Cancer Screening Test Use – U.S., 2019

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Abstract

Introduction: The U.S. Preventive Services Task Force recommends breast, cervical and colorectal cancer (CRC) screening to reduce mortality from these cancers, but screening use has been below national targets. The purpose of this study is to examine the proportion of screening-eligible adults up-to-date with these screenings, and how screening use compares to Healthy People 2020 (HP2020) targets.

Methods: Data from the 2019 National Health Interview Survey (NHIS) were used to examine percentages up-to-date with breast cancer screening among women aged 50−74 years without prior breast cancer; cervical cancer screening among women aged 21−65 years without prior cervical cancer or hysterectomy; and CRC screening among adults aged 50−75 years without prior CRC. Estimates are presented by sociodemographic characteristics and healthcare access factors. Analyses were conducted in 2021.

Results: Percentages of adults up-to-date were 76.2% (95%CI 75.0–77.5) for breast cancer screening, 76.4% (95%CI 75.2%−77.6%) for cervical cancer screening, and 68.3% (95%CI 67.3% −69.3%) for CRC screening. Although some population subgroups met breast and CRC screening

targets (81.1% and 70.5%, respectively), many did not, and cervical cancer screening was below the target for all examined subgroups. Lower education and income, non-metropolitan county of residence (which included rural counties), no usual source of care or health insurance coverage, and Medicaid coverage were associated with lower screening test use.

Conclusions: Estimated use of breast, cervical and CRC screening tests based on the 2019 NHIS were below national targets. Continued monitoring may allow examination of screening trends, inform interventions, and track progress in eliminating disparities.

INTRODUCTION

The U.S. Preventive Services Task Force (USPSTF) recommends breast, cervical, and colorectal cancer (CRC) screening.[1] Screening use has been below national targets, with disparities among some population groups.[2,3] This analysis uses the most recent National Health Interview Survey (NHIS) data to examine use of these screenings. Findings are compared with Healthy People 2020 (HP2020) targets.[4] The USPSTF recommends lung cancer screening for some adults;[1] however, this information was not collected in 2019.

METHODS

Study Sample

Data came from the 2019 NHIS, a survey of a nationally representative sample of the civilian, noninstitutionalized U.S. population.[5] NHIS underwent survey redesign in 2019, including changes in some questions and response options, imputation methods, weighting and other changes.[5] Screening questions (Table 1) were asked of 1 randomly selected adult from each household (final response rate 59.1%). For each screening type, screening-eligible adults per USPSTF recommendations were included (breast: n=7,289; cervical: n=11,763; CRC: n=13,989) (Table 2).[1] Respondents with personal or unknown history of that cancer (breast: n=447; cervical: n=171; CRC: n=138), unknown screening status (breast: n=76; cervical: n=530; CRC: n=414), and for cervical screening previous or unknown hysterectomy (n=1,787) were excluded.

Measures

Up-to-date screening included tests for any reason within USPSTF-recommended intervals. For CRC tests, responses about time since most recent fecal immunochemical test (FIT) with stool deoxyribonucleic acid tests (FIT-DNA) were not released by the National Center for Health Statistics (NCHS). Therefore, timing of home blood stool (FOBT) or FIT test was used to classify FIT-DNA status (Table 2).

Estimates are presented by sociodemographic characteristics and healthcare access factors (Tables 3−4).[5,6] Ethnicity includes Hispanic and non-Hispanic groups. Income is presented as percentage of poverty thresholds. County metropolitan status in NHIS includes 4 groups based on the 2013 NCHS Urban-Rural Classification Scheme for Counties.[5] Usual source of care includes places respondents usually go when sick or needing healthcare. No usual source included no place, no one place most often, emergency rooms, urgent care centers, or grocery or drug store clinics.

Statistical Analysis

Estimates are presented as percentages with Korn-Graubard CIs. Overall percentages were age-standardized to the 2000 U.S. standard population. Wald F tests were used to test differences across groups. Design variables and survey weights were used to account for the complex sample design. Estimates not meeting NCHS standards for reliability were suppressed.[7] SAS (version 9.4) and SUDAAN (version 11.0.03) were used in analyses conducted in 2021.

