerto Rican [30.0%], Dominican [24.1%], other Hispanic [24.8%], $P = .232$), nor did it vary among Blacks (African American [33.9%], West Indian [29.7%], other Black [25.0%], $P = .381$).

Table 1 shows demographic, access to care, and cancer risk profile characteristics by rates of colon cancer screening (sigmoidoscopy or colonoscopy), stratified by the five racial/ethnic categories. For Whites, colon cancer screening was more common among older respondents and men, and among those

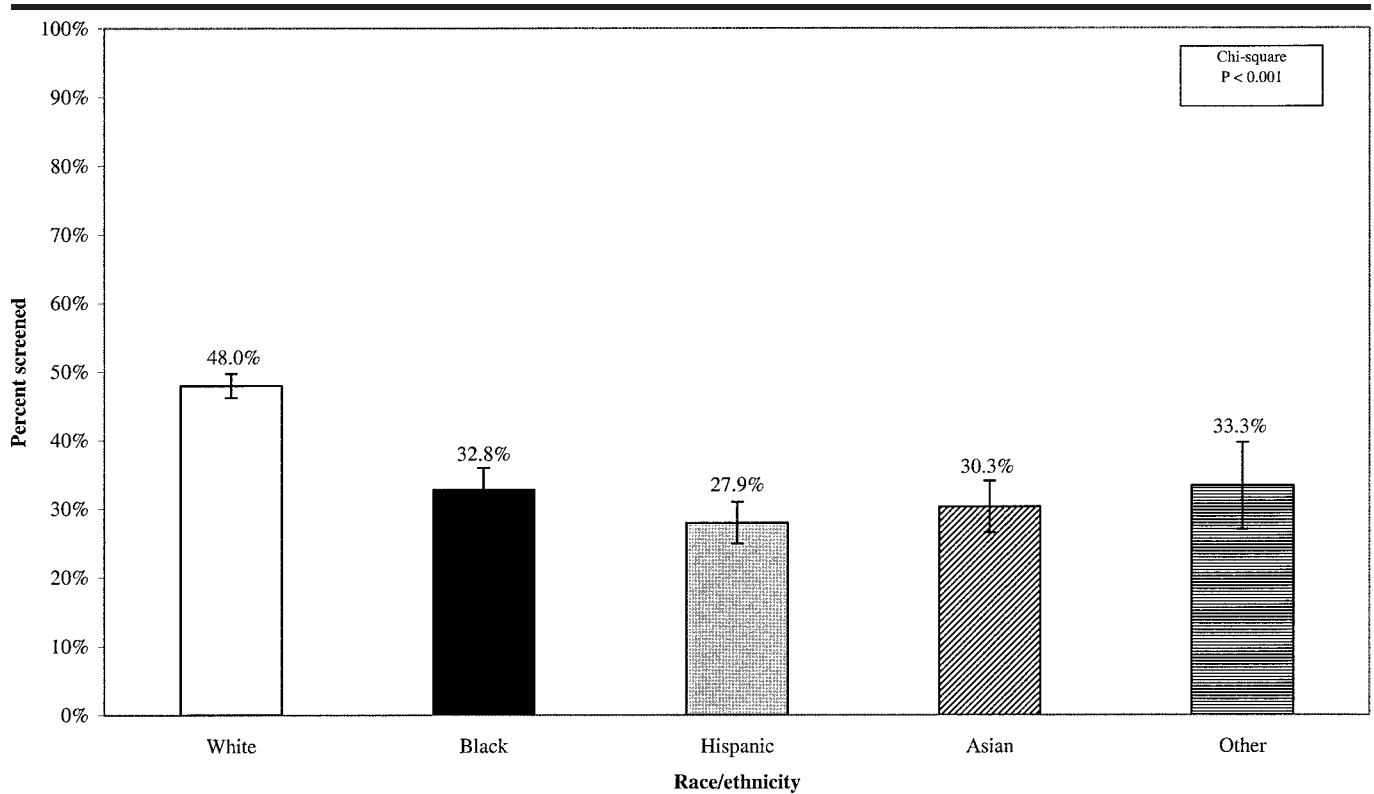


Fig. 2. Screening for colon cancer using colonoscopy or sigmoidoscopy by race/ethnicity among persons 50 years and older. New York Cancer Project, 2000–2002 (N = 5595)

