HHS Public Access

Author manuscript

Am J Prev Med. Author manuscript; available in PMC 2018 September 01.

Published in final edited form as:

Am J Prev Med. 2017 September ; 53(3): 392–395. doi:10.1016/j.amepre.2017.02.024.

Cervical Cancer Screening and Incidence by Age: Unmet Needs Near and After the Stopping Age for Screening

Mary C. White, ScD, **Meredith L. Shoemaker, MPH**, and **Vicki B. Benard, PhD**

Division of Cancer Prevention and Control, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention (CDC), Atlanta, Georgia

Abstract

Introduction—Leading professional organizations recommend cervical cancer screening for average-risk women aged 21–65 years. For average-risk women aged >65 years, routine screening may be discontinued if “adequate” screening with negative results is documented. Screening is recommended after age 65 years for women who do not meet adequate prior screening criteria or are at special risk.

Methods—Authors examined the most recent cervical cancer incidence data from two federal cancer surveillance programs for all women by age and race, corrected for hysterectomy status. The 2013 and 2015 National Health Interview Surveys were analyzed in 2016 to examine the proportion of women aged 41–70 years without a hysterectomy who reported that they never had a Pap test or that their most recent Pap test was >5 years ago (not recently screened).

Results—The incidence rate for cervical cancer among older women, corrected for hysterectomy status, did not decline until age ≥85 years. The proportion not recently screened increased with age, from 12.1% for women aged 41–45 years to 18.4% for women aged 61–65 years.

Conclusions—Even among women within the recommended age range for routine screening, many are not up to date, and a substantial number of women approach the “stopping” age for cervical cancer screening without an adequate prior screening history. Efforts are needed to reach women who have not been adequately screened, including women aged >65 years, to prevent invasive cervical cancer cases and deaths among older women.

INTRODUCTION

One fifth of cervical cancer cases and one third of cervical cancer deaths occurred among women aged ≥65 years in the U.S. in 2013.[1] Cervical cancer screening is effective at preventing invasive cases and deaths from cervical cancer among older women.[2,3] Professional organizations recommend that routine cervical cancer screening be discontinued for average-risk women aged >65 years after three consecutive negative cytology results or two consecutive negative co-test results within the previous 10 years, with the most recent test performed within the past 5 years.[4–6] Substantially lower risk of cervical cancer after age 65 years was associated with adequate screening at age 50–64

Address correspondence to: Mary C. White, ScD, Epidemiology and Applied Research Branch, Division of Cancer Prevention and Control, CDC, 4770 Buford Highway, MS F76, Atlanta GA 30341. mxw5@cdc.gov.

years, suggesting benefits of increasing screening uptake prior to and, if needed for catch-up, after age 65 years.[7]

Data from the 2013 and 2015 National Health Interview Survey (NHIS) were used to examine cervical cytology test use as women approach the cervical cancer screening "stopping age." Cervical cancer incidence rates were examined for all women by age, corrected by hysterectomy status, based on data from the 2013 NHIS and the latest cancer incidence data from 2013.

METHODS

Data Sample

Survey data came from the 2013 and 2015 NHIS, a cross-sectional household survey, conducted in person and representative of the civilian, non-institutionalized U.S. population (www.cdc.gov/nchs/nhis/index.htm). Information was collected about the household, each family in the household, and a randomly selected sample adult and child in each family. Response rates for the 2013 and 2015 NHIS sample adult section were 61.2% and 55.2%, respectively, for the final samples taking household nonresponse into account.[8,9] Data were combined for these 2 years to improve estimate stability.

Survey respondents were asked which group best represents their race and if they consider themselves to be Hispanic/Latino. The sample adult data file included specific race and ethnicity recodes. Participants were categorized as non-Hispanic white, non-Hispanic black/African American, American Indian/Alaska Native, Asian/Pacific Islander (Asian), or Hispanic. In 2013 and 2015, the survey asked female respondents if they ever had a hysterectomy, ever had a Pap smear or Pap test, and when their most recent Pap test was performed. These responses were used to determine the proportion of the female population aged 41–70 years who were not recently screened, defined as never having a Pap test or the last Pap test was >5 years ago.[10,11] Only women with no hysterectomy were included in the analyses for the combined years (n=12,518).