RESULTS

For breast cancer screening (Table 3), 76.2% of women were up-to-date (age-adjusted 76.2%), below the HP2020 target (81.1%). Lower use was associated with lower educational attainment and income, nonmetropolitan county, and no usual source of care or health insurance coverage. Use was generally lowest among women without a usual source of care (47.4%) or aged <65 years without health insurance coverage (43.2%).

For cervical cancer screening, 76.4% of women were up-to-date (age-adjusted 76.8%), below the HP2020 target (93.0%). Use was generally lowest among women without a high school education (59.3%), with U.S. residence <10 years (56.4%), and aged <65 years without health insurance coverage (57.4%).

For CRC screening (Table 4), 68.3% of adults were up-to-date (age-adjusted 67.9%), below the HP2020 target (70.5%). Use was generally lowest among those with U.S. residence <10 years (29.0%), no usual source of care (39.4 %) and aged <65 years without health insurance coverage (31.1%).

DISCUSSION

Based on 2019 NHIS estimates, three-quarters of women eligible for breast and cervical cancer screening and two-thirds of those eligible for CRC screening were up-to-date. Each was below HP2020 targets, although CRC test use approached its target. Some population subgroups exceeded breast and CRC targets while many did not. Screening disparities were observed by education, income, health insurance coverage, and U.S. residence duration, as previously reported.[2,3] Nonmetropolitan counties had lower test use, a finding relevant to rural health. Lack of healthcare access has been associated with lower cancer screening uptake.[8–12] Consistent with this, lacking health insurance coverage or a usual source of care were strongly associated with lower test use. Although the disparities in the current analysis are not new,[2,3] their persistence and the continued failure to meet national targets for screening test use are important. Such results can help inform efforts to implement strategies to address screening barriers and healthcare inequities. As the population grows and ages, more adults will be at risk for cancer[13] and in need of screening, further underscoring efforts around promoting and facilitating recommended screening.

The 2019 NHIS redesign[5] has implications for interpreting findings. The extent to which changes in questions and methods may have influenced estimates is uncertain, and changes limit direct comparison with prior years.[14] Differences between 2019 estimates for breast

and cervical cancer screening and those based on the 2018 NHIS (72.4% and 82.9%, respectively)[2] could reflect changes in test use, survey changes, or both. Little change was reported in these 2 screenings from 2005 to 2018.[2] In 2018, the USPSTF added human papillomavirus (HPV) testing alone as a cervical cancer screening option for women aged 30−65 years.[15] This option was included in this analysis and not the 2018 analysis,[2] but this unlikely explains the lower proportion up-to-date in 2019. In general, increasing guideline complexity presents greater opportunity for missing or incomplete self-reported information about tests; differences in handling missing information could result in different estimates across studies. For CRC screening, differences between 2019 estimates and those using 2018 data (66.9%)[2] were smaller. CRC screening use has increased over time,[2] and findings could reflect that trend or survey changes. Although the redesign limits comparisons with earlier years, examining trends in future years will enable monitoring of screening use.

In March 2020, the WHO declared COVID-19 a pandemic,[16] and subsequent reports documented reductions in cancer screening,[17−20] leading to concerns about the effects of delayed or canceled screenings on health outcomes.[21,22] Evidence suggests at least a partial recovery in screening use over time.[17,19,20] These 2019 findings can serve as a pre-pandemic baseline to compare with future estimates to assess recovery and growth in screening use.

Limitations

Findings are subject to limitations. Information is self-reported and not verified using medical records. Previous research demonstrated generally good validity for self-reported screening for breast, cervical and CRC, although some over-reporting has been noted.[23−25] Less is known about self-reported HPV tests for cervical cancer screening, suggesting an area for future research. Some variables had missing information for some respondents; thus, caution may be warranted in interpretating some subgroup estimates. The final sample adult response rate was 59.1%; therefore, nonresponse bias may be present despite survey weight adjustments. Up-to-date screening was defined as a relevant test for any reason among eligible adults within USPSTF-recommended intervals, consistent with HP2020 measures and earlier studies.[2−4,8,26] Furthermore, having a diagnostic test might result in being considered screened in effect. In an analysis of 2018 NHIS data, 95% of women who reported a recent mammogram said it was part of a "routine exam",[2] suggesting relatively few may be diagnostic. Similarly, an NHIS analysis examining CRC screening suggested most respondents indicated tests were done for screening purposes.[8]

CONCLUSIONS

Estimated breast, cervical and CRC screening test use based on the 2019 NHIS remained below national targets. Continued monitoring will help to examine progress in screening uptake and eliminating disparities, and track recovery from changes in use resulting from the pandemic.

