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Acceptable and Preferred Cervical Cancer Screening Intervals Among U.S. Women

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Introduction: Current U.S. cervical cancer screening guidelines recommend a 3- or 5-year screening interval depending on age and screening modality. However, many women continue to be screened annually. The purpose of this study is to investigate U.S. women's self-reported frequency of cervical cancer screening, acceptance of an extended screening interval (once every 3–5 years), and preferred screening options.

Methods: Data from a 2012 web-based survey of U.S. women aged ≥18 years who had not undergone a hysterectomy or been diagnosed with cervical cancer (N=1,380) were analyzed in 2014. Logistic regression models of extended screening interval use, acceptance, and preference were developed.

Results: Annual Pap testing was the most widely used (48.5%), accepted (61.0%), and preferred (51.1%) screening option. More than one third of respondents (34.4%) indicated that an extended screening interval would be acceptable, but only 6.3% reported that they were currently screened on an extended interval. Women who preferred an extended screening interval (32.9% of those willing to accept regular screening) were more likely to report no primary care visits during the last 12 months (AOR=2.05, $p < 0.003$), no history of abnormal Pap test results (AOR=1.71, $p=0.013$), and that their last Pap test was performed by an internist/family practitioner rather than an obstetrician–gynecologist (AOR=2.03, $p < 0.001$).

Conclusions: U.S. women's acceptance of and preference for an extended cervical cancer screening interval appears to be more widespread than utilization. Strategies to educate women about the reasoning behind recommendations for less-than-annual testing and to foster informed preferences should be devised and evaluated.
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Introduction

Many U.S. women continue to be screened annually for cervical cancer,[1,2] even though less-frequent testing has been endorsed by the American Cancer Society,[3] American College of Obstetricians and Gynecologists,[4] and U.S. Preventive Services Task Force (USPSTF)[5] for more than a decade. Current guidelines issued by these organizations in 2012[6–8] recommend two major screening strategies: for women aged 21–29 years, Pap testing alone every 3 years; for women aged 30–65 years, either Pap testing alone every 3 years or Pap testing with human papillomavirus (HPV) testing every 5 years. The recommended 3- and 5-year screening intervals reflect the limited benefit and potential harms associated with more frequent screening.[8] The previous iteration of guidelines released in 2002–2003 varied by organization[3–5]; recommended screening intervals included annual, every 2 years, and every 3 years, depending on age, screening history, and administration of the Pap test alone or in conjunction with the HPV test.

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Although the cervical cancer screening preferences of providers have been the subject of a great deal of investigation,[9–16] fewer studies have explored women's acceptance of extended screening intervals. The small pool of studies investigating this topic found that 37%– 69% of women were resistant to following a 3-year screening interval.[16–19] The present study investigated U.S. women's self-reported frequency of cervical cancer screening, acceptance of an extended screening interval (a Pap test once every 3 years or a Pap test with an HPV test once every 3–5 years), and preferred screening option. Understanding women's attitudes about extended screening intervals can inform strategies to increase adoption of screening recommendations.

Methods

The HealthStyles Fall survey is an annual survey conducted by Porter Novelli (Washington, DC) that explores the health behaviors and attitudes of U.S. adults. The 2012 HealthStyles Fall survey was administered online from September 21 to October 5. The survey items analyzed in the present study were licensed by CDC's *Inside Knowledge: Get the Facts About Gynecologic Cancer* campaign (www.cdc.gov/cancer/knowledge), in order to inform the campaign's efforts and development as well as other initiatives to increase women's understanding of gynecologic cancer.

Study Sample

Participants in the 2012 HealthStyles Fall survey were recruited from the KnowledgePanel®,[20] a 50,000-member online research panel that is randomly assembled and representative of the U.S. population. Panel members were recruited by probability-based sampling (using both random-digit dial and address-based sampling methods) to reach potential respondents regardless of whether they had landline phones or Internet access. If needed, panel members were provided with a laptop computer and Internet access so they could take part in surveys.

