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Perceived effectiveness of HPV test as a primary screening modality among US providers

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Abstract

Background—The human papillomavirus (HPV) test, administered alone without the Papanicolaou (Pap) test, was recently recognized as a cervical cancer screening option in the United States by the Society of Gynecologic Oncology and the American Society for Colposcopy and Cervical Pathology, and the Food and Drug Administration has approved an HPV test for primary screening.

Methods—Surveys of US internists, family practitioners, nurse practitioners, and obstetrician–gynecologists were conducted in 2009 and 2012 to investigate providers' perceptions of the effectiveness of the HPV test administered alone as a population-based screening modality (2009: $N = 1040$, 141–494 per provider group; 2012: $N = 1039$, 155–435 per provider group).).

Results—The majority in each provider group agreed that the HPV test administered alone is an effective screening modality in 2009 (75.3%–86.1%) and 2012 (79.5%–91.8%), and agreement rose significantly during this time period among family practitioners ($\chi^2 = 15.26$, df = 1, $p < 0.001$) and nurse practitioners ($\chi^2 = 4.53$, df = 1, $p = 0.033$).

Conclusions—Agreement that the HPV test administered alone is an effective cervical cancer screening modality was widespread among providers in both 2009 and 2012, however implementation of guidelines for screening with the HPV test may be influenced by many other factors including reimbursement and patient preferences.

Keywords

Cervical cancer; Screening; Human papillomavirus DNA test; Health care providers

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Conflict of interest statement

The authors declare that there are no conflicts of interests.

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Introduction

Currently two cervical cancer screening strategies are recommended by the American Cancer Society (ACS) (Saslow et al., 2012), American College of Obstetricians and Gynecologists (ACOG) (2012), and US Preventive Services Task Force (USPSTF) (2012): 1) Papanicolaou (Pap) testing every 3 years for women aged 21–65 years and 2) Pap testing every 3 years for women aged 21–29 years followed by testing with both the Pap test and the human papillomavirus (HPV) test (also known as co-testing) administered every 5 years for women aged 30–65 years. Similarly, Pap testing and co-testing are the only cervical cancer screening modalities included in HEDIS measures, which are used by 90% of US health plans to assess care quality (National Committee for Quality Assurance).

However, the HPV test, administered alone without the Pap test, was recently recognized as a cervical cancer screening option. The US Food and Drug Administration (FDA) approved an HPV test for primary screening in 2014, and the Society of Gynecologic Oncology (SGO) and the American Society for Colposcopy and Cervical Pathology (ASCCP) released interim guidelines which endorsed screening with the HPV test alone every 3 years for women aged 25 years and older in 2015 (Huh et al., 2015). While the Pap test detects the presence of precancerous cells on the cervix, the HPV test detects a prevalent oncogenic HPV infection. Like a positive Pap test, a positive HPV test requires followup testing to confirm a diagnosis of precancer or cancer.

We investigated US providers' perceptions of the effectiveness of the HPV test administered alone as a primary screening modality in 2009 and 2012, which predated FDA approval of a specific test for this indication and the release of the SGO/ASCCP interim guidelines. The current ACS (Saslow et al., 2012), ACOG (American College of Obstetricians and Gynecologists, 2012), and USPSTF (US Preventive Services Task Force, 2012) screening recommendations were issued shortly before the 2012 survey. At the time of the 2009 survey, ACS (Saslow et al., 2002) and ACOG (A.C.O.G. Committee on Practice Bulletins, 2003) guidelines included co-testing as a recommended screening modality when administered every 3 years among low-risk women aged 30 years and older with previous negative tests, but the USPSTF (US Preventive Services Task Force, 2003) did not recommend co-testing at that time.

Methods

Data from the 2009 and 2012 DocStyles surveys of US health care providers were analyzed. The surveys were administered online by Porter Novelli (Washington DC) in July 2009 and July 2012. Participants were recruited from the Epocrates Honors Panel, which includes more than 275,000 US health professionals. The opportunity to join the panel and be a paid research participant was offered when providers registered for Epocrates®, the leading medical reference app in the United States (Epocrates) with >1,000,000 users (Epocrates). At the time of panel enrollment, the identities of physicians were verified by comparing first name, last name, date of birth, medical school, and graduation date against the American Medical Association's (AMA) Masterfile®, an inventory of licensed US physicians that

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includes both AMA members and non-members. However, no verification of the identities of nurse practitioners was performed.

