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Changes to cervical cancer prevention guidelines: Effects on screening among U.S. women ages 15–29

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ABSTRACT

Objective. A shift toward later initiation of cervical cancer screening for women began in 2002. We generated national estimates of screening prevalence rates and guideline-consistent screening among U.S. women ages 15–29 before and after the first evidence-based recommendations for reduced cervical cancer screening.

Method. We used National Survey of Family Growth data to compare self-reported cervical cancer screening in 2002 and 2006–2008, stratified by age (15–17, 18–20, 21–29) and sexual activity. We also assessed receipt of guideline-consistent screening by selected demographic variables.

Results. Among females ages 15–17, the proportion screened decreased from 23% to 12%, and screening was significantly more likely to be guideline-consistent. Among females ages 18–20, 24% were screened too early in 2006–2008, but among those not yet sexually active, screening declined to 8%, appropriately reflecting new guidelines. In multivariable analysis, private health insurance, pregnancy, and hormonal contraceptive use were associated with guideline-consistent screening among sexually-active women.

Conclusion. Fewer adolescents were being screened before sexual initiation, representing newer guidelines. However, sexually-active young adult women also should have later screening initiation. Factors related to health care access contribute to receipt of screening. Monitoring and provider education are needed to improve guideline-consistent screening, as newer guidelines call for less screening.

Introduction

Until 2002, most U.S. cervical cancer screening guidelines recommended women at average risk for cervical cancer to begin annual screening at the onset of sexual intercourse or by age 18 (ACOG, 1995; Smith et al., 2000; USPSTF, 1996). These guidelines began to change in 2002 due to evidence concerning the transient nature of human papillomavirus (HPV) infections in adolescents and young adults, low incidence of cervical cancer among women less than 25 years old, and harms associated with overtreatment of precancerous lesions that would not necessarily progress (Arbyn et al., 2008; Kyrgiou et al., 2006; Watson et al., 2008). In 2003, the United States Preventive Services Task Force issued a recommendation that women begin annual cervical cancer screening within 3 years of sexual initiation, or by age 21 (USPSTF, 2003). Other professional and international organizations, including the American Cancer Society (ACS) (Saslow et al., 2002), American College of Obstetricians and Gynecologists (ACOG, 2003), and the International Agency for Research on Cancer (IARC, 2005) similarly updated their evidence and clinical recommendations.

These changes in screening guidelines have significant implications for women's health care. Monitoring progress in the implementation of the revised clinical guidelines can help identify women least likely to receive recommended screening as well as those who are likely to be over-screened, for whom different preventive services should be prioritized. We therefore generated nationally representative estimates of the percentage of U.S. women aged 15–29 who were screened in accordance with screening guidelines in 2002 (before the guideline revisions) and in 2006–2008 (after the revisions), and identify factors associated with guideline-consistent screening.

Materials and methods

We analyzed data from the 2002 and 2006–2008 National Survey of Family Growth (NSFG), when initial transitions toward later initiation of screening for cervical cancer occurred. The NSFG is an in-person, population-based survey of U.S. women and men of reproductive age (15–44 years). The 2006–2008 NSFG

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data are comparable with data collected during earlier NSFG cycles, although the 2006–2008 survey was based on a continuous interviewing design (Groves et al., 2009). For both, interviews were conducted with computer-assisted personal interview technology, with more sensitive survey items administered via an audio-assisted computer self-interview. Blacks, Hispanics, and women aged 15–19 were oversampled for more reliable estimation. The 2002 NSFG collected data from 7643 women and had a response rate of 80% (Groves et al., 2005 and Lepkowski et al., 2006). The 2006–2008 NSFG collected data from 7356 women and had a response rate of 76% (Lepkowski et al., 2010).

The NSFG includes items asking women whether they had had a Papanicolaou (Pap) test in the previous 12 months, whether they have had vaginal heterosexual intercourse, and, if so, their age at the time of first sex. With this information, we constructed screening categories reflecting consistency with the dominant clinical guidelines in effect for 2002 and 2006–2008 for women aged 15–29. Women older than age 29 were not included because guidelines shifted to longer intervals after three normal tests, and the NSFG asked only about Pap testing in the prior year.

Measures

Our main outcome measure, whether women had had a Pap test in the previous year, was based on responses to the question, "In the past 12 months, have you received a Pap smear?" Other relevant measures included age at first vaginal intercourse (first sex), coded as never had sex, initiated sex in the past 36 months, and initiated sex over 36 months ago.

We constructed a variable indicating whether women received a Pap test in accordance with screening guidelines, received a Pap test too early, or did not receive a recommended Pap test (Table 1). Survey respondents were classified as having received guideline-consistent care in 2002 if they 1) were aged 15–17, had not had sex, and had not received a Pap test or 2) were either sexually active or aged 18–29 and had received a Pap test. Respondents to the 2006–2008 NSFG were classified as having received guideline-consistent care if they 1) were aged 15–20, had either never had sex or first had sex less than 3 years earlier, and had not had a Pap test or 2) first had sex more than 3 years earlier or were aged 21–29 and had received a Pap test.