The 2012 HealthStyles Fall survey was sent to a random sample of 4,371 panel members aged ≥18 years who responded to an earlier linked survey (HealthStyles Spring survey). A total of 3,503 participants (1,733 men and 1,770 women) took part in the survey, for a completion rate of 80.1%. Women diagnosed with cervical cancer (*n*=24), and those who had had a hysterectomy (*n*=366) were excluded from analyses, resulting in a sample size of 1,380. Women aged >65 years were included in the present study because many continue to participate in cervical cancer screening,[21] despite the recommendation that screening should generally cease after age 65 years.[6–8]

To protect participant confidentiality, no individual identifiers were included in the data set received by investigators. As a result, analyses of data from the 2012 HealthStyles Fall survey were declared exempt by CDC's IRB.

Measures

The analyzed items were developed by a multidisciplinary team, which included physicians, epidemiologists, social scientists, and methodologists, based on items previously administered in Health-Styles Fall surveys and other national surveys.

Current frequency of Pap test screening was assessed by asking: *Typically, how often do you get a Pap test?* Nine response options were provided: *more often than once a year, once every year, once every 2 years, once every 3 years, once every 4 years, once every 5 years, once every 6 years or longer, I do not have regular Pap tests,* and *not sure.* Only one response to this item was accepted. Current use of HPV testing was not assessed, as the USPSTF did not recommend HPV testing in conjunction with the Pap test as a cervical cancer screening modality until shortly before this study was conducted.[8]

Respondent's acceptance of various screening options was assessed by asking: *Which of the following cervical cancer screening options would be acceptable to you if your doctor recommended it for you?* Seven response options were provided: *Pap test once a year, Pap test once every 2 years, Pap test once every 3 years, Pap test with human papillomavirus (HPV) test once every 3 years, Pap test with HPV test once every 4 years, Pap test with HPV test once every 5 years,* and *none of these.* Multiple responses were accepted unless *none of these* was selected. Although a Pap test administered in conjunction with an HPV test every 3 years is not endorsed in current guidelines,[6–8] this option was included in the response set, as it was previously reccommended[3,4] and may have still been in use at the time of the study.

Respondents who indicated that they would accept a Pap test once every 1–3 years or a Pap test administered in conjunction with an HPV test once every 3–5 years were asked: *If your doctor offered each of these cervical cancer screening options to you, which one would you prefer?* Provided response options were the same as those in the previous item. Only one response to this item was accepted.

Women's perception of the purpose of the Pap test was assessed by asking: *To the best of your knowledge, the reason to have a Pap test or Pap smear is to check for which of the following?* Seventeen possible responses were provided: *anal cancer, bladder cancer, cervical cancer, colorectal cancer, endometrial cancer, fallopian tube cancer, human papillomavirus (HPV) infection, pregnancy, ovarian cancer, ovarian cysts, sexually transmitted diseases/infections (other than HPV), uterine cancer, uterine fibroids, vaginal cancer, vulvar cancer, none of these,* and *not sure.* Multiple responses were accepted unless *none of these* or *not sure* was selected. Responses were classified into three categories: (1) selection of "cervical cancer" and no other responses; (2) other response combinations; and (3) not sure.

Statistical Analysis

The analyses reported here were conducted in 2014. Unweighted and weighted proportions (matched to 2012 U.S. estimates on age, household income, race/ethnicity, educational attainment, and geographic region) were calculted for participant characteristics, current frequency of Pap test screening, acceptable cervical cancer screening strategies, and preferred cervical cancer screening option. Additional descriptive analyses were conducted to assess the concordance and discordance between screening interval preferences and the Pap testing interval currently used.

Bivariate analyses were performed using Pearson chi-square tests to identify covariates associated with: (1) current use of 3-year screening interval (analyses were limited to women who reported

Table 1. Participant Characteristics, Current Pap Testing Interval, and Acceptable and Preferred Cervical Cancer Screening Options