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Table 1.

2019 National Health Interview Survey (NHIS) Questions on Breast, Cervical, and Colorectal Cancer Screening

Cancer screening/NHIS survey universe	Survey question
Breast cancer	
Females aged 30 years	Have you ever had a mammogram?
	If yes: About how long has it been since your most recent mammogram?
Cervical cancer	
Females aged 18 years	Have you ever had a test to check for cervical cancer?
	If yes: When did you have your most recent test to check for cervical cancer?
	At your most recent cervical cancer screening, did you have a Pap test?
	At your most recent cervical cancer screening, did you have an HPV test?
Colorectal cancer	
Adults aged 40 years	Colonoscopy and sigmoidoscopy are exams to check for colon cancer. Have you ever had either of these exams?
	If yes: Have you had a colonoscopy, a sigmoidoscopy, or both?
Adults aged 40 years who ever had sigmoidoscopy or both colonoscopy and sigmoidoscopy	When was your most recent sigmoidoscopy?
Adults aged 40 years who ever had colonoscopy or both colonoscopy and sigmoidoscopy	About how long has it been since your most recent colonoscopy?
Adults aged 40 years who ever had colonoscopy or sigmoidoscopy but don't know which type	When was your most recent colonoscopy or sigmoidoscopy?
Adults aged 40 years	Have you ever had any other kind of test for colorectal cancer, such as virtual colonoscopy, CT colonography, blood stool test, FIT-DNA or Cologuard test?
Adults aged 40 years who had a test other than colonoscopy or sigmoidoscopy	Have you ever had a CT colonography or virtual colonoscopy?
	If yes: When was your most recent CT colonography or virtual colonoscopy?
	Have you ever had a blood stool or FIT test, using a home test kit?
	If yes: When was your most recent blood stool or FIT test, using home test kit?
Adults aged 40 years who ever had a home blood stool or FIT test	Have you ever had a Cologuard test?
	If yes: Was the blood stool or FIT test you reported earlier conducted as part of a Cologuard test?
	When did you have your most recent Cologuard test? (not released)

HPV, human papillomavirus; CT, computed tomography; FIT, fecal immunochemical test.

Table 2.

Definitions of Up-to-Date With Cancer Screening, by Cancer Screening Type

Screening type	Age and sex eligibility criteria	Definition of up-to-date with screening
Breast cancer	Women aged 50−74 years	Mammography within 2 years
Cervical cancer	Women aged 21−65 years	Papanicolaou (Pap) test within 3 years among women aged 21−65 years, or human papillomavirus (HPV) test only or with Pap (co-test) within 5 years among ages 30−65 years
Colorectal cancer	Adults aged 50−75 years	Colonoscopy within 10 years, sigmoidoscopy or CT colonography within 5 years, home blood stool (FOBT) or fecal immunochemical (FIT) test within 1 year, or FIT-DNA[a] within 3 years

[a] Survey responses to the NHIS question about time since most recent FIT-DNA were not released because it was not asked of some respondents. For this analysis, respondents were considered up-to-date with FIT-DNA if their most recent FOBT/FIT was reported to have been part of FIT-DNA and received within 3 years, and not up-to-date if they never had FOBT/FIT or FIT-DNA, or if they had FIT-DNA and their most recent FOBT/FIT occurred more than 3 years prior.

NHIS, National Health Interview Survey.

Table 3.