The 2009 and 2012 survey participants were limited to providers who actively saw patients and had practiced for at least 3 years. A variety of provider groups were studied, but the analyses reported here included only internists, family practitioners, nurse practitioners, and obstetrician–gynecologists.

An invitation to participate in the surveys was emailed to randomly selected primary care physicians (internists and family practitioners; 2325 in 2009 and 2175 in 2012), nurse practitioners (500 in 2009 and 456 in 2012), and obstetrician–gynecologists (500 in 2009 and 489 in 2012). The samples of physicians matched the 2009 and 2012 American Medical Association Masterfile estimates for age, gender, and geographic region. The samples of nurse practitioners were randomly drawn, but not selected to match any demographic thresholds. Quota sampling (Cumming, 1990) was used to ensure adequate representation of all provider groups surveyed. In both 2009 and 2012, the quotas were 1000 primary care physicians, 250 nurse practitioners, and 250 obstetrician–gynecologists, and these quotas were filled or slightly exceeded in two instances—the 2012 sample included 1001 primary care physicians and 252 nurse practitioners, as a result of multiple providers responding simultaneously. Primary care physicians who took part in the surveys included 391 internists and 609 family practitioners in 2009 and 464 internists and 537 family practitioners in 2012, and these specialties were analyzed separately. Analyses in the present study were limited to providers who performed ≥1 Pap test per month and worked primarily in out-patient settings which narrowed the 2009 sample to 189 internists, 494 family practitioners, 141 nurse practitioners, and 216 obstetrician–gynecologists and the 2012 sample to 205 internists, 435 family practitioners, 155 nurse practitioners, and 244 obstetrician–gynecologists.

The 2009 and 2012 survey respondents were paid $20–$95 depending on specialty. The surveys were administered by Porter Novelli and complied with the ICC/ESOMAR International Code for ethical research (ESOMAR, 2008). 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 efforts to increase gynecologic cancer awareness. This project was not subject to CDC IRB review as it involved secondary data analysis, and no individual identifiers were included in the dataset received by investigators.

In both the 2009 and 2012 surveys, the perceived effectiveness of cervical cancer screening options was assessed by asking providers if the Pap test (cytology) alone, co-testing (Pap test in conjunction with the HPV test), and the HPV test alone were "effective cervical cancer screening modalities for asymptomatic women in the average-risk population." Cervical cancer screening practices were only assessed in the 2012 survey; providers were asked what cervical cancer screening modality they typically used with asymptomatic women aged 30–65 years with four response options provided: Pap test (cytology) alone, co-testing (Pap test in conjunction with the HPV test), either the Pap test alone or co-testing depending on patient preference, and other (use of HPV testing alone was not assessed, as this screening modality was not recommended at the time of the study). Providers in 2012

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who indicated that they typically used co-testing or provided it based on patient preference were asked what co-testing interval they generally recommended for asymptomatic women aged 30–65 years with five response options provided: annually, every 2 years, every 3 years, every 5 years, and other.

To assess the comparability of the 2009 and 2012 samples, provider characteristics were compared by year within each provider group using Pearson *chi square* tests (categorical variables) and *t*-tests (continuous variables). In addition, Pearson chi square tests were used to compare perceived effectiveness of screening options 1) among provider groups in 2009, 2) among provider groups in 2012, and 3) by year within each provider group.

