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## Overuse of Papanicolaou Testing Among Older Women and Among Women Without a Cervix

Deanna Kepka, PhD, MPH, Nancy Breen, PhD, Jessica B. King, MPH, Vicki B. Benard, PhD, and Mona Saraiya, MD, MPH

Cancer Control and Population Sciences, Huntsman Cancer Institute, University of Utah, Salt Lake City (Kepka); College of Nursing, University of Utah, Salt Lake City (Kepka); Health Services and Economics Branch, National Cancer Institute, National Institutes of Health, Rockville, Maryland (Kepka, Breen); Cancer Surveillance Branch, Centers for Disease Control and Prevention, Atlanta, Georgia (King); Epidemiology and Applied Research Branch, Division of Cancer Prevention and Control, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Atlanta, Georgia (Benard, Saraiya)

### Abstract

Leading national organizations are increasingly using evidence-based recommendations for Papanicolaou testing. As of 2003, organizations recommended against Papanicolaou testing for women without a cervix following a hysterectomy who do not have a history of high-grade precancerous lesion or cervical cancer and for women older than 65 years with adequate prior screening and who are not at high risk.<sup>1–3</sup> Few studies have investigated overuse of Papanicolaou testing among US women. We aimed to investigate overuse of Papanicolaou testing in relation to cervical cancer screening recommendations.

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**Corresponding Author:** Deanna Kepka, PhD, MPH, Huntsman Cancer Institute, College of Nursing, University of Utah, 2000 Circle of Hope, Room 4144, Salt Lake City, Utah 84112 (deanna.kepka@hci.utah.edu).

**Author Contributions:** Dr Kepka had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

*Study concept and design:* Kepka, Breen, Benard, Saraiya.

*Acquisition of data:* Breen.

*Analysis and interpretation of data:* All authors.

*Drafting of the manuscript:* Kepka, Breen, Benard, Saraiya.

*Critical revision of the manuscript for important intellectual content:* Kepka, Breen, King, Saraiya.

*Statistical analysis:* Kepka, Breen, King

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*Study supervision:* Kepka.

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## Methods

A cross-sectional study was conducted using data from the 2010 National Health Interview Survey (NHIS). The NHIS is a nationally representative survey of the civilian non-institutionalized population of the United States that uses a random, stratified, multistage cluster sampling design. Analyses of public use data are considered exempt by the institutional review board (IRB) of the National Cancer Institute; IRB approval and informed consent were obtained in the original study. In 2010, the NHIS included a Cancer Control Supplement, which is the most recently available national data set that includes detailed items on cervical cancer screening and hysterectomy status, including, for the first time, questions to assess date of self-reported hysterectomy. The Cancer Control Supplement, fielded to adults 18 years and older, had a response rate of 60.8%.<sup>4</sup> Because women younger than 30 years are less likely to have undergone a hysterectomy, our study sample includes women 30 years and older from NHIS 2010 who responded to questions about Papanicolaou test use and hysterectomy status and reported that their Papanicolaou test was for screening purposes (“part of a routine exam”) (N = 9494).

We examined sociodemographic characteristics for our study sample by hysterectomy status and age. We then investigated timing of most recent Papanicolaou test (within the past year, 1–3 years ago, >3 years ago) by sociodemographic characteristics and by hysterectomy status. National estimates of Papanicolaou testing overuse were calculated using the population weights from the 2010 NHIS. Women who reported a history of cervical cancer, an abnormal Papanicolaou test result within the past 3 years, or whose last Papanicolaou test was not part of a routine test were excluded from the results used to generate the national estimates. SAS-callable SUDAAN, version 9.2, was used in all analyses to account for the stratification and clustering of data within the complex survey design of the NHIS.

## Results

Among women reporting a hysterectomy, 34.1% (95% CI, 31.7%–36.6%) reported a Papanicolaou test in the past year (Table 1). A total of 64.8% (95% CI, 62.2%–67.3%) of women reporting a hysterectomy also reported a recent Papanicolaou test since their hysterectomy, and among women 65 years and older without a hysterectomy, 58.4% (95% CI, 55.3%–61.4%) reported receipt of a Papanicolaou test in the past 3 years (Table 2), together representing approximately 14 million women.