Percentage of Women Up-to-Date With Breast and Cervical Cancer Screening − U.S., 2019

Characteristics	Breast cancer screening				Cervical cancer screening			
	Sample n	Weighted % (95%CI)	*p*-value[a]	HP2020 target	Sample n	Weighted % (95%CI)	*p*-value[a]	HP2020 target
				81.1%				**93.0%**
Overall − unadjusted	6,766	76.2 (75.0, 77.5)			9,275	76.4 (75.2, 77.6)		
Overall − age-standardized[b]	6,766	76.2 (74.9, 77.5)			9,275	76.8 (75.6, 77.9)		
Age, years			0.122				**<0.001**	
21−30					2,017	71.1 (68.3, 73.8)		
31−40					2,466	81.9 (79.9, 83.8)		
41−50					1,896	79.3 (77.0, 81.5)		
51−65					2,896	74.4 (72.4, 76.3)		
50−64	4,085	75.5 (73.9, 77.2)						
65−74	2,681	77.7 (75.5, 79.7)						
Race			0.109				**0.001**	
AIAN	104	64.3 (52.2, 75.2)			183	75.6 (63.6, 85.2)		
Asian only	266	72.3 (64.7, 79.0)			620	67.3 (62.4, 71.9)		
Black/African American only	788	79.0 (74.9, 82.6)			1,206	77.8 (74.7, 80.7)		
White only	5,293	76.0 (74.5, 77.4)			6,569	77.9 (76.5, 79.2)		
Other single and multiple race	60	80.8 (68.2, 90.0)			145	70.6 (60.2, 79.6)		
Missing/Unknown	255	80.6 (74.0, 86.2)			552	70.8 (65.5, 75.7)		
Ethnicity[c]			0.308				**<0.001**	
Non-Hispanic	6,103	76.0 (74.6, 77.3)			7,744	78.0 (76.7, 79.2)		
Hispanic	663	78.1 (74.0, 81.8)			1,531	69.9 (66.9, 72.9)		
Mexican/Mexican American	341	77.3 (71.4, 82.5)			876	70.2 (66.0, 74.1)		
All other Hispanic groups[d]	311	79.0 (72.9–84.2)			642	69.4 (64.9–73.5)		
Education			**<0.001**				**<0.001**	
<High school	580	68.1 (62.9, 72.9)			610	59.3 (54.1, 64.2)		
High school/GED	1,710	73.2 (70.7, 75.7)			1,965	68.9 (66.2, 71.5)		
Some college	2,151	75.9 (73.7, 78.0)			2,743	77.3 (75.3, 79.2)		
College degree	2,304	82.5 (80.6, 84.3)			3,933	85.1 (83.7, 86.4)		
Missing/Unknown	21	*h*			24	*h*		
Income, % poverty threshold			**<0.001**				**<0.001**	
138%	1,225	66.9 (63.4, 70.3)			1,808	64.6 (61.6, 67.6)		
>138%−250%	1,297	70.7 (67.3, 73.8)			1,752	71.2 (68.3, 73.9)		
>250%−400%	1,320	75.1 (71.9, 78.0)			1,947	77.8 (75.1, 80.2)		

