

LESS IS MORE

Prevalence of Cancer Screening in Older, Racially Diverse Adults

Still Screening After All These Years

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Background: While a great deal is known about cancer screening behaviors and trends in young and middle-aged adults, little is known about screening behaviors in older adults from different racial backgrounds. Our goal was to establish prevalence estimates and correlates of cancer screening, including physician recommendation in older (≥ 75 years), racially diverse adults.

Methods: Data were analyzed from the National Health Interview Survey—an annual, in-person, nationwide survey used to track health trends in US civilians. The analytic sample included 49 575 individuals, of whom 1697 were 75 to 79 years old and 2376 were 80 years or older. Screening behaviors were examined according to the US Preventive Services Task Force recommendations for breast, cervical, colorectal, and prostate cancer screening.

Results: Among adults aged 75 to 79 years, the percentage screened for cancer was as follows: colorectal, 57%; breast, 62%; cervical, 53%; and prostate, 56%. Among those 80 years or older, rates of screening ranged from a low of 38% for cervical cancer to a high of 50% for breast cancer. Although unadjusted screening prevalence rates differed by race/ethnicity, these differences were accounted for by low education attainment in the multivariate logistic regression model. Physician recommendation for a specific test was the largest predictor of screening. Over 50% of men and women older than 75 years report that their physicians continue to recommend screening.

Conclusion: A high percentage of older adults continue to be screened in the face of ambiguity of recommendations for this group.

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WHILE PROMOTION OF early detection of cancer through screening programs has led to a substantial decline in mortality and morbidity in the population,^{1,2} the thrust of programs is to increase uptake and adherence to screening and to reducing minority disparities in

See Invited Commentary at end of article

screening rates.³ Less attention has been given to assessing rates of screening in older, racially diverse adults, a population expected to grow exponentially over the next few decades.⁴ This is imperative because there is growing recognition that certain segments of the older population, mainly older healthy adults with good functional status, few comorbid conditions, and a life expectancy of more than 5 years may benefit from continued screening and, if needed, can tolerate cancer treatments.^{5,6}

Current US Preventive Services Task Force (USPSTF) screening guidelines sug-

gest that there is insufficient evidence to evaluate the mortality benefits of screening men and women older than 75 years and advocate for individualized decisions in this group.⁷ The lack of clarity regarding screening guidelines for older adults is partly due to the paucity of data from screening and treatment trials that include older adults.⁸ As such, screening decisions for this group are often based on physicians' extrapolations from screening trials in younger adults, clinicians' subjective judgment of a person's health status, and patient preference.⁹

While a great deal is known about cancer screening behaviors and trends in young and middle-aged adults,^{2,10-12} less is known about screening behaviors in older adults from different racial backgrounds. A study analyzing data from the 2006 Behavioral Risk Factor Surveillance System (BRFSS) found that 60% of men older than 76 years, without a history of prostate cancer, received a prostate-specific antigen (PSA) test in the past year,¹³ which is consistent with some studies examining PSA test use in older men,¹⁴ yet inconsistent with others that

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Table 1. US Preventive Services Task Force (USPSTF) Summary of Recommendations

USPSTF (Year)	Summary of Recommendation ^a	Comment
Mammography (2009)	Every 2 y for women aged 50-74 y (grade: B). Insufficient evidence to assess the additional benefits and harms of screening in women 75 y or older (grade: I).	The decision to start regular, biennial screening mammography before age 50 y should be an individual one and take patient context into account, including the patient's values regarding specific benefits and harms (grade: C recommendation)
Colorectal screening (2008)	At age 50 y, using fecal occult blood test, sigmoidoscopy, or colonoscopy. Routine screening until age 75 y (grade: A). Recommends against routine screening for colorectal cancer in adults aged 76-85 y (grade: C). Recommends against screening for colorectal cancer in adults older than 85 y (grade: D).	There may be considerations that support colorectal cancer screening in an individual patient.
Cervical (2003)	Recommends screening for cervical cancer in women who have been sexually active and have a cervix (grade: A). Recommends against routinely screening women older than 65 y for cervical cancer if they have had adequate recent screening with normal results from a Papanicolaou screen and are not otherwise at high risk for cervical cancer (grade: D).	None
Prostate (2008)	Insufficient to assess the balance of benefits and harms of screening for prostate cancer in men younger than 75 y (grade: I). Recommends against screening for prostate cancer in men 75 y or older (grade: D).	In men 75 y or older, the USPSTF found adequate evidence that the incremental benefits of treatment for prostate cancer detected by screening are small to none.