Data on the number of invasive cervical cancer cases were obtained from combined registry data from the Centers for Disease Control and Prevention's National Program of Cancer Registries and the National Cancer Institute's Surveillance, Epidemiology, and End Results Program for 2013.[1] All contributing cancer registries meet high data quality criteria (www.cdc.gov/cancer/npcr/uscs/technical_notes/criteria.htm).

Statistical Analysis

Weighted proportions and 95% CIs were calculated for populations that were not recently screened by age and race/ethnicity and prevalence of hysterectomy by age, using SAS, version 9.3, with SUDAAN, version 11, to adjust for the NHIS complex sampling design and the combined survey years. American Indian/Alaska Native women were included in the combined sample of all women, but estimates for American Indian/Alaska Native women were unreliable (relative SE >30%) and not reported. All analyses were conducted in 2016.

For 2013, combined registry data from the National Program of Cancer Registries and the Surveillance, Epidemiology, and End Results Program cover approximately 99% of the U.S. population. Data for specific racial or ethnic populations other than white and black were not examined because of misclassification of race or ethnicity or suppressed cell counts.[1] Following a method similar to Rositch et al.,[12] the authors used age- and race-specific estimates of hysterectomy prevalence based on data from the 2013 NHIS to adjust the age- and race-specific number-at-risk denominators to exclude women without an intact cervix. These adjusted denominators were used to calculate cervical cancer incidence rates corrected for hysterectomy with 95% CIs.

RESULTS

Hysterectomy prevalence increased with age, from about 12% for women aged 40–44 years to >40% after age 70 years (data not shown). Cervical cancer incidence rates corrected for hysterectomy increased with age until about age 70 years and then declined after age 85 years (Figure 1). The absolute magnitude of the difference between uncorrected and corrected cervical cancer incidence rates increased with age and was larger for black women than white women (Figure 1).

Among women with no hysterectomy, the proportion not recently screened increased with age, from about 12% for women in their 40s to nearly 24% for women aged 66–70 years (Table 1). For most age groups, this proportion was slightly higher for Hispanic and Asian women than for other women, but the CIs were fairly wide. Among women aged 66–70 years, 5.1% (95% CI=3.7%, 6.8%) reported never being screened (data not shown).

DISCUSSION

Before reaching age 65 years, many women are not up to date with routine cervical cancer screening, and a substantial number approach the “stopping” age without an adequate screening history. Based on the 2015 NHIS data, about 845,000 American women aged 61–65 years were not recently screened. For these women, catch-up screening may be needed after age 65 years to achieve an adequate negative screening history. Many women aged 66–70 years also may still need to be screened, especially those never screened.

A recommended upper age limit for routine screening may lead women and providers to assume that cervical cancer is a younger women’s disease.[13] Some of the highest cervical cancer incidence rates occur among women aged >65 years, with notably higher rates among older black women. These results, representing 99% of the U.S. population, confirm those of Rositch and colleagues[12] using data from 4–13 years earlier and 13 states. Although corrected incidence rates were not calculated for Asian women, their observed lower cervical cancer screening is of concern and incidence rates may be higher for Asians than uncorrected rates suggest.[1]

Limitations

These data are subject to several limitations. Self-reported data from NHIS on screening history may be inaccurate,[14] error may vary by race/ethnicity, and hysterectomy status could

not be confirmed. The sample may under-represent disadvantaged population groups most likely not to be recently screened. Sample sizes in specific age and race or ethnic groups were small, leading to unstable estimates. Additional women might have had a Pap test within the past 5 years, but not three negative tests within the past 10 years. Screening use among older women at special risk was not examined.