## Discussion

For more than a decade, the US Preventive Services Task Force (USPSTF) has recommended that women discontinue Papanicolaou testing if they have received a total hysterectomy and have no history of cervical cancer or if they are older than 65 years and have ongoing and recent normal Papanicolaou test results.<sup>5</sup> Nevertheless, in 2010, nearly two-thirds of women reported a Papanicolaou test since their hysterectomy and approximately one-half of women older than 65 years reported a Papanicolaou test in the past 3 years. With the implementation of the Affordable Care Act, the use of electronic

medical records, health care provider reminder systems, decision support, and new strategies to improve quality of care may improve guideline-consistent practices among clinicians.<sup>6</sup>

Limitations of this study are the use of self-reported data to obtain information on Papanicolaou testing and the lack of detail on type of hysterectomy received and on whether older women were adequately screened prior to stopping use of the test.

Misuse of Papanicolaou testing continues despite USPSTF recommendations, and health care resources could be spent better elsewhere. Targeted efforts are needed to reduce unnecessary testing among older women and women without a cervix in compliance with clinical recommendations for cervical cancer prevention.

## References

1. US Preventive Services Task Force. Screening for Cervical Cancer: Recommendations and Rationale. Rockville, MD: Agency for Healthcare Research and Quality; 2003.
2. Saslow D, Runowicz CD, Solomon D, et al. American Cancer Society. American Cancer Society guideline for the early detection of cervical neoplasia and cancer. *CA Cancer J Clin.* 2002; 52(6): 342–362. [PubMed: 12469763]
3. ACOG Committee on Practice Bulletins. ACOG Practice Bulletin: clinical management guidelines for obstetrician-gynecologists. number 45, August 2003. cervical cytology screening (replaces committee opinion 152, March 1995). *Obstet Gynecol.* 2003; 102(2):417–427. [PubMed: 12907124]
4. Roland KB, Benard VB, Soman A, Breen N, Kepka D, Saraiya M. Cervical cancer screening among young adult women in the United States. *Cancer Epidemiol Biomarkers Prev.* 2013; 22(4):580–588.. [PubMed: 23355601]
5. US Preventive Services Task Force. Guide to Clinical Preventive Services. 2nd ed.. Baltimore, MD: Lippincott Williams & Wilkins; 1996.
6. US Department of Health and Human Services. [Accessed October 18, 2013] Key Features of the Affordable Care Act by Year. <http://www.hhs.gov/healthcare/facts/timeline/timeline-text.html>

**Table 1** Characteristics of Women by Hysterectomy Status and by Age, National Health Interview Survey (NHIS) (2010)<sup>a</sup>

Characteristic	Women 30 Years and Older		Women 65 Years and Older, No. and Older, No. (% [95% CI]) (n = 2581)	
	Reporting No. Hysterectomy, No. (% [95% CI]) (n = 7216)	Reporting Hysterectomy (n = 2278)	No. (% [95% CI])	Mean, y
			Age at Hysterectomy	Time Since Hysterectomy
All women	...	...	41.3	20.2
Age, y				
30–44	2748 (38.1 [36.8–39.5])	156 (7.3 [6.1–8.7])	33.9	5.9
45–64	2960 (43.7 [42.3–45.0])	1049 (49.6 [47.2–52.1])	40.0	15.7
65	1508 (18.2 [17.2–19.3])	1073 (43.1 [40.7–45.5])	44.2	29.9
Race/ethnicity				
Non-Hispanic white	4214 (70.3 [69.0–71.6])	1502 (75.1 [73.1–77.1])	41.4	22.0
Non-Hispanic black	1149 (11.2 [10.3–12.1])	439 (13.6 [12.1–15.4])	39.7	19.0
Hispanic or Latino	1346 (12.5 [11.6–13.4])	258 (8.0 [6.9–9.4])	41.8	15.5
Other	507 (6.0 [5.3–6.7])	79 (3.2 [2.5–4.1])	42.7	17.1
Education				
Less than high school	1122 (12.2 [11.3–13.2])	430 (15.4 [13.7–17.2])	40.7	24.9
High school graduate or GED	1785 (24.5 [23.2–25.7])	753 (35.4 [33.1–37.8])	41.0	21.2
Some college	2105 (29.8 [28.6–31.1])	703 (31.1 [29.0–33.3])	40.4	20.2
College graduate	2188 (33.5 [31.9–35.1])	384 (18.2 [16.2–20.3])	43.6	18.1
Missing	16	8	...	...
Proportion of poverty level, %				
<200	3230 (36.8 [35.3–38.4])	1126 (41.8 [39.5–44.2])	40.5	23.1
200 to <400	1465 (21.4 [20.3–22.6])	494 (22.8 [21.0–24.8])	41.7	21.5
400	2519 (41.8 [40.1–43.4])	658 (35.3 [32.9–37.8])	41.9	18.1
Missing	2	...	...	...
Health care coverage <sup>b</sup>				