with higher income, insurance coverage, and cancer in the immediate family. For Blacks, screening was more common among older respondents and among those with higher income, insurance coverage, and cancer in the immediate family. For Hispanics, screening was more common among the insured and those with cancer in the immediate family. For Asians, screening was associated with higher income, insurance coverage, history of smoking, and cancer in the immediate family. For those classified as other race/ethnicity, screening was not significantly associated with any characteristics. Although the statistical significance ($P < .05$) of characteristics in association with colon cancer screening varied by racial/ethnic group, due to the consistent direction of the associations among all groups, we combined the five groups for the final model.

In a multivariable logistic regression model predicting colon cancer screening

in the past five years, Blacks and Hispanics were less likely than Whites to have undergone screening (odds ratios [OR]=0.77; 95% confidence interval [CI]=0.63, 0.93, and OR=0.61; 95% CI=0.50, 0.74, respectively) after accounting for age, gender, insurance, income, history of smoking, family history of cancer, and obesity (Table 2). Overall, colon cancer screening was more common among older respondents (>60 years of age) and men, and among those with insurance, more income, and a family history of cancer. Among those with a history of smoking there was some suggestion of an increased likelihood of screening.

DISCUSSION

In this analysis, rates of colon cancer screening in the New York City metropolitan area were very low, particularly

in comparison to screening for other cancers. Blacks and Hispanics had lower rates of screening compared with other racial/ethnic groups, even after accounting for other demographic, access to care, and cancer risk profile characteristics that might have explained these disparities.

The rate of colon cancer screening in this population at 40% within the past five years was higher than that reported for a national sample (under 30%)² and lower than that reported in a recently completed random digit dial survey of New York City residents (50% ever).¹¹ However, across all of these studies using different sampling strategies and data collection techniques, the rate of colon cancer screening was lower than screening for other cancers, such as breast, cervix, and prostate, and racial/ethnic disparities were seen in colon cancer screening as well. For example, in a random digit dial survey conducted

Table 1. Bivariate associations of demographic, access, and risk characteristics with colon cancer screening (by colonoscopy or sigmoidoscopy) by race/ethnicity

	White			Black			Hispanic			Asian			Other		
	Total N	% Screened	P Value	Total N	% Screened	P Value	Total N	% Screened	P Value	Total N	% Screened	P Value	Total N	% Screened	P Value
Total	3115	48.0		821	32.8		848	27.9		571	30.3		213	33.3	
Age															
50-59	2076	44.6	<.001	605	29.3	.002	609	27.4	.311	432	28.7	.197	173	32.4	.202
60-69	899	55.2		186	42.5		203	31.0		129	34.1		32	31.3	
≥70	140	52.1		30	43.3		36	19.4		10	50.0		8	62.5	
Sex															
Male	1175	54.6	<.001	198	34.8	.482	260	30.0	.376	143	36.4	.068	77	33.8	.920
Female	1940	43.9		622	32.2		588	27.0		428	28.3		136	33.1	
Income															
≥\$100,000	771	58.4	<.001	54	50.0	.048	45	35.6	.064	40	42.5	.013	33	39.4	.193
\$99,999-\$50,000	1052	46.7		192	37.0		166	35.5		64	42.2		60	46.7	
\$49,999-\$30,000	442	42.8		186	32.3		119	23.5		64	37.5		42	28.6	
\$29,999-\$15,000	213	43.2		147	31.3		132	26.5		118	35.6		16	18.8	
<\$15,000	200	42.0		131	28.2		250	24.4		141	22.0		17	35.3	
Any insurance															
No	83	18.1	<.001	66	15.2	.001	99	14.1	.001	243	13.2	<.001	21	19.0	.095
Yes	2988	48.9		742	34.4		730	30.0		319	43.9		176	37.5	
Ever smoked cigarettes															
No	1486	46.8	.198	475	31.8	.485	499	25.7	.071	493	28.4	.013	151	35.1	.394
Yes	1628	49.1		346	34.1		348	31.3		78	42.3		62	29.0	
Cancer in immediate family															
No	1272	43.6	<.001	469	29.2	.012	527	23.3	.0001	344	26.7	.023	118	29.7	.205
Yes	1843	51.0		352	37.5		321	35.5		227	35.7		95	37.9	
Body mass index ≥30															
No	2232	49.0	.086	480	32.1	.715	508	28.3	.9571	533	31.1	.198	142	35.2	.997
Yes	809	45.5		306	33.3		298	28.5		26	19.2		54	35.2	
History of polyps															
No	2765	42.9	<.001	774	30.4	<.0001	808	25.2	<.0001	512	26.8	<.0001	202	30.2	<.0001
Yes	350	88.0		47	72.3		40	82.5		59	61.0		11	90.9	