^aGrade definitions as of May 2007: "A," The USPSTF recommends the service. There is high certainty that the net benefit is substantial. "B," The USPSTF recommends the service. There is high certainty that the net benefit is moderate or there is moderate certainty that the net benefit is moderate to substantial. "C," The USPSTF recommends against routinely providing the service. There may be considerations that support providing the service in an individual patient. There is at least moderate certainty that the net benefit is small. "D," The USPSTF recommends against the service. There is moderate or high certainty that the service has no net benefit or that the harms outweigh the benefits. "I," The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of the service. Evidence is lacking, of poor quality, or conflicting, and the balance of benefits and harms cannot be determined.

have found national rates of PSA test use to be 46% in older men.¹⁵ In regard to mammography, a study of women older than 65 years, without a history of cancer, who participated in the Health and Retirement Study, found 68% of the sample had received mammography screening in previous 2 years.¹⁶ Another study examining screening utilization in 87 736 older adults diagnosed as having advanced cancer from the linked Surveillance, Epidemiology, and End Results (SEER)/Medicare claims data set found a sizable proportion of older patients with terminal cancer continue to be screened with mammography (8.9%), Papanicolaou test (5.8%), and PSA test (15.0%), despite a median 5-year survival rate of less than 16%.¹⁷ What was not assessed in this study was whether continued screening was the result of physicians' recommendations or preferences of patients. Finally, a study examining older adults' attitudes and preferences for continued screening in later life found that 72% of adults 70 years or older reported that they would continue cancer screening throughout their lives, and almost half of those (43%) would continue despite their physician's recommendation against further screening.¹⁸ While these studies have contributed to our understanding of screening in older adults, the generalizability of these findings is limited for various reasons, including lack of racial diversity, examining rates of screening in data that are almost 10 years old, or including older adults (65-74 years) who still fall within guidelines for screening.

The goal of this study was to examine cancer screening practices and correlates of screening, including physician recommendations for screening tests in racially diverse older adults, given that this group is the fastest growing segment of the US population and the largest consumers of health care.¹⁹ We expected that a sizable proportion of adults

older than 75 years would continue to be screened and that differences would exist by racial status that mirror well known differences in younger adult minority populations. We also anticipated that a substantial percentage of physicians would continue to recommend screening tests, despite guidelines that recommend against routine screening after age 75 years, and that these recommendations would vary by race/ethnicity.

METHODS

SOURCE OF THE DATA

Data were analyzed from the National Health Interview Survey (NHIS), an annual, in-person, nationwide survey of approximately 30 000 households that is used to track trends in illness and health status of noninstitutionalized US civilians.²⁰ Each survey year represents a different sample, and blacks and Hispanics are oversampled. To obtain a sample of adults from minority backgrounds with sufficient power for analyses we combined data from the surveys conducted in 2005 and 2008. The final response rate for the adult sample was 69.0% in 2005 and 62.6% in 2008.

PARTICIPANT POPULATION

Of the 31 428 sample adults surveyed in 2005, 2095 adults were excluded owing to self-reported diagnosis of cancer other than nonmelanoma skin cancer. The 2008 survey included 21 781 sampled adults, but 1539 reported a history of cancer and therefore were excluded from analyses. This resulted in an analytic sample of 49 575 (29 333 from 2005 and 20 242 from 2008), of whom 1697 were 75 to 79 years of age and 2376 were older than 80 years. Men and women who fell within USPSTF guidelines for screening (**Table 1**) were included in the analysis as a comparative group. Owing to concerns about confidentiality, the NHIS

does not release exact ages for respondents older than 85 years. Hence, older respondents have their age truncated at 85 years.

MEASURES

Demographic and Health Characteristics

Self-reported information included age, sex, race/ethnicity, education, family income (imputed for analyses), comorbidity (calculated as sum of 13 health conditions contained in the 2005 and 2008 NHIS), and physical limitations of any kind.