		Unweighted N=1,380[a]	Weighted N=1,428[a,b]
		n (%)	*n* (%)
Participant characteristics			
Age (years)	18–24	167 (12.1)	202 (14.2)
	25–34	218 (15.8)	286 (20.0)
	35–44	243 (17.6)	288 (20.2)
	45–54	278 (20.1)	270 (18.9)
	55–64	247 (17.9)	197 (13.8)
	≥65	227 (16.4)	184 (12.9)
Race/ethnicity	White, non-Hispanic	1,022 (74.1)	927 (64.9)
	Black, non-Hispanic	130 (9.4)	165 (11.6)
	Other, non-Hispanic	76 (5.5)	99 (6.9)
	Hispanic	152 (11.0)	237 (16.6)
Educational attainment	<High school	61 (4.4)	136 (9.5)
	High school	369 (26.7)	452 (31.7)
	Some college	445 (32.2)	422 (29.6)
	Bachelor degree	336 (24.3)	299 (20.9)
	Graduate degree	169 (12.2)	119 (8.3)
Geographic region	Northeast	282 (20.4)	286 (20.0)
	Midwest	336 (24.3)	312 (21.9)
	South	450 (32.6)	494 (34.6)
	West	312 (22.6)	335 (23.5)
Menopause status	Post-menopausal	501 (36.6)	410 (28.9)
	Peri-menopausal	123 (9.0)	118 (8.3)
	Not post- or peri-menopausal	743 (54.4)	815 (62.7)
Health insurance coverage	Insured	1,133 (84.3)	1,117 (81.6)
	Uninsured	211 (15.7)	252 (18.4)
Number of primary care visits during the last 12 months[c]	No visits	241 (17.6)	276 (19.6)
	1–2 visits	711 (52.0)	740 (52.5)
	≥3 visits	416 (30.4)	394 (27.9)
Type of provider who performed most recent Pap test	Obstetrician–gynecologist	635 (58.9)	608 (59.4)

(continued on next page)

receiving a Pap test once every 1–3 years); (2) acceptance of an extended screening interval (defined as a Pap test once every 3 years or a Pap test administered in conjunction with an HPV test once every 3–5 years); and (3) preference for an extended screening interval. All of the participant characteristics listed in Table 1 were tested as potential covariates, with one exception: the association between prior Pap test usage and having a Pap test once every 3 years was not tested, as evaluating use of an extended screening interval among women who had never been screened was not logical. All variables were categorized as shown in Table 1, with the exception of age, which was condensed into three groups (<30 years, 30–65 years, and >65 years) to provide age groups consistent with current screening recommendations.[6–8]

The covariates found to be significant (*p*<0.05) in the bivariate analyses were included in adjusted, forward-stepwise logistic regression models to predict the three outcome variables delineated above.

Results

The demographic distribution of the unweighted sample differed slightly from that of the weighted sample (Table 1). The largest discrepancy was found in race/ethnicity, with the sample including more participants who identified themselves as white, non-Hispanic than found in the U.S. adult population.

Overall, 19.7% of participants indicated that they did not have regular

Table 1. Participant Characteristics, Current Pap Testing Interval, and Acceptable and Preferred Cervical Cancer Screening Options *(continued)*

		Unweighted N=1,380[a]	Weighted N=1,428[a,b]
		n (%)	*n* (%)
	Internist/family practitioner	298 (27.6)	274 (26.8)
	Nurse practitioner/ physician assistant	146 (13.5)	142 (13.9)
Pap test usage	≥1 Pap test	1,104 (80.3)	1,054 (74.3)
	No prior Pap test	270 (19.7)	365 (25.7)
Lifetime abnormal Pap test result history	≥1 abnormal Pap result	187 (13.7)	176 (12.4)
	No prior abnormal Pap result	1,182 (86.3)	1,242 (87.6)
HPV test usage	Had HPV test	126 (9.2)	121 (8.5)
	No prior HPV test	1,24 (90.8)	1,299 (91.5)
HPV vaccine reception	Vaccinated	87 (6.3)	106 (7.5)
	Unvaccinated	1,287 (93.7)	1,313 (92.5)
Perceived purpose of Pap test	Detection of cervical cancer exclusively	400 (29.3)	354 (25.2)
	Other responses	783 (57.4)	821 (58.5)
	Not sure	182 (13.3)	228 (16.3)
Current Pap testing interval			
More often than once a year		13 (1.0)	14 (1.0)
Once every year		676 (49.5)	683 (48.5)
Once every 2 years		230 (16.8)	218 (15.5)
Once every 3 years		88 (6.4)	89 (6.3)
Once every 4 years		10 (0.7)	10 (0.7)
Once every 5 years		12 (0.9)	9 (0.6)
Once every 6 years or longer		13 (1.0)	15 (1.1)
I do not have regular Pap tests		255 (18.7)	277 (19.7)
Not sure		68 (5.0)	94 (6.7)
Acceptable cervical cancer screening options[d]			
Pap test once a year		834 (62.0)	836 (61.0)
Pap test once every 2 years		322 (23.9)	294 (21.5)
Pap test once every 3 years		213 (15.8)	203 (14.8)
Pap test with HPV test once every 3 years		314 (23.3)	314 (22.9)
Pap test with HPV test once every 4 years		116 (8.6)	117 (8.5)
Pap test with HPV test once every 5 years		123 (9.1)	132 (9.6)
		(continued on next page)	