Table 2. Multivariable logistic regression predicting colon cancer screening: colonoscopy or sigmoidoscopy, New York City

Parameter	OR	Low CI	Upper CI
Race/ethnicity			
White	1.00	—	—
Black	0.77	0.63	0.93
Hispanic	0.61	0.50	0.74
Asian	1.06	0.82	1.36
Other	0.82	0.59	1.16
Age			
50–59	1.00	—	—
60–69	1.67	1.44	1.93
≥70	1.64	1.17	2.29
Gender			
Male	1.00	—	—
Female	0.72	0.63	0.82
Any insurance			
No	1.00	—	—
Yes	3.07	2.21	4.26
Income			
≥\$100,000	1.00	—	—
\$99,999–\$50,000	0.69	0.58	0.82
\$49,999–\$30,000	0.54	0.44	0.66
\$29,999–\$15,000	0.60	0.47	0.75
<\$15,000	0.49	0.38	0.62
Ever smoked cigarettes			
No	1.00	—	—
Yes	1.11	0.98	1.26
Cancer in immediate family			
No	1.00	—	—
Yes	1.48	1.30	1.68
Body mass index			
No	1.00	—	—

by the New York City Department of Health, lifetime rates of mammogram, pap smear, and sigmoidoscopy/colonoscopy were 77%, 80%, and 50% respectively for persons >50 years of age. The lower rate in our study, compared with the random digit dial survey, likely reflects our measure of past five year screening, while theirs measured lifetime screening. The higher rates in our survey compared to the national survey¹² may reflect better screening in the New York City metropolitan area or may reflect a volunteer population more concerned about cancer and therefore were screened for cancer in the past. In fact, our observed rates of screening in the prior five years for mammography and

pap smears were 90%, which is higher than that seen for the City Health Department survey noted above. This supports the conclusion that this population may have self-selected for interest in cancer risk. Despite these differences, the rates for colon cancer screening were the lowest among anatomical sites for screening across all of the studies, which indicates that work is needed to improve colon cancer screening efforts.

Several factors may explain the low rates of colon cancer screening in comparison to screening for other cancers. Earlier studies have noted that socioeconomic status and insurance coverage, as well as routine source of care were important predictors of cancer screening,

even after accounting for age, sex, and racial/ethnic group.² In our study, we also found socioeconomic status and insurance to be important after accounting for demographic variables, which further emphasizes the need for improved access to screening procedures. Higher rates for breast and cervical cancer screening may reflect the widely available federal and state programs that offer free screening for breast and cervix cancers to all low income and uninsured women. However, countries with universal healthcare access continue to show low results for colon cancer screening, which suggests that access is necessary but not sufficient to promote screening.^{13,14} Other factors, such as improved awareness of the preventive role of colonoscopy, colon cancer risks for patients and providers, and acceptability of these procedures, need to be addressed.^{15–17} In addition, the optimal approach to colon cancer screening (fecal occult blood testing, flexible sigmoidoscopy, or colonoscopy), remains to be determined. Recent information suggests that colonoscopy may identify lesions earlier than other procedures, although cost and acceptability need to be addressed.^{18,19} In our study, we examined smoking, family history of cancer, and obesity, all of which are risk factors for colon cancer.^{1,6} In this analysis, those with a family history of cancer were more likely to be screened, smoking had borderline association, and obesity was not associated with screening. This finding is consistent with other studies that have found not all cancer risk factors to be associated with more screening.¹¹ Education for individuals and providers about individual risks may help increase screening for those at higher risk of colon cancer.²⁰