Cancer Screening Behaviors

Screening behaviors of older adults were analyzed according to the USPSTF recommendations for breast, cervical, colorectal, and prostate cancer screening (Table 1).²¹ The USPSTF recommends against routine cervical cancer screening in women older than 65 years, and for other cancers, there is general agreement that screening decisions should be individualized based on life expectancy and patient preferences.

Physician's Recommendation for Screening

The NHIS asks participants "Within the past year, has a physician or other healthcare professional recommended that you have a particular screening test?" (ie, mammogram, Papanicolaou screen, fecal occult blood test, PSA test). Thus, we examined this question by age and race/ethnicity. This question was not asked in the survey for PSA testing in 2005.

DATA ANALYSIS METHODS

To account for the complex sample design of the NHIS, including stratification, clustering, and multistage sampling, estimates were weighted to provide national estimates. Variance estimates for proportions and logistic regression model odds ratios (ORs) were calculated using SUDAAN statistical software (Research Triangle Institute; Research Triangle Park, North Carolina) to take into account the complexity of the survey design. Descriptive statistics, *t* tests, and χ^2 tests were used to examine differences between age, race/ethnicity, education, family income, comorbidities, and physical limitations between survey years (2005 and 2008). Despite statistically significant differences between survey years on age, income, and comorbidity, owing to the large sample size, the percentage differences were small (all <4%), suggesting no meaningful differentiation. Thus, the 2 data waves (2005 and 2008) were collapsed for analyses. To examine cancer screening rates of adults, weighted percentages, standard errors, and *P* values are presented by age group (screening guideline-specific ages for each test (75-79 years and ≥ 80 years) and race for each screening test. A multivariate logistic regression model is also presented for each test to indicate ORs of meeting guidelines by age group, race/ethnicity, education, family income, comorbidities, and physician recommendation. To further examine the percentage of physicians recommending specific screening tests by age and race/ethnicity, weighted percentages, standard errors, and *P* values are presented with *t* tests for differences between percentage of older age groups and guideline-specific ages for each racial group as well as within each age group.

RESULTS

PARTICIPANT CHARACTERISTICS

Characteristics of the sample from each survey year are shown in **Table 2**. In the sample, 4073 participants were

Table 2. Characteristics of Sample (2005 and 2008 NHIS Survey Years)

Characteristic	No. (%) ^a		<i>P</i> Value ^b
	2005	2008	
Total	29 333 (49.2)	20 242 (50.8)	.01
Age group, y			
18-39	11 615 (42.4)	7934 (41.7)	.28
40-49	5919 (21.0)	3844 (20.0)	.02
50-74	9428 (30.2)	6762 (31.9)	.002
75-79	979 (2.7)	718 (2.8)	.76
≥ 80	1392 (3.6)	984 (3.6)	.96
Race/ethnicity			
White, non-Hispanic	18 637 (70.3)	12 087 (68.1)	.002
Black, non-Hispanic	4186 (11.7)	3208 (12.1)	.44
Hispanic	5358 (13.3)	3551 (14.1)	.10
Asian, non-Hispanic	925 (3.9)	1199 (4.7)	.001
Education			
<High school	5392 (16.2)	3460 (15.3)	.10
High school graduate	13 691 (48.3)	9437 (48.0)	.61
2- or 4-y college graduate	7461 (26.7)	5469 (27.7)	.09
>Bachelor degree	2448 (8.8)	1737 (9.0)	.54
Family income \$			
$\geq 20\ 000$	21 646 (81.2)	15 571 (83.5)	<.001
<20 000	7687 (18.8)	4671 (16.5)	<.001
Comorbidity ^c			
None	13 280 (46.9)	8449 (42.9)	<.001
1-2	11 936 (40.4)	8714 (43.2)	<.001
>2	4117 (12.7)	3079 (13.9)	.004
Physical limitations of any kind			
Limited in any way	9534 (30.8)	6494 (30.7)	.89
Not limited in any way	19 714 (69.2)	13 609 (69.3)	.89

Abbreviation: NHIS, National Health Interview Survey.

^aWeighted percentages.