Pap tests, and significant differences were found by age that were consistent with current guidelines[6–8]: 18–20 years (younger than recommended), 51.6%; 21–65 years (recommended age range), 15.3%; >65 years (older than recommended), 27.2% (χ^2=96.647, df=16, $p<0.001$, results not shown). Most women who reported not having regular Pap tests had health insurance (70.1%, results not shown).

An annual Pap test was the most widely used (48.5%), accepted (61.0%), and preferred (51.1%) screening option. A minority of women (6.3%) reported that they currently received a Pap test once every 3 years (Figure 1). However, more than one third (34.4%) indicated that an extended screening interval would be acceptable to them if it was recommended by their doctor. In addition, 32.9% of those willing to accept regular screening (a Pap test every 1–5 years) reported that they preferred an extended screening interval.

Among regularly screened women who reported a preference for an extended screening interval, less than one quarter (23.8%) reported that they received a Pap test once every 3 years (Figure 2). Conversely, 89.2% of regularly screened women who reported a preference for

Table 1. Participant Characteristics, Current Pap Testing Interval, and Acceptable and Preferred Cervical Cancer Screening Options *(continued)*

	Unweighted N=1,380[a]	Weighted N=1,428[a,b]
	n (%)	*n (%)*
None of these	134 (10.0)	162 (11.9)
Acceptance of 3- to 5-year screening interval[e]	468 (34.8)	471 (34.4)
Preferred cervical cancer screening option[f]		
Pap test once a year	562 (49.6)	578 (51.1)
Pap test once every 2 years	196 (17.3)	166 (14.6)
Pap test once every 3 years	119 (10.5)	108 (9.5)
Pap test with HPV test once every 3 years	147 (13.0)	151 (13.4)
Pap test with HPV test once every 4 years	16 (1.4)	18 (1.6)
Pap test with HPV test once every 5 years	76 (6.7)	95 (8.4)
None of these	18 (1.6)	16 (1.4)
Preference for 3- to 5-year screening interval[e]	358 (31.6)	371 (32.9)

Note: Data were from the 2012 HealthStyles Fall Survey of U.S. adults. The analysis presented in the table was limited to women who had never been diagnosed with cervical cancer and had not undergone a hysterectomy.
[a]When variable responses do not sum to N, responses are missing unless otherwise noted.
[b]Data were weighted to match 2012 U.S. Census estimates for age, household income, race/ethnicity, educational attainment, and geographic region.
[c]Included visits to obstetrician–gynecologists, internists, and family practitioners.
[d]Multiple responses to this item were accepted unless "none of these" was selected.
[e]Included Pap test once every 3 years and a Pap test administered in conjunction with an HPV test once every 3–5 years.
[f]Only respondents who indicated that receiving a Pap test every 1–5 years would be acceptable (n=1,134) responded to this item.
HPV, human papillomavirus.

annual screening were screened annually.