We used the Behavioral Model of Health Services Use (Andersen, 1995, 2008) to guide analysis of factors associated with receipt of guideline-consistent screening. The model relates predisposing, enabling, need, and contextual variables to the use of health services. The predisposing variables included race/ethnicity (white, black, Hispanic, other), maternal education level as a marker of socioeconomic status (the adolescents in our analysis have not yet completed their educations) (Trotter et al., 2010), and U.S. nativity. Enabling measures of health care access were health insurance coverage (private or public, coverage gaps in the past year). Reproductive need and context variables were age at first sex, pregnancy in the previous 12 months, number of sexual partners in the previous 12 months, and use of a provider-dependent birth control method (a marker for reproductive health services use) (Schwarz et al., 2005).

Statistical analysis

Data from 2002 were compared to data from 2006–2008 since these surveys occurred soon after changes to cervical cancer screening guidelines. Our analysis is limited to woman ages 15–29 to capture key time periods referenced in screening recommendations, including the age of sexual initiation. In the analytic subsamples, in 2002 there were 3809 women and in 2006–2006 there were 4047 women. Pap test among women who have not had sex and women who have had sex were compared and the percentage of women reporting a Pap test according to age and the timing of first sex was calculated.

The proportion of women having early, on time, or missed Pap testing for the two cycles of data was compared across the covariates described above. Design-based Pearson chi-squared tests for independence were used to test the significance of differences within data cross-sections. Differences from 2002 to 2006–2008 were tested with standard two-tailed t-tests using design-based point estimates and standard errors. Multivariable logistic regression models were constructed to examine adjusted associations of sociodemographic, health care access, and reproductive characteristics on the receipt of guideline-consistent Pap testing. Sexually active women were included in the multivariable analysis so that adjusted relationships with reproductive health context factors such as recent pregnancy and contraceptive use could be considered.

Data were weighted to be representative of the U.S. population 15 to 29 years of age. To take into account the complex survey design of the NSFG, producing standard errors that account for clustering, stratification, and weighting of the data, we used SAS (version 9.2, SAS Institute, Cary, NC) and Sudaan (version 10, RTI International, Research Triangle Park, NC). The National Center for Health Statistics IRB has reviewed and approved the National Survey of Family Growth protocol.

Results

Overall, the percentage of women aged 15–29 who reported receiving a Pap test in the previous year changed little between 2002 (58%) and 2006–2008 (55%) (Table 2). However, the percentage receiving a Pap test was significantly lower in 2006–2008 among women aged 15–17, regardless of sexual activity status, and among those aged 18–20 who had never had sex. Among women who had never had sex, the proportion who received a Pap test at age 20 declined from 34% in 2002 to 18% in 2006–2008 (Fig. 1). Among sexually active women there were no significant differences in the percentage who reported receiving a Pap test at age 18 or older (Fig. 2).

Characteristics associated with receiving guideline-consistent screening in 2002 were similar to those associated with receiving guideline-consistent screening in 2006–2008 (Table 3), though the change in

Table 1
Classification of cervical cancer screening guideline-consistency for 2002 and 2006–2008, United States National Survey of Family Growth data by age and sexual activity.

	Guideline-consistent	Too early	Missed
Based on clinical recommendations from 1995–2000[a] (2002 NSFG)	Had Pap test • Ages 15–17 and sexually active • Ages 18–29, regardless of sexual activity status No Pap test • 15–17 and not sexually active	Had Pap test • Ages 15–17 and not sexually active	No Pap test • Ages 15–17 and sexually active • Ages 18–29
Based on clinical recommendations from 2002–2003[b] (2006–2008 NSFG)	Had Pap test • Ages 15–20 and ≥3 years from first intercourse • Ages 21–29 No Pap test • Ages15–20 and <3 years from first intercourse or never had sex	Had Pap test • Ages 15–20 and <3 years from first intercourse or never had sex	No Pap test • Ages 15–20 and ≥3 years from first intercourse • Ages 21–29[c]

[a] ACOG: recommendations on frequency of Pap test screening. American College of Obstetrics & Gynecology Opinion Committee on Gynecologic Practice; 1995. USPSTF: U.S. preventive services task force guide to clinical preventive services. 2nd ed. Washington, DC: Office of Disease Prevention and Health Promotion; 1996. ACS: American cancer society guidelines for the early detection of cancer; 2000.

[b] ACOG: practice bulletin no. 45: cervical cytology screening; 2003. USPSTF: screening for cervical cancer, recommendations and rationale; 2003. http://www.uspreventiveservicestaskforce.org/3rduspstf/cervcan/cervcanrr.htm ACS: American cancer society guideline for the early detection of cervical neoplasia and cancer; 2002.

[c] Missed screening for 21–29 year olds in 2006–2008 was defined according to ACOG and USPSTF recommendations for conventional cytology. Some women in this category could have received guideline-consistent screening based on ACS guidelines for liquid-based cytology every other year.