^bThe *P* value next to each categorical variable label corresponds to the χ^2 independence test between survey years. *P* values next to each continuous variable corresponds to *t* tests of difference in percentage between survey year.

^cSum of the following conditions: hypertension, coronary heart disease, angina, myocardial infarction, other heart condition, stroke, emphysema, asthma, ulcer, diabetes mellitus, chronic bronchitis, kidney problems, liver problems, and joint pain.

75 years or older, providing sufficient sample size for estimating prevalence rates in this population. The mean (SE) age of the 4073 adults 75 years or older was 80.4 (0.07) years.

PREVALENCE OF SCREENING BEHAVIORS IN ADULTS BY AGE AND RACE/ETHNICITY

Table 3 shows the prevalence rates of screening for breast, cervical, colorectal, and prostate cancer by age group and race/ethnicity. Among women 75 to 79 years old and those 80 years or older, 62% and 50%, respectively, reported receiving a mammogram within the past 2 years. Receipt of mammogram in 50- to 74-year-old women was 74%. Similarly, 53% and 38% of women ages 75 to 79 years and 80 years or older, respectively, reported receipt of Papanicolaou screen within the past 3 years for cervical cancer screening. The prevalence of colorectal cancer screening in men and women was highest in the 75- to 79-year-old group (57%), followed by the USPSTF screening guideline-specific age group (48%) and the group that was 80 years or older (47%). The preva-

Table 3. Prevalence of Screening by Age and Race/Ethnicity (2005 and 2008 NHIS Surveys Combined)

Type of Screening Received	Screening Guideline–Specific Ages ^a			Age, y					
				75-79			≥80		
	No. (%) ^b	SE	P Value ^c	No. (%) ^b	SE	P Value ^c	No. (%) ^b	SE	P Value ^c
Breast	8271 (74.1)	0.6	NA	974 (62.3)	1.8	NA	1411 (50.2)	1.6	NA
White, non-Hispanic	5618 (74.9)	0.7	NA	732 (63.7)	2.0	NA	1093 (50.8)	1.8	NA
Black, non-Hispanic	1255 (75.5)	1.5	.71	122 (52.2)	5.4	.045	172 (52.7)	4.6	.70
Hispanic	1056 (67.8)	2.1	.001	96 (57.9)	6.6	.40	98 (42.5)	6.6	.23
Asian, non-Hispanic	279 (69.0)	3.2	.08	22 (61.5)	12.7	.87	43 (35.9)	7.9	.07
Cervical	19458 (82.3)	0.4	NA	577 (53.4)	2.4	NA	876 (38.3)	1.9	NA
White, non-Hispanic	11307 (84.3)	0.4	NA	410 (53.6)	2.8	NA	675 (38.0)	2.1	NA
Black, non-Hispanic	3175 (84.0)	0.9	.76	79 (54.3)	6.5	.91	102 (42.9)	6.1	.45
Hispanic	3924 (77.4)	0.9	<.001	71 (51.0)	6.8	.75	66 (41.8)	8.7	.68
Asian, non-Hispanic	865 (65.8)	2.1	<.001	17 (53.6)	15.3	>.99	32 (26.5)	7.4	.13
Colorectal	14873 (48.4)	0.6	NA	1510 (57.0)	1.5	NA	2026 (46.5)	1.4	NA
White, non-Hispanic	10275 (51.5)	0.6	NA	1133 (59.9)	1.7	NA	1595 (47.0)	1.5	NA
Black, non-Hispanic	2127 (44.0)	1.4	<.001	190 (41.2)	4.0	<.001	220 (45.2)	4.8	.72
Hispanic	1829 (31.2)	1.4	<.001	138 (42.8)	5.5	.004	145 (46.1)	5.8	.88
Asian, non-Hispanic	515 (41.4)	2.8	<.001	44 (51.1)	9.0	.33	61 (41.0)	6.3	.36
Prostate	6590 (39.6)	0.8	NA	563 (56.5)	2.6	NA	634 (42.4)	2.4	NA
White, non-Hispanic	4630 (41.9)	0.9	NA	417 (62.7)	2.6	NA	504 (43.8)	2.6	NA
Black, non-Hispanic	885 (36.0)	2.1	.01	76 (28.7)	6.2	<.001	62 (32.1)	7.7	.15
Hispanic	775 (29.4)	2.2	<.001	46 (42.3)	10.1	.047	50 (33.8)	8.9	.29
Asian, non-Hispanic	236 (32.1)	3.6	.01	21 (25.3)	15.5	.02	18 (41.4)	11.6	.84

Abbreviations: NA, not applicable; NHIS, National Health Interview Survey.