Characteristic	Women 30 Years and Older				Women 65 Years and Older, No. (% [95% CI]) (n = 2581)
	Reporting No. Hysterectomy, No. (% [95% CI]) (n = 7216)	Reporting Hysterectomy (n = 2278)			
		No. (% [95% CI])	Age at Hysterectomy	Mean, y Time Since Hysterectomy	
Private only	2003 (30.2 [28.7–31.7])	434 (22.2 [20.1–24.4])	39.8	14.2	c
Public only	1491 (16.3 [15.3–17.4])	695 (25.5 [23.5–27.5])	41.5	26.3	1209 (42.9 [40.5–45.4])
Public and private	2639 (40.0 [38.5–41.6])	955 (44.6 [42.1–47.0])	42.6	22.2	1315 (54.9 [52.4–57.4])
None	1069 (13.4 [12.4–14.5])	189 (7.8 [6.6–9.2])	37.1	15.8	c
Missing	14	5	...	...	57
Has a usual source of health care					
Yes	6428 (90.2 [89.4–91.0])	2161 (95.2 [94.0–96.1])	41.5	21.0	2504 (97.5 [96.8–98.1])
No	788 (9.8 [9.0–10.6])	116 (4.8 [3.9–6.0])	37.5	19.0	76 (2.5 [1.9–3.2])
Missing	0	1	...	...	1
Ever heard of HPV					
Yes	4141 (75.4 [74.0–76.8])	830 (73.1 [70.1–75.9])	39.5	13.9	d
No	1554 (24.6 [23.2–26.0])	371 (26.9 [24.1–29.9])	38.3	16.1	d
Missing	1521	1077	...	...	...
Time since most recent Papanicolaou test, y <sup>e</sup>					
<1	3790 (54.4 [52.9–55.9])	724 (34.1 [31.7–36.6])	41.6	16.0	659 (27.2 [24.9–29.6])
1–3	1880 (26.3 [25.1–27.5])	494 (21.7 [19.8–23.7])	40.2	19.7	582 (23.2 [21.2–25.3])
>3	1490 (19.3 [18.2–20.4])	1036 (44.2 [41.8–46.5])	41.6	25.2	1291 (49.6 [47.2–52.1])
Missing	56	24	...	...	49
No. of Papanicolaou tests in past 6 y					
0	782 (9.9 [9.1–10.9])	718 (31.1 [28.8–33.5])	41.1	26.8	907 (34.7 [32.4–37.2])
1	681 (9.2 [8.4–10.0])	264 (11.5 [10.0–13.2])	41.7	21.0	326 (12.8 [11.4–14.4])
2	660 (9.0 [8.3–9.9])	210 (9.0 [7.7–10.5])	40.4	22.4	250 (10.1 [8.7–11.6])
3	808 (11.4 [10.6–12.2])	203 (9.9 [8.4–11.7])	40.2	19.5	255 (11.0 [9.5–12.7])
4	513 (6.7 [6.1–7.4])	128 (5.6 [4.6–6.7])	41.8	16.7	129 (4.7 [3.8–5.7])
5	535 (8.2 [7.4–9.2])	102 (4.8 [3.8–6.1])	41.9	19.2	122 (5.3 [4.2–6.6])

Characteristic	Women 30 Years and Older				Women 65 Years and Older, No. (% [95% CI]) (n = 2581)
	Reporting No. Hysterectomy, No. (% [95% CI]) (n = 7216)		Reporting Hysterectomy (n = 2278)		
	No. (% [95% CI])	Mean, y	Age at Hysterectomy	Time Since Hysterectomy	
6	3032 (44.4 [42.9–45.9])	593 (26.9 [24.9–29.1])	41.6	15.9	504 (21.2 [19.2–23.2])
7	93 (1.1 [0.0–1.4])	c	c	c	c
Missing	112	60	...	...	88

Abbreviations: GED, General Education Development; HPV, human papillomavirus.