Covariates significantly associated with the target outcome variables in the bivariate analyses (results are included in the Appendix Table, available online) were included in the respective adjusted logistic regression models. Use of a 3-year Pap testing interval was less likely among women who reported three or more primary care visits during the last 12 months and those who were uncertain about the purpose of the Pap test, and was more likely among women living in western U.S. states (Table 2). Acceptance of an extended screening interval was more likely among women who had received the HPV vaccine and those who had a prior Pap test. Acceptance was less likely among women who were uncertain about
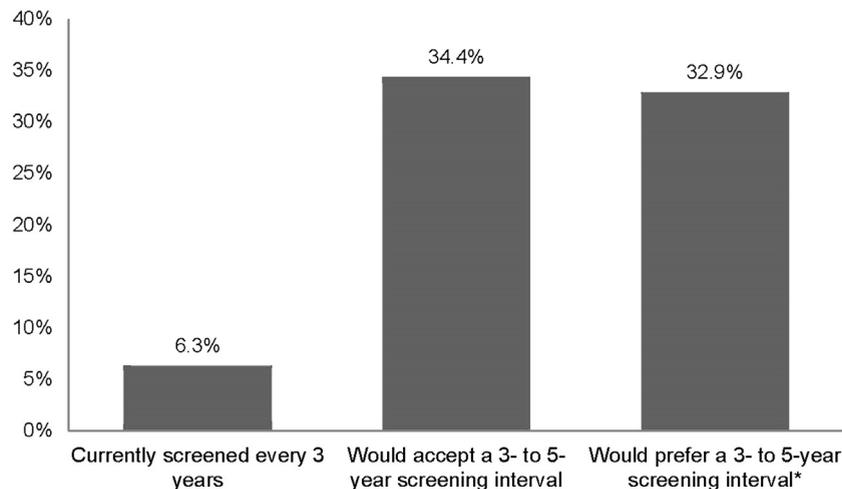
Figure 1. Extended cervical cancer screening interval use, acceptance, and preference.
Note: Data were from the 2012 HealthStyles Fall Survey of U.S. adults. The analysis presented in the figure was limited to women who had never been diagnosed with cervical cancer and had not undergone a hysterectomy (N=1,380), and data were weighted to match 2012 U.S. Census estimates for age, household income, race/ethnicity, educational attainment, and geographic region.
*Only women who indicated that receiving a Pap test once every 1–5 years would be acceptable were asked to report a preferred cervical cancer screening option (n=1,134).
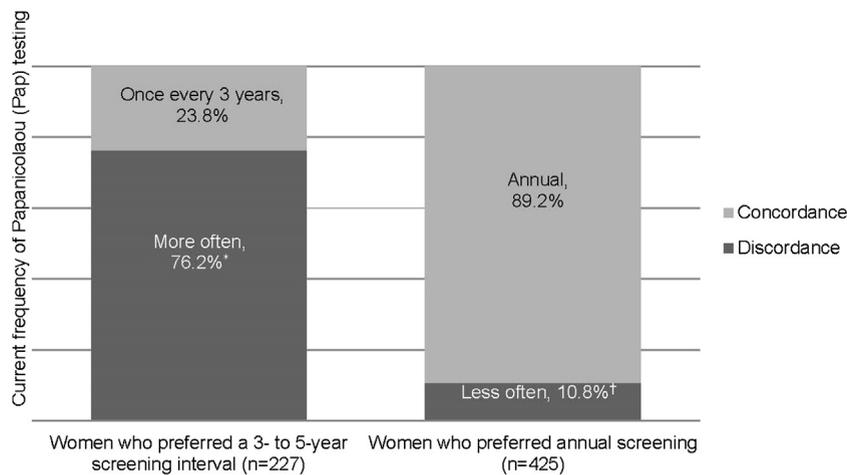
Figure 2. Concordance and discordance between cervical cancer screening interval preference and use.
Note: Data were from the 2012 HealthStyles Fall Survey of U.S. adults. The analysis presented in the figure was limited to women who had the Pap test once every 3 years or more frequently, ≥1 prior Pap test, not undergone a hysterectomy, and never been diagnosed with cervical cancer, and data were weighted to match 2012 U.S. Census estimates for age, household income, race/ethnicity, educational attainment, and geographic region.
*Included Pap test more often than once a year, once every year, and once every 2 years.
†Included Pap test once every 2 years and once every 3 years.

the purpose of the Pap test, black women, non-Hispanic women, and women who had completed high school or some college. Women who preferred an extended screening interval were more likely to report no primary care visits during the last 12 months, no history of abnormal Pap test results, and that their last Pap test was performed by an internist/family practioners.

Discussion

Acceptance of and preference for an extended screening interval was more widespread than utilization. More than one third of respondents indicated that an extended screening interval would be acceptable to them, but only 6.3% reported that they were currently screened on an extended interval.