^aAll men and women (aged 50-74 years) who had received a fecal occult blood test within the past year or had had a sigmoidoscopy in the past 5 years or had had a colonoscopy in the past 10 years. All women (aged 50-74 years) who had received a mammogram within the past 2 years. All women (aged 18-74 years) who had received a Papanicolaou screen within the last 3 years (excluding those that had had a hysterectomy). All men (aged 50-74 years) who had received a prostate-specific antigen test within the past year.

^bWeighted percentages.

^cP values correspond to *t* tests on the difference of percentage between racial/ethnic groups and white non-Hispanics for each age group.

lence of PSA testing within the past year for prostate cancer among men was highest in the 75- to 79-year-old group (57%), followed by the group that was 80 years or older (42%) and the 50- to 74-year-old group (40%).

Among women in the 75- to 79-year-old group, blacks were less likely to report receiving a mammogram within the past 2 years compared with whites ($P < .05$) (Table 3). There were no statistically significant differences in screening behaviors by race/ethnicity in the group that was 80 years or older. Among 75- to 79-year-olds, black and Hispanic men and women were significantly less likely to be screened for colorectal cancer compared with whites ($P < .005$). Similarly, among this same age group, black, Hispanic, and Asian men were less likely to receive a PSA test compared with whites ($P < .05$ for all comparisons).

ADJUSTED CORRELATES OF SCREENING

Although prevalence rates differ by race in Table 3, separate multivariate logistic regression analyses for each screening test suggest that race/ethnicity was not a significant predictor of screening in older adults. Education and recalling a physician recommendation for a specific test were predictive of screening in adults older than 75 years. Those individuals without a high school diploma were significantly less likely to be screened for breast (OR, 0.4; 95% CI, 0.3-0.7), cervical (OR, 0.4; 95% CI, 0.2-0.8), colorectal (OR, 0.5; 95% CI, 0.3-0.8), and prostate (OR, 0.5; 95% CI, 0.3-0.8) cancer compared with adults older than 75 years with a college degree. Adults

older than 75 years were significantly more likely to be screened for breast (OR, 21.4; 95% CI, 16.0-28.6), cervical (OR, 42.1; 95% CI, 25.4-69.8), colorectal (OR, 67.7; 95% CI, 50.5-90.9), and prostate (OR, 44.1; 95% CI, 20.5-94.9) cancer if they recalled that a physician recommended the test. Also, men with more comorbidity were more likely to be screened for prostate cancer compared with men without any self-reported comorbidity (Table 4).

PHYSICIAN RECOMMENDATIONS FOR SCREENING TESTS BY AGE AND RACE/ETHNICITY

Table 5 presents percentages of people recalling recommendations for screening tests for breast, cervical, colorectal, and prostate cancer by age group and race/ethnicity. Among women, the rate of recalling physician recommendation for mammogram and Papanicolaou screen was highest in the screening guideline-specific age group (69% and 60%, respectively) followed by the group that was 75 to 79 years old group (62% and 48%, respectively) and the group that was 80 years or older (50% and 36%, respectively). The percentage of people recalling physician recommendations for screening for colorectal cancer was highest in the group that was 75 to 79 years old (65%) followed by the screening guideline-specific age group (62%) and the group that was 80 years or older (54%). Among men, the percentage recalling physician recommendation for PSA testing was highest among those

Table 4. Odd Ratios (ORs) of Screening by Sociodemographic Factors, Comorbidity Status, and Physician Recommendation (2005 and 2008 NHIS Survey Combined)^a