<sup>a</sup>Includes all women 30 years and older, excluding women who report history of cervical cancer or an abnormal Papanicolaou test result in the past 3 years and women whose last Papanicolaou test was not a routine test (meaning that women who never had a Papanicolaou test are excluded). Mean age at hysterectomy and mean time since hysterectomy are missing for 105 of the 2278 women who report a hysterectomy. Percentages are weighted estimates. Missing responses are not included in the denominator. All analyses account for the stratification and clustering of data within the complex survey design of the NHIS.

<sup>b</sup>Private insurance includes military insurance; public insurance includes Medicaid, Medicare, State Children’s Health Insurance Program (SCHIP), Indian Health Service (IHS), and other public and other government insurance types; single service plan is considered underinsured and is included with uninsured.

<sup>c</sup>Suppressed because of count less than 50 and/or relative standard error greater than 0.30.

<sup>d</sup>Women 65 years and older were not asked whether they had ever heard of HPV.

<sup>e</sup>Excludes women who did not have a Papanicolaou test in the past 3 years.

**Table 2**

Receipt of a Papanicolaou Test Among Women 30 Years and Older by Hysterectomy Status and Sociodemographic Characteristics, National Health Interview Survey (NHIS) (2010)<sup>a</sup>

Characteristic	Women Who Received a Papanicolaou Test Within the Past 3 Years, No. (% [95% CI])	
	Reporting Hysterectomy <sup>b</sup>	Reporting No Hysterectomy
Total	1705 (64.8 [62.2–67.3])	7160 (80.7 [79.6–81.8])
Age, y		
30–44	97 (87.8 [79.5–93.1])	2738 (87.8 [86.1–89.3])
45–64	836 (73.3 [69.8–76.6])	2947 (83.8 [82.0–85.4])
65	772 (50.8 [46.5–55.0])	1475 (58.4 [55.3–61.4])
Race/ethnicity		
Non-Hispanic white	1126 (61.5 [58.4–64.4])	4179 (79.7 [78.2–81.1])
Non-Hispanic black	337 (76.3 [70.3–81.3])	1140 (82.2 [79.6–84.5])
Hispanic or Latino	190 (74.2 [66.9–80.3])	1337 (83.0 [80.3–85.4])
Other	52 (70.9 [54.4–83.3])	504 (85.4 [81.5–88.6])
Education		
Less than high school	318 (56.2 [49.4–62.7])	1107 (66.7 [63.0–70.2])
High school graduate or GED	570 (64.1 [59.3–68.6])	1764 (73.0 [70.7–75.3])
Some college	523 (69.6 [65.0–73.8])	2090 (83.0 [81.0–84.8])
College graduate or greater	291 (66.1 [59.3–72.2])	2184 (89.3 [87.8–90.7])
Missing	3	15
Proportion of poverty level, %		
<200	832 (57.6 [53.2–61.8])	3194 (71.5 [69.6–73.3])
200 to <400	368 (61.0 [55.4–66.4])	1456 (79.7 [77.3–81.9])
400	505 (75.5 [71.4–79.2])	2508 (89.3 [87.8–90.7])
Missing	0	2
Health care coverage <sup>c</sup>		
Private only	334 (80.3 [74.7–84.9])	1996 (88.6 [86.9–90.1])
Public only	514 (52.9 [47.7–58.1])	1469 (69.3 [66.2–72.3])
Public and private	710 (63.9 [59.7–67.8])	2617 (85.0 [83.4–86.5])
None	144 (62.5 [52.1–71.9])	1064 (64.2 [60.8–67.5])
Missing	3	14
Has a usual source of health care		
Yes	1625 (65.4 [62.7–67.9])	6379 (82.6 [81.5–83.7])
No	80 (50.8 [36.5–65.0])	781 (63.2 [58.8–67.4])

Abbreviation: GED, General Education Development.

<sup>a</sup> All women 30 years and older, excluding women who report history of cervical cancer or an abnormal Papanicolaou test result in the past 3 years and women whose last Papanicolaou test was not a routine test. Percentages are weighted estimates. Missing responses are not included in the denominator. All analyses account for the stratification and clustering of data within the complex survey design of the NHIS.

<sup>b</sup> Among women who reported a hysterectomy more than 3 years ago. Cases in which it could not be determined whether the hysterectomy or the Papanicolaou test came first were excluded.

<sup>c</sup> Private insurance includes military insurance; public insurance includes Medicaid, Medicare, State Children's Health Insurance Program (CHIP), Indian Health Service (IHS), other public, and other government insurance types; single service plan is considered underinsured and is included with uninsured.

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