Characteristics	Breast cancer screening				Cervical cancer screening			
	Sample n	Weighted % (95%CI)	*p*-value[a]	HP2020 target	Sample n	Weighted % (95%CI)	*p*-value[a]	HP2020 target
>400%	2,923	82.9 (81.2, 84.4)			3,768	84.3 (82.8, 85.7)		
Duration of U.S. residence			0.088				**<0.001**	
<10 years	58	*h*			372	56.4 (49.9, 62.7)		
10 years	869	77.4 (73.7, 80.8)			1,335	73.4 (70.5, 76.2)		
Born in U.S.	5,709	76.6 (75.2, 78.0)			7,364	78.6 (77.3, 79.9)		
Missing/Unknown	130	65.7 (54.8, 75.5)			204	64.4 (55.4, 72.7)		
County metropolitan status[e]			**0.002**				**0.033**	
Large central metropolitan	1,794	77.3 (74.8, 79.7)			2,994	77.1 (75.1, 79.0)		
Large fringe metropolitan	1,592	78.5 (75.9, 80.9)			2,146	78.6 (76.3, 80.7)		
Medium/small metropolitan	2,182	76.6 (74.3, 78.7)			2,910	75.3 (73.1, 77.4)		
Nonmetropolitan	1,198	70.5 (67.0, 73.8)			1,225	72.9 (69.2, 76.4)		
Sexual orientation			0.797				0.381	
Lesbian or gay	61	72.1 (56.0, 84.9)			138	72.3 (61.6, 81.4)		
Straight	6,476	76.5 (75.2, 77.8)			8,581	77.2 (76.0, 78.4)		
Bisexual	37	*h*			244	72.3 (64.3, 79.3)		
Other	16	*h*			48	*h*		
Missing/Unknown	176	68.0 (58.9, 76.1)			264	58.6 (50.8, 66.0)		
Usual source of care			**<0.001**				**<0.001**	
Yes	6,136	79.3 (78.0, 80.6)			7,582	79.6 (78.3, 80.8)		
No	628	47.4 (42.3, 52.6)			1,688	63.4 (60.5, 66.2)		
Missing/Unknown	2	*h*			5	*h*		
Insurance[f]								
Age <65 years			**<0.001**				**<0.001**	
Private	2,888	80.0 (78.2, 81.7)			6,273	81.5 (80.2, 82.7)		
Medicaid/Other Public	550	74.6 (70.0, 78.8)			1,346	70.9 (67.6, 74.0)		
Other coverage	282	78.5 (72.3, 83.9)			396	78.1 (72.1, 83.3)		
Uninsured	360	43.2 (37.0, 49.5)			1,039	57.4 (53.6, 61.1)		
Missing/Unknown	5	*h*			12	*h*		
Age 65 years[g]			**<0.001**				0.799	
Private	1,175	79.8 (76.5, 82.9)			94	67.4 (55.0, 78.3)		
Medicare + Medicaid	202	66.3 (57.1, 74.7)			15	*h*		
Medicare Advantage	789	83.5 (80.1, 86.6)			52	69.0 (54.0, 81.5)		
Medicare only	365	66.5 (60.1, 72.6)			29	*h*		
Other coverage	117	76.5 (66.5, 84.7)			12	*h*		

Characteristics	Breast cancer screening				Cervical cancer screening			
	Sample n	Weighted % (95%CI)	*p-*value[a]	HP2020 target	Sample n	Weighted % (95%CI)	*p-*value[a]	HP2020 target
Uninsured	26	*h*			7	*h*		
Missing/Unknown	7	*h*			0	*h*		

Notes: Boldface indicates statistical significance (*p*<0.05).

[a]*P*-value from Wald F tests testing for any differences across groups excluding missing/unknown.

[b]Overall percentages were age-standardized to the 2000 U.S. standard population. Percentages by sociodemographic characteristics and access to care factors are unadjusted.

[c]*P*-value testing for differences between Hispanic and non-Hispanic groups.

[d]Estimates are provided for Mexican/Mexican American adults. Separate information was not available from NHIS for other subgroups.

[e]County metropolitan status in the 2019 NHIS includes 4 groups based on the 2013 NCHS Urban-Rural Classification Scheme for Counties.[5,6]

[f]Within each age group, insurance was categorized hierarchically in order of categories listed.

[g]Findings for cervical cancer screening include only women aged 65 years because USPSTF does not recommend routine cervical cancer screening after age 65 years.

[h]Estimates suppressed because they did not meet National Center for Health Statistics reliability standards.[7]

AIAN, American Indian/Alaska Native (includes AIAN only or in combination); HP2020, Healthy People 2020; NHIS, National Health Interview Survey; NCHS, National Center for Health Statistics; USPSTF, U.S. Preventive Services Task Force.

Table 4.

Percentage of Adults Aged 50−75 Years Up-to-Date With Colorectal Cancer Screening − U.S., 2019