Characteristic	Screening, OR (95% CI)			
	Breast	Cervical	Colorectal	Prostate ^b
Age group				
75-79	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]
≥80	0.7 (0.5-1.0)	0.7 (0.4-1.0)	0.9 (0.7-1.2)	0.5 (0.4-0.7)
Race/ethnicity				
White, non-Hispanic	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]
Black, non-Hispanic	0.9 (0.6-1.4)	1.7 (0.9-3.0)	1.2 (0.8-1.8)	0.5 (0.3-1.0)
Hispanic	0.9 (0.4-2.0)	0.9 (0.2-3.7)	1.1 (0.5-2.4)	0.8 (0.5-1.5)
Asian, non-Hispanic	0.5 (0.2-1.3)	0.6 (0.3-1.3)	1.6 (0.4-6.2)	0.4 (0.2-1.1)
Education				
<High school	0.4 (0.3-0.7)	0.4 (0.2-0.8)	0.5 (0.3-0.8)	0.5 (0.3-0.8)
High school graduate	0.9 (0.6-1.4)	0.7 (0.4-1.2)	0.7 (0.5-1.0)	0.8 (0.5-1.1)
2- or 4-y college graduate	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]
>Bachelor degree	1.7 (0.7-4.1)	1.9 (0.7-5.1)	0.9 (0.5-1.7)	0.7 (0.4-1.3)
Family income, imputed, \$				
≥20 000	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]
<20 000	0.9 (0.7-1.2)	1.0 (0.6-1.5)	0.8 (0.6-1.1)	0.7 (0.5-1.0)
Known comorbidities				
None	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]
1-2	1.0 (0.7-1.5)	0.9 (0.5-1.5)	0.9 (0.6-1.4)	1.6 (1.0-2.5)
>2	1.2 (0.8-1.7)	0.9 (0.5-1.7)	1.2 (0.8-1.8)	1.7 (1.1-2.7)
Physician recommended screening test				
Yes	21.4 (16.0-28.6)	42.1 (25.4-69.8)	67.7 (50.5-90.9)	44.1 (20.5-94.9)
No	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]

Abbreviation: NHIS, National Health Interview Survey.

^aAdjusted estimates for all other variables in the model.

^bData from NHIS 2008 only, because the physician recommended screening question for prostate-specific antigen testing was not asked in the 2005 NHIS.

Table 5. Percentage of Physicians' Recommending Screening Tests by Age and Race/Ethnicity (2005 and 2008 NHIS Survey Combined)

Type of Screening Received	Age, y								
	Screening Guideline Specific Ages			75-79			≥80		
	No. (%)	SE	P Value	No. (%)	SE	P Value	No. (%)	SE	P Value
Breast ^a	7804 (68.8)	0.7		924 (61.7)	1.8		1317 (49.6)	1.7	
White, non-Hispanic	5320 (70.2)	0.8	1 [Ref]	693 (62.3)	2.0	1 [Ref]	1018 (49.2)	1.9	1 [Ref]
Black, non-Hispanic	1196 (64.2)	2.0	.005	114 (57.2)	5.5	.39	165 (53.6)	4.8	.40
Hispanic	977 (62.4)	2.1	.001	93 (53.1)	5.7	.14	90 (52.8)	7.7	.66
Asian, non-Hispanic	253 (69.3)	3.4	.79	22 (80.6)	8.4	.04	39 (42.1)	8.0	.39
Cervical ^b	18 273 (60.0)	0.5	>.99	516 (48.3)	2.7		728 (36.0)	2.3	1 [Ref]
White, non-Hispanic	10 735 (62.1)	0.6	1 [Ref]	364 (50.5)	3.2	1 [Ref]	550 (36.5)	2.5	1 [Ref]
Black, non-Hispanic	3015 (56.1)	1.2	<.001	71 (40.8)	7.2	.22	88 (32.4)	5.8	.50
Hispanic	3576 (54.9)	1.1	<.001	67 (38.5)	5.8	.07	59 (43.3)	10.3	.52
Asian, non-Hispanic	771 (53.9)	2.3	.001	14 (44.7)	17.3	.74	30 (22.2)	7.1	.06
Colorectal ^c	13 059 (62.4)	0.6		1380 (65.4)	1.6		1845 (54.1)	1.5	
White, non-Hispanic	9058 (66.2)	0.7	1 [Ref]	68.6 (1.7)	1.7	1 [Ref]	1445 (55.0)	1.6	1 [Ref]
Black, non-Hispanic	1893 (55.0)	1.5	<.001	52.9 (4.2)	4.2	<.001	203 (51.0)	5.0	.44
Hispanic	1542 (43.9)	1.7	<.001	48.7 (5.2)	5.2	<.001	136 (49.8)	6.1	.40
Asian, non-Hispanic	454 (51.3)	2.9	<.001	49.1 (8.1)	8.1	.02	57 (46.6)	6.6	.22
Prostate ^d	2619 (49.4)	1.2		252 (62.2)	4.2	1 [Ref]	260 (53.0)	3.5	
White, non-Hispanic	1811 (50.9)	1.5	1 [Ref]	178 (68.1)	4.5	1 [Ref]	202 (54.5)	3.8	1 [Ref]
Black, non-Hispanic	374 (49.7)	3.7	.77	35 (47.9)	9.1	.05	25 (39.7)	12.3	.25
Hispanic	289 (42.7)	3.6	.04	22 (56.3)	12.6	.38	20 (56.6)	13.5	.88
Asian, non-Hispanic	115 (38.4)	5.4	.03	16 (23.3)	17.2	.01	13 (37.0)	12.5	.18