Results

The 2009 and 2012 samples were generally comparable with three exceptions—the 2012 sample included a significantly higher percentage of female family practitioners, and the mean ages of internists and obstetrician–gynecologists were significantly higher than the 2009 sample (Table 1). Agreement that Pap testing and co-testing are effective screening strategies was consistently high (≥90%) in 2009 and 2012 across all provider groups surveyed. The majority (N70%) in each provider group in 2009 and 2012 also agreed that the HPV test alone is an effective screening modality (Fig. 1), and agreement rose significantly during this time period among family practitioners and nurse practitioners. In 2009 and 2012, agreement about test effectiveness was highest among obstetrician–gynecologists and lowest among internists for co-testing (2009: $\chi^2 = 15.12$, df = 3, $p = 0.002$, 2012: $\chi^2 = 9.90$, df = 3, $p = 0.019$) and HPV testing (2009: χ) and HPV testing (2009: $\chi^2 = 13.71$, df = 3, $p = 0.003$, 2012: $\chi^2 = 15.61$, df = 3, $p = 0.001$) (results not shown). However, no difference in agreement about the effectiveness of Pap testing was found between provider groups in 2009 or 2012.) (results not shown). However, no difference in agreement about the effectiveness of Pap testing was found between provider groups in 2009 or 2012.

In 2012, the majority (N58%) in all provider groups reported that they typically screened women aged 30–65 years using co-testing. A 3-year co-testing interval was used most commonly (39.5%–55.3% depending on specialty), and a 5-year co-testing interval was used least often (5.5%–7.0%).

Discussion

Our findings provide evidence of widespread and growing acceptance of the HPV test as a stand-alone screening modality. This increasing acceptance predated FDA approval of an HPV test for primary screening (US Food and Drug Administration) and the release of the SGO/ASCCP interim guidelines endorsing the HPV test administered alone as a screening modality (Huh et al., 2015). The 2009 results are especially surprising, as no screening options involving the HPV test was recommended by the USPSTF (US Preventive Services Task Force, 2003) at that time (although, ACS (Saslow et al., 2002) and ACOG (A.C.O.G. Committee on Practice Bulletins, 2003) endorsed co-testing in 2002).

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In both 2009 and 2012, the perceived effectiveness of the HPV test administered alone and co-testing was highest among obstetrician–gynecologists and lowest among internists. This pattern may reflect the volume of cervical cancer screening administered with providers who screen larger numbers of women being more familiar with HPV-related research and guidelines. It is also possible that internists, family practitioners, and nurse practitioners may be more familiar with the USPSTF (US Preventive Services Task Force, 2012) guidelines, which recommended co-testing more recently than ACOG (American College of Obstetricians and Gynecologists, 2012), as previously noted.

Co-testing was the most widely used screening modality across all provider groups in 2012, but, few providers (5.5%–7.0% depending on specialty) reported using the recommended 5-year co-testing interval. It should be reiterated that current screening recommendations (Saslow et al., 2012; American College of Obstetricians and Gynecologists, 2012; US Preventive Services Task Force, 2012) were issued shortly before the 2012 survey, and respondents may have lacked familiarity with them and specifically, the new 5-year screening intervals. Cotesting was associated with similar levels of perceived effectiveness as Pap testing (co-testing = 90.7%–97.1; Pap testing = 95.6%–97.5%). However, screening intervals were not specified in perceived effectiveness measures.

No comparison data for the results reported here were identified, and the use of quota sampling (Cumming, 1990) limits generalizability. However, physicians who participated in the 2009 and 2012 DocStyles surveys were found to be comparable with providers in the same specialty in the corresponding years of the AMA Masterfile in terms of gender, average age, and geographic region (Porter Novelli, 2009, and 2012).

Implementation of US guidelines for primary screening with the HPV test may not be as rapid as the present study suggests. Providers' acceptance of any specific parameters for primary screening with the HPV test was not assessed. The new SGO/ASCCP interim guidelines endorse a 3-year screening interval for the HPV test administered alone to women aged 25 years and older (Huh et al., 2015). However, there is evidence which supports the effectiveness of longer screening intervals (Dillner et al., 2008; Elfström et al., 2014), and Australia's National Cervical Screening Program recently adopted HPV testing every 5 years for women aged 25 to 74 years old (Services Advisory Committee and Standing Committee on Screening). While a 3-year co-testing interval was the most widely used in the current study, providers may be less comfortable with screening every 3 years or longer when the HPV test is administered without the Pap test. Similarly, providers may not support the age threshold of 25 years for primary screening with the HPV test (Sawaya and Kuppermann, 2015), as the HPV infection is prevalent among women aged 25–29 years (Dunne et al., 2007) and often regresses without intervention (Ault, 2006). Further, cervical cancer is uncommon among women younger than 30 years old (Benard et al., 2012). Thus, providers may believe that the possibility of unnecessary treatment and associated harms outweighs any benefit of diagnosing the HPV infection among women in their twenties (Sawaya and Kuppermann, 2015).