While access to health care is an issue for screening, income and insurance were not sufficient to explain the observed racial/ethnic differences. This finding has been noted elsewhere.²¹ Another variable, education, which is an important link to health literacy,²² but

is also highly correlated with income, was not available and limits inferences that can be drawn. Similarly, personal risk factors such as smoking, family history, and obesity were not sufficient to explain the racial/ethnic differences observed for colon cancer screening in this study. Additional efforts are needed to consider what might be contributing to these observed differences. Of note, while others have suggested that broad groupings of racial/ethnic categories can mask differences within such groupings,²³ our limited comparisons within our groupings did not suggest major differences within this study population. However, a recent report suggests that special attention for cancer screening needs to be directed toward those that are foreign-born.²⁴

Although this survey suggested residual differences by racial/ethnic groups that were not explained by variation in distributions of access to health services and personal risk factors, the survey was not structured to probe deeper into factors that might explain the racial/ethnic differences that persisted. We conducted an initial focus group at the Harlem Hospital with 30 adult African-American patients recruited from the outpatient clinics, and found that the issues among these African Americans included limited knowledge about colon cancer, limited knowledge about the procedure (not knowing how or when to get procedure, affordability) and concerns about the screening procedures, including invasiveness, embarrassment, worries about pain and analgesia, and suspicion of doctors. These preliminary results are consistent with the literature on barriers that impede preventive care for under-served African Americans and other minorities. These barriers have been identified as: 1) inadequate access to and availability of healthcare services; 2) competing priorities; 3) lack of knowledge of cancer prevention and screening recommendations; 4) culturally inappropriate or insensitive cancer control materials; 5) low literacy; 6)

mistrust of the healthcare system; and 7) embarrassment, fear, and fatalism.^{15,25-28} To be effective programs others have noted the need to incorporate community participation, innovative outreach, use of social networks and trusted social institutions, cultural competence, and a sustained approach.²⁵ Socioeconomic and racial/ethnic differences in physicians offering cancer screening have been described,²⁹ and need to be addressed.

As is commonly accepted, race is a social construct.³⁰ When race and ethnicity are viewed as multidimensional psychological and social constructs, our understanding is advanced of how ethnic identity, minority status, and culture affect screening practices.

Efforts are needed to understand provider practices and the role of community advocacy groups to encourage participation in programs. In New York City, while screening for colon cancer was lowest among Blacks and Hispanics, death rates for colon cancer are high in both of these groups (with rates of 24 and 16 per 100,000, respectively). Improved and more comprehensive efforts at colon cancer prevention and detection are urgently needed, especially among racial and ethnic minorities. Recently, the New York City Department of Health and Mental Hygiene issued screening guidelines for colon cancer³¹ and held summits of providers and consumers to work on increasing colon cancer screening activities in New York City. Further sensitivity and culturally appropriate activity is needed to achieve the aim of widespread colon cancer screening in these communities.

AUTHOR CONTRIBUTIONS

Design and concept of study: Vlahov, Mitchell
 Acquisition of data: Vasquez, Johnson, Mitchell, Phillips
 Data analysis and interpretation: Vlahov, Ahern, Freeman, Nash
 Manuscript draft: Vlahov, Ahern, Vasquez, Freeman, Phillips
 Statistical expertise: Vlahov, Ahern, Phillips
 Acquisition of funding: Mitchell
 Administrative, technical, or material assistance: Vasquez, Johnson, Mitchell

Supervision: Vlahov, Mitchell

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