Abbreviations: NHIS, National Health Interview Survey; Ref, reference.

^aAll women (aged 50-74 years) who had received a mammogram within the past 2 years.

^bAll women (aged 18-74 years) who had received a Papanicolaou screen within the past 3 years (excluding those who had had a hysterectomy).

^cAll men and women (aged 50-74 years) who had received a fecal occult blood test within the past year or had had a sigmoidoscopy in the past 5 years or had had a colonoscopy in the past 10 years.

^dAll men (aged 50-74 years) who had received prostate-specific antigen test within the past year.

who were 75 to 79 years old (62%), followed by those who were 80 years or older (53%) and the screening guideline-specific age group (49%).

Among the guideline specific-age group, several significant racial differences existed with respect to physicians' recommendation of screening tests. Blacks were significantly less likely to recall a physician's recommendation for colorectal screening, mammogram, and Papanicolaou screen compared with whites ($P < .005$ for all comparisons). Similarly, Hispanics were significantly less likely to recall a physician's recommendation for all types of screening examined ($P < .05$ for all comparisons). Finally, among the screening guideline-specific age group, Asians were significantly less likely to recall a physician's recommendation for colorectal screening, Papanicolaou screen, and PSA test ($P < .05$ for all comparisons).

These differences in recall of physician recommendations for colorectal screening for blacks, Hispanics, and Asians were also found in the group that was 75 to 79 years old ($P < .01$ for all comparisons). Although a statistically significant difference was found in recall of physician recommendations for mammography and PSA testing among Asians compared with whites in the group that was 75 to 79 years old, the sample size was too small for meaningful interpretation. No statistically significant differences were found in the group that was 80 years or older.

COMMENT

We examined the prevalence of cancer screening behaviors in older, racially diverse adults, as well as the extent to which they recalled physician recommendations for screening. A high percentage of older adults undergo cancer screening. Particularly striking are the rates of breast (62%) cervical (53%), colorectal (57%), and prostate cancer (56%) screening in the group that was 75 to 79 years old. Among those 80 years or older, rates of screening remain elevated and include a low of 38% for cervical cancer screening to a high of 50% for breast cancer screening. These persistently elevated rates of screening raise the question of whether the decision to be screened is being made without fully knowing or discussing the risks and benefits.

With heterogeneity in the health status of this older population, it is likely that continued screening for certain population segments is warranted, but making that determination is complex. These national estimates argue for more research that would examine factors that influence clinicians' and patients' decisions to screen or not to screen. A framework has been proposed to guide individualized cancer screening decisions that take into account estimated life expectancy, risk of cancer death from indolent or aggressive disease, and patients' values and preferences.⁵ Another option, used primarily to understand treatment tolerance in older adults, is the use of Comprehensive Geriatric Assessment (CGA),²² a measure of physical function, frailty, cognitive impairments, nutrition, and physical disabilities. This may be useful in individualized cancer screening decisions for older adults, although the evidence for the effectiveness of this tool for cancer prevention is nonexistent. Notable shortcomings of implementing this type of frame-

work for individualized decision making are time, familiarity, and cost. In addition, third-party reimbursement may need to "forgo oversimplified guidelines that do not allow for the application of clinical judgment."^{5 (p2756)}