Many other factors, in addition to providers' perception of test effectiveness, can influence cervical cancer screening practices including standards of care encouraged by health

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maintenance organizations and other payors (Sarfaty and Myers, 2008), reimbursement (Halpern et al., 2014), and patient preferences (Teoh et al., 2015), which may be especially relevant in this instance (resistance to the HPV test as a stand-alone screening modality has been detected among US women (Silver et al., 2015). Of course, patient acceptance of screening guidelines can depend largely on provider recommendations (Finney Rutten et al., 2004), and the extent to which providers will embrace primary screening with the HPV test administered alone remains to be seen.

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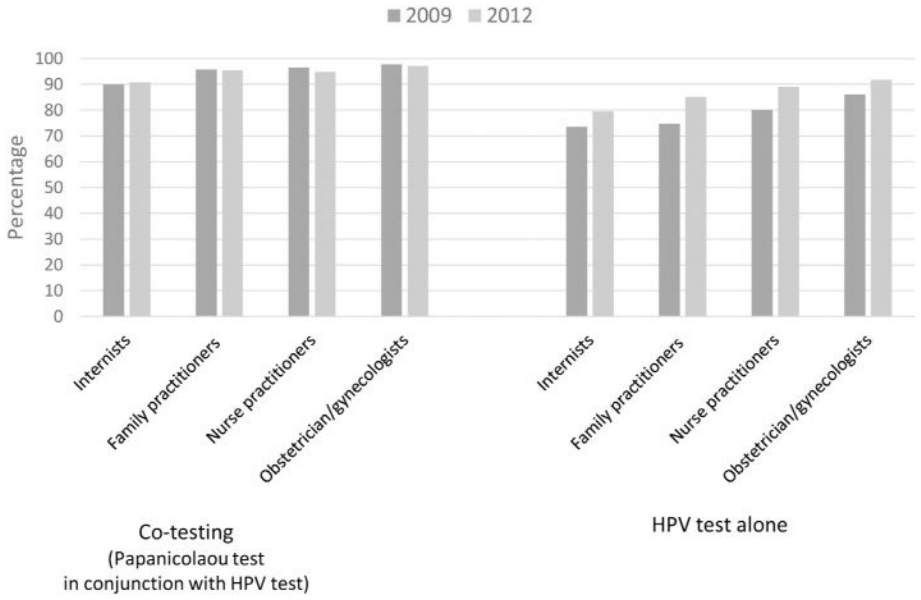

Fig. 1.

Agreement that cervical cancer screening options involving the human papillomavirus (HPV) test are effective by year and specialty, US providers, 2009 and 2012 DocStyles surveys.

Note: Analyses were limited to providers who worked in out-patient settings and performed ≥1 Pap test per month.

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Table 1

Provider characteristics, perceived effectiveness of cervical cancer screening options, and current screening practices by year and specialty, US providers, 2009 and 2012 DocStyles surveys.*