The percentage of women in this study who did not find an extended screening interval acceptable (66%) is consistent with a 2002 survey of U.S. women aged ≥18 years (69%)[17] but higher than the rate found in a 2005 survey with U.S. women aged ≥40 years (37%).[16] Neither of these earlier surveys explored women's preferences for an extended screening interval. In the present study, women who preferred an extended screening interval were more likely to report no primary care visits during the last 12 months, no history of abnormal Pap test results, and that their last Pap test was performed by an internist/family practitioner. A desire to minimize healthcare visits for convenience or other reasons may be the underlying characteristic that accounts for the associations with no primary care visits during the prior

year and receipt of last Pap test from an internist/family practitioner, which may have been administered in the context of a one-stop, comprehensive health maintenance examination. Women with no prior history of abnormal Pap tests may be more comfortable with an extended screening interval because they perceive that they have a low risk of developing gynecologic cancer.

Acceptance of an extended screening interval was higher among women in the present study who had received the HPV vaccine, which may be due to the perception that the vaccine affords a protective benefit. Also, women who were uncertain about the purpose of the Pap test were less likely to accept an extended screening interval than those with actual or perceived knowledge of the Pap test's purpose. It is possible that women who believed that they lacked basic screening knowledge felt ill equipped to assess the implications of changing their current screening regimen. Other significant predictors associated with an increased likelihood of accepting an extended screening interval included race (white, non-Hispanic), prior Pap test receipt, and educational attainment (graduate degree). The variables in the present study associated with acceptance of an extended screening interval differ from those previously identified. Acceptance of an extended screening interval was found to be higher among older women[16,17] and lower among women with personal or family experience with cancer,[16] those who knew someone diagnosed with cervical cancer,[17] those who believed that screening guidelines were based on cost considerations,[17] and those who were screened annually.[16] Thus, no consistent markers for

Table 2. Significant Predictors of Extended Cervical Cancer Screening Interval Use, Acceptance, and Preference

	Outcome variable	Significant predictors	Predictive category	AOR	95% CI	*p*-value	Reference category
Model1[a]	Current use of 3-year screening interval	Number of primary care visits during the last 12 months[b]	No visits 1–2 visits	12.34 2.47	5.72–26.63 1.22–5.03	**<0.001** **0.012**	≥3 visits
		Perceived purpose of Pap test	Detection of cervical cancer exclusively Other responses	9.58 9.57	1.45–63.16 1.49–61.56	**0.019** **0.017**	Not sure
		Geographic region	Northeast Midwest South	0.44 0.30 0.58	0.22–0.86 0.14–0.63 0.33–1.02	**0.016** **0.002** 0.059	West
Model 2[c]	Acceptance of 3- to 5-year screening interval	HPV vaccine reception	Vaccinated	1.74	1.14–2.65	**0.010**	Unvaccinated
		Pap test usage	≥1 Pap test	1.61	1.19–2.18	**0.002**	No prior Pap test
		Perceived purpose of Pap test	Detection of cervical cancer exclusively Other responses	2.01 2.19	1.30–3.09 1.48–3.25	**0.002** **<0.001**	Not sure
		Race/ethnicity	Black, non-Hispanic Other, non-Hispanic Hispanic	0.62 1.38 0.78	0.41–0.92 0.88–2.16 0.56–1.10	**0.019** 0.156 0.161	White, non-Hispanic
		Educational attainment	<High school High school Some college Bachelor degree	0.73 0.53 0.62 0.79	0.42–1.27 0.34–0.82 0.41–0.96 0.51–1.23	0.264 **0.004** **0.031** 0.300	Graduate degree
Model 3[d]	Preference for 3- to 5-year screening interval	Type of provider who performed last Pap test	Internist/family practitioner Nurse practitioner/physician assistant	2.03 1.11	1.46–2.81 0.71–1.74	**<0.001** 0.641	Obstetrician–gynecologist
		Number of primary care visits during the last 12 months[b]	No visits 1–2 visits	2.05 1.18	1.27–3.30 0.84–1.64	**0.003** 0.346	≥3 visits
		Lifetime abnormal Pap test result history	No prior abnormal result	1.71	1.12–2.62	**0.013**	≥1 abnormal results

Note: Models were developed using forward stepwise logistic regression. Data were from the 2012 HealthStyles Fall Survey of U.S. adults. The analysis presented in the table was limited to women who had not undergone a hysterectomy and had never been diagnosed with cervical cancer (N=1,380) with additional model-specific inclusion criteria noted below. Data were weighted to match 2012 U.S. Census estimates for age, household income, race/ethnicity, educational attainment, and geographic region. Boldface indicates statistical significance ($p<0.05$).