Our analyses revealed racial differences in breast, colorectal, and prostate cancer screening among older adults (75-79 years) in the unadjusted prevalence estimates, but these differences were accounted for by low education attainment in the logistic regression model. These findings perhaps point to differences in educational access between blacks and Hispanics compared with whites. Although the education attainment of all races has increased over the past decade, the gap between Hispanics and blacks compared with whites is still significant.²³ These findings suggest that older minority adults from racial groups, perhaps owing to education level, are being screened less frequently than older whites, which demonstrates a continuing pattern of health disparities. Randomized clinical trials and/or leveraging existing population based data sets, such as the SEER/Medicare data set, are needed to examine the efficacy of cancer screening in this diverse population of older adults. Also of note is the interesting finding that men with more comorbidity were more likely to be screened for prostate cancer, perhaps reflecting a relationship between higher rates of screening in men who have frequent interaction or encounters with the health care system.

Despite USPSTF guidelines recommending against routine screening for breast, cervical, colorectal, and prostate cancer at the age of 75 years (65 years for cervical cancer), over 50% of physicians are continuing to recommend these screening tests in older men and women. Interestingly, these high recommendation rates continue in the group 80 years or older for colorectal (54%), breast (50%), and prostate (53%). These data could not be assessed to provide insight into whether physician recommendations are initiated as part of the informed decision making process, patient preferences, or objective measures of mortality risk. Findings from the logistic regression suggest that a person's recollection of a physician's recommendation for screening was a significant predictor of screening behavior. This finding reinforces the critical role for health care providers to make informed screening decision for older adults.

We know from studies of older adults' attitudes and preferences for continued screening in later life that 72% of adults 70 years or older report that they would continue cancer screening throughout their lives and almost half of those (43%) would continue despite their physicians recommendation against further screening.^{18,24} Other studies in younger adult populations found higher perceived risk for cancer increased screening rates,²⁵ which could not be assessed in this study. Perhaps with the known increase risk of cancer with age, older adults are hypervigilant with their primary care physicians about their desires to be screened. This is an empirical question yet to be examined.

Our analyses should be interpreted in the context of limitations using NHIS data. First, this study relied on self-report data. Therefore, rates of screening may have been overestimated as a result of social desirability.¹² Second, individuals who live in nursing homes, long-term care facilities, or hospice are not included in the survey,

so these findings generalize to noninstitutionalized US civilians. Third, current screening recommendations for breast, colorectal, and prostate cancer were not in place at the time of the surveys. Finally, the low numbers of older Asian men and women in our sample provided insufficient power to detect meaningful differences in screening behaviors between these groups and whites.

In the United States, the number of adults 65 years or older, currently estimated at 36.8 million, is expected to double by the year 2030.⁴ Providing high-quality care to this growing population while attempting to contain costs will pose a significant challenge. One strategy is to develop and disseminate evidence-based decision tools to guide clinicians to objectively determine, in conjunction with values and preferences of older adults, whether the benefits of screening outweigh the harms. This approach needs to be equitably distributed across the racially diverse population of older adults at risk for cancer. Prevalence results from this study can serve as a benchmark for progress as we move the science of cancer screening in older, diverse adults forward.

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INVITED COMMENTARY

What Is the Right Cancer Screening Rate for Older Adults?

Cancer screening rates are often used to measure of the quality of medical care. To define high quality, there are established target rates for screening in younger persons. For example, the Healthcare Effectiveness Data and Information Set (HEDIS) and Veterans Affairs set target rates for screening persons aged 50 to 75 years for colorectal cancer, women aged 50 to 69 years for breast can-

cer, and women aged 21 to 64 years for cervical cancer.¹ Age ranges for these quality measures are based on US Preventive Services Task Force guidelines. However, there are no quality measures that address appropriate target rates for cancer screening in persons older than 75 years.

This lack of target rates for cancer screening in older persons stems in part from the controversy surrounding