			Internists			Family practitioners			Nurse practitioners			Obstetrician–gynecologists		
			2009 (*n* = 189)	**2012 (*n* = 205)**	***p***	**2009 (*n* = 494)**	**2012 (*n* = 435)**	***p***	**2009 (*n* = 141)**	**2012 (*n* = 155)**	***p***	**2009 (*n* = 216)**	**2012 (*n* = 244)**	***p***
Provider characteristics	Gender (%)	Male	64.6	63.9	0.89	74.9	66.7	**0.01**	12.1	8.4	0.30	66.2	66.4	0.97
		Female	35.4	36.1		25.1	33.3		87.9	91.6		33.8	33.6	
	Race (%)	White	60.8	63.9	0.79	82.4	77.5	0.10	94.3	92.3	0.67	84.3	80.7	0.69
		Asian	27.5	25.4		10.5	12.2		2.1	1.9		6.5	9.4	
		Black	3.2	3.9		4.0	3.7		2.1	1.9		5.1	5.3	
		Native American/ native Alaskan/ Pacific islander	1.6	0.5		0.4	0.9		0.7	0.6		0.5	1.2	
		≥2 more races/Other	6.9	6.3		2.6	5.7		0.7	3.2		3.7	3.3	
	Hispanic ethnicity (%)		2.6	4.4	0.35	5.3	5.3	0.99	5.0	2.6	0.28	5.6	4.9	0.76
	Mean age (years)		45.8	48.5	**0.01**	45.9	46.5	0.33	46.7	47.9	0.26	47.0	49.0	**0.02**
	Practice type (%)	Solo	25.9	21.5	0.30	22.9	20.9	0.47	17.0	20.6	0.43	18.5	25.8	0.06
		Group	74.1	78.5		77.1	79.1		83.0	79.4		81.5	74.2	
	Mean number of patients seen in an average week		118.4	111.4	0.40	121.3	117.5	0.43	92.0	96.1	0.52	111.2	116.0	0.41
	Teaching hospital privileges (%)		49.7	46.8	0.56	41.3	39.5	0.59	19.1	20.6	0.75	57.4	56.1	0.79
Perceived effectiveness	Agreement that testing option is an effective population-based cervical cancer screening modality (%)	Papanicolaou (Pap) test alone	89.9	95.6	**0.03**	92.3	96.6	**0.01**	91.5	97.4	**0.02**	94.0	97.5	0.06
		Co-testing (Pap test in conjunction with HPV test)	89.9	90.7	0.79	95.7	95.4	0.80	96.5	94.8	0.50	97.7	97.1	0.71
		HPV test alone	73.5	79.5	0.16	74.7	85.1	**0.01**	80.1	89.0	**0.03**	86.1	91.8	0.05

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			Internists			Family practitioners			Nurse practitioners			Obstetrician–gynecologists		
			2009 (*n* = 189)	**2012 (*n* = 205)**	***p***	**2009 (*n* = 494)**	**2012 (*n* = 435)**	***p***	**2009 (*n* = 141)**	**2012 (*n* = 155)**	***p***	**2009 (*n* = 216)**	**2012 (*n* = 244)**	***p***
Current screening practices	Screening modality typically used with asymptomatic women aged 30–65 years (%)	Pap test alone	n.a.	27.8	n.a.	n.a.	21.0	n.a.	n.a.	14.8	n.a.	n.a.	11.1	n.a.
		Co-testing	n.a.	58.5		n.a.	68.4		n.a.	67.7		n.a.	79.5	
		Either Pap test alone or co-testing depending on patient preference	n.a.	12.7		n.a.	7.8		n.a.	15.5		n.a.	8.6	
		Other	n.a.	1.0		n.a.	2.8		n.a.	1.9		n.a.	0.8	
	Co-testing interval typically used with asymptomatic women aged 30–65 years (%) †	Annually	n.a.	19.2	n.a.	n.a.	23.0	n.a.	n.a.	30.2	n.a.	n.a.	25.6	n.a.
		Every 2 years	n.a.	24.7		n.a.	19.9		n.a.	20.2		n.a.	12.6	
		Every 3 years	n.a.	47.9		n.a.	48.0		n.a.	39.5		n.a.	55.3	
		Every 5 years	n.a.	5.5		n.a.	6.9		n.a.	7.0		n.a.	5.6	
		Other	n.a.	2.7		n.a.	2.1		n.a.	3.1		n.a.	0.9	

n.a. = not available (current screening practices were not assessed in the 2009 survey).

*Analyses were limited to providers who worked in out-patient settings and performed ≥1 Pap test per month. Variables were compared by year within each provider group using two-sided Pearson chi-square tests (categorical variables), and *t*-tests (continuous variables). Significant *p*-values are bolded.

†Only providers who indicated that they used co-testing or provided it based on patient preference responded to this item.