[a]Model was limited to women who received a Pap tests once every 1–3 years, in addition to inclusion criteria previously listed (*n*=1,007). Covariates found to be significant in bivariate comparisons and entered into model included: race/ethnicity, geographic region, health insurance coverage, number of primary care visits during the past year, HPV vaccine usage, and perceived purpose of Pap test.

[b]Included visits to obstetrician–gynecologists, internists, and family practitioners.

[c]Model included all women in the sample (N=1,380). Covariates found to be significant in bivariate comparisons and entered into model included: race/ethnicity, educational attainment, Pap test usage, lifetime abnormal Pap test result history, HPV test usage, HPV vaccine usage, and perceived purpose of Pap test.

[d]Model was limited to women who indicated that receiving a Pap test once every 1–5 years would be acceptable in addition to inclusion criteria previously listed (*n*=1,134). Covariates found to be significant in bivariate comparisons and entered into model included: race/ethnicity, educational attainment, number of primary care visits during the past year, type of provider who performed last Pap test, and lifetime abnormal Pap test result history.

women's willingness to adopt an extended screening interval have emerged.

Primary care visit volume was a key marker for current use of an extended screening interval, with women who reported no primary care visits (including gynecologist visits) during the last year being 12 times more likely to report current use of a 3-year screening interval than those with three or more visits. Dissecting which came first—less-frequent care seeking or an extended cervical cancer screening interval—is not possible. Clearly, some women may have been screened on a 3-year interval by default; however, others who purposefully follow an extended screening interval may have no perceived need to seek care during a given year.

It should be noted that two extended-interval screening options included in the present study are not currently recommended: Pap test with HPV test once every 3 years and Pap test with HPV test once every 4 years. During the period in which this study was conducted (September–October 2012), cervical cancer screening in the U.S. was in a period of transition, as current guidelines[6–8] had only been released recently. Prior studies indicate that the incidence and timing of guideline adoption is variable.[22–26] Thus, it is not surprising that an out-of-date screening recommendation—the Pap test with HPV test once every 3 years[3,4]—was associated with higher levels of acceptance and preference than currently endorsed screening alternatives. It is also important to note that the present study investigated acceptable and preferred screening options in a hypothetical context, and women may respond differently in real life.

Limitations

The KnowledgePanel® from which study participants were recruited is a representative, random sample of U.S. households, which was created to meet the highest statistical standards for peer-reviewed research.[20] Further, Internet research panels have been found to generate results that are comparable with other survey modes.[27–29] The present study is subject to the limitations of any analysis of self-reported survey data from participants in a preassembled research panel. Although data were weighted to reflect the U.S. population, the extent to which results are generalizable is not known. A high completion rate (80.1%) was achieved, which could be interpreted as strengthening the generalizability of results, but at the same time it raises questions as to whether respondents were more receptive to participating in research or more interested in health issues than the general population. As with all self-reported data, responses may have been influenced by social desirability

bias, the tendency to answer questions in a manner that will be viewed favorably by others.[30] Also, black and Hispanic women, who are at highest risk of cervical cancer,[31] were underrepresented in the sample, and the present study did not investigate whether women with prior abnormal Pap test results were candidates for more frequent screening. Future studies should attempt to oversample racial minorities and include a detailed assessment of cervical cancer screening history and follow-up treatment.

Conclusions

The current screening preferences of U.S. women may reflect long-held beliefs about the importance of annual Pap testing coupled with limited awareness of the potential harms associated with this practice. Women's attitudes and beliefs related to screening frequency may differ if they reflected truly informed preferences[32] and may be associated with less testing.[33] From a provider perspective, annual cervical cancer screening has facilitated regular contact with patients. Thus, there are financial incentives for providers to screen annually, particularly for obstetrician–gynecologists who otherwise may not see patients for extended periods. Strategies may be needed to encourage providers to adopt recommended screening intervals and to educate women about the reasoning behind less-than-annual testing, including explicit discussions about the potential harms associated with overscreening.

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Appendix

Supplementary data

Supplementary data associated with this article can be found at, http://dx.doi.org/10.1016/j.amepre.2015.04.025.