Characteristics	Sample n	Weighted % (95% CI)	p-value[a]	HP2020 target
Overall − unadjusted	13,437	68.3 (67.3, 69.3)		70.5%
Overall − age-standardized[b]	13,437	67.9 (66.9, 68.9)		
Age, years			<0.001	
50−64	7,979	62.2 (60.9, 63.6)		
65−75	5,458	79.7 (78.3, 81.0)		
Sex			0.002	
Male	6,202	66.7 (65.2, 68.2)		
Female	7,235	69.8 (68.4, 71.0)		
Race			<0.001	
AIAN	216	62.8 (53.8, 71.1)		
Asian only	524	57.6 (51.9, 63.3)		
Black/African American only	1,461	69.5 (66.6, 72.2)		
White only	10,677	69.8 (68.7, 70.9)		
Other single and multiple race	97	62.6 (51.1, 73.1)		
Missing/Unknown	462	56.0 (50.3, 61.6)		
Ethnicity[c]			<0.001	
Non-Hispanic	12,202	70.3 (69.3, 71.3)		
Hispanic	1,235	53.8 (50.1, 57.4)		
Mexican/Mexican American	627	50.0 (45.3, 54.6)		
All other Hispanic groups[d]	585	57.6 (52.1, 63.0)		
Education			<0.001	
<High school	1,235	52.2 (48.4, 56.0)		
High school/GED	3,496	64.5 (62.7, 66.3)		
Some college	4,034	71.0 (69.2, 72.7)		
College degree	4,616	76.3 (74.7, 77.9)		
Missing/Unknown	56	g		
Income, % poverty threshold			<0.001	
138%	2,253	53.7 (50.8, 56.5)		
>138%−250%	2,454	62.1 (59.5, 64.7)		
>250%−400%	2,615	68.7 (66.2, 71.1)		
>400%	6,115	75.8 (74.3, 77.2)		
Duration of U.S. residence			<0.001	
<10 years	107	29.0 (19.7, 39.8)		
10 years	1,703	57.8 (54.9, 60.7)		
Born in U.S.	11,341	71.4 (70.4, 72.4)		
Missing/Unknown	286	57.5 (49.9, 64.9)		

Characteristics	Colorectal cancer screening			
	Sample n	Weighted % (95% CI)	*p*-value[a]	HP2020 target
County metropolitan status[e]			**0.002**	
Large central metropolitan	3,564	65.7 (63.6, 67.8)		
Large fringe metropolitan	3,233	70.5 (68.5, 72.4)		
Medium/small metropolitan	4,262	69.8 (67.9, 71.5)		
Nonmetropolitan	2,378	66.6 (63.9, 69.1)		
Sexual orientation			**0.041**	
Lesbian or gay	172	77.4 (69.5, 84.1)		
Straight	12,778	68.5 (67.5, 69.6)		
Bisexual	67	*g*		
Other	32	*g*		
Missing/Unknown	388	57.5 (51.5, 63.4)		
Usual source of care			**<0.001**	
Yes	12,029	71.9 (70.9, 72.9)		
No	1,404	39.4 (36.4, 42.4)		
Missing/Unknown	4	*g*		
Insurance[f]				
Age <65 years			**<0.001**	
Private	5,600	67.4 (65.9, 68.9)		
Medicaid/Other public	950	54.7 (50.4, 58.9)		
Other coverage	659	70.3 (66.0, 74.3)		
Uninsured	758	31.1 (27.1, 35.2)		
Missing/Unknown	12	*g*		
Age 65 years			**<0.001**	
Private	2,350	85.4 (83.6, 87.0)		
Medicare + Medicaid	369	64.9 (57.9, 71.4)		
Medicare Advantage	1,506	82.2 (79.7, 84.6)		
Medicare only	714	68.8 (64.7, 72.7)		
Other coverage	461	79.1 (73.9, 83.8)		
Uninsured	47	*g*		
Missing/Unknown	11	*g*		

Notes: Boldface indicates statistical significance (*p*<0.05).

[a]*P*-value from Wald F tests testing for any differences across groups excluding missing/unknown.

[b]Overall percentages were age-standardized to the 2000 U.S. standard population. Percentages by sociodemographic characteristics and access to care factors are unadjusted.

[c]*P*-value testing for differences between Hispanic and non-Hispanic groups.

[d]Estimates are provided for Mexican/Mexican American adults. Separate information was not available from NHIS for other subgroups.

^{e}County metropolitan status in the 2019 NHIS includes 4 groups based on the 2013 NCHS Urban-Rural Classification Scheme for Counties.[5,6] Differences between non-metropolitan counties and large fringe metropolitan counties (p=0.016) and medium/small metropolitan counties (p=0.045) were statistically significant.

^{f}Within each age group, insurance was categorized hierarchically in order of categories listed.

^{g}Estimates suppressed because they did not meet National Center for Health Statistics reliability standards.[7]

AIAN, American Indian/Alaska Native (includes AIAN only or in combination); HP2020, Healthy People 2020; NHIS, National Health Interview Survey; NCHS, National Center for Health Statistics.