CONCLUSIONS

Premature discontinuation of routine screening among women in the years before age 65 years could contribute to preventable cases of invasive cervical cancer and deaths. Catch-up screening may be needed for underscreened women after age 65 years, taking into account the physical and psychological issues associated with cervical cancer screening decisions for older women.[13,15] In the short term, efforts could be undertaken to clarify misperceptions about the risk of cervical cancer among older women and providers. Messages about a "stopping age" should emphasize the recommendation for an adequate screening history of previous negative tests before screening is discontinued, not just chronologic age. Age itself may need to be reconsidered, given high cervical cancer incidence rates after age 65 years, increases in life expectancy, and different human papillomavirus exposures by birth cohort.[16]

Acknowledgments

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

Drs. White and Benard are federal employees and their work on this paper was performed as part of their official duties. This research was supported in part by an appointment (ML Shoemaker) to the Research Participation Program at the Centers for Disease Control and Prevention administered by the Oak Ridge Institute for Science and Education through an interagency agreement between the U.S. Department of Energy and Centers for Disease Control and Prevention.

MC White conceptualized the study and led the drafting of the article. ML Shoemaker performed data analysis. All authors interpreted findings, reviewed and edited drafts of the article, and approved the final version.

Article contents were presented at the 144th Annual Meeting of the American Public Health Association (APHA), Denver, CO, November 1, 2016. An earlier, unpublished version of this article received the Aetna Award for Excellence in Research on Older Women and Public Health (Honorable Mention) from the Aging and Public Health Section, APHA, on October 31, 2016.

No financial disclosures were reported by the authors of this paper.

References

1. U.S. Cancer Statistics Working Group. United States Cancer Statistics: 1999–2013 Incidence and Mortality Web-based Report. Atlanta, GA: U.S. DHHS, CDC, and National Cancer Institute; 2016.
2. Kamineni A, Weinmann S, Shy KK, Glass AG, Weiss NS. Efficacy of screening in preventing cervical cancer among older women. Cancer Causes Control. 2013; 24(9):1653–1660. https://doi.org/10.1007/s10552-013-0239-4. [PubMed: 23744043]
3. Rustagi AS, Kamineni A, Weinmann S, Reed SD, Newcomb P, Weiss NS. Cervical screening and cervical cancer death among older women: a population-based, case-control study. Am J Epidemiol. 2014; 179(9):1107–1114. https://doi.org/10.1093/aje/kwu035. [PubMed: 24685531]
4. American College of Obstetricians and Gynecologists. ACOG Practice Bulletin No. 157. Cervical Cancer Screening and Prevention. Obstet Gynecol. 2016; 127(1):e1–e20. https://doi.org/10.1097/AOG.0000000000001263. [PubMed: 26695583]

5. Moyer VA. Screening for cervical cancer: U.S. Preventive Services Task Force recommendation statement. Ann Intern Med. 2012; 156(12):880–891. https://doi.org/10.7326/0003-4819-156-12-201206190-00424. [PubMed: 22711081]

6. Saslow D, Solomon D, Lawson HW, et al. American Cancer Society, American Society for Colposcopy and Cervical Pathology, and American Society for Clinical Pathology screening guidelines for the prevention and early detection of cervical cancer. CA Cancer J Clin. 2012; 62(3): 147–172. https://doi.org/10.3322/caac.21139. [PubMed: 22422631]

7. Castanon A, Landy R, Cuzick J, Sasieni P. Cervical screening at age 50–64 years and the risk of cervical cancer at age 65 years and older: population-based case control study. PLoS Med. 2014; 11(1):e1001585. https://doi.org/10.1371/journal.pmed.1001585. [PubMed: 24453946]

8. National Center for Health Statistics. Survey Description, National Health Interview Survey, 2013. Hyattsville, MD: National Center for Health Statistic; 2014.

9. National Center for Health Statistics. Survey Description, National Health Interview Survey, 2015. Hyattsville, MD: National Center for Health Statistic; 2016.

10. Benard VB, Thomas CC, King J, et al. Vital signs: cervical cancer incidence, mortality, and screening–United States, 2007–2012. MMWR Morb Mortal Wkly Rep. 2014; 63(44):1004–1009. [PubMed: 25375072]

11. Benard V, Royalty J, Saraiya M, Rockwell T, Helsel W. The effectiveness of targeting never or rarely screened women in a national cervical cancer screening program for underserved women. Cancer Causes Control. 2015; 26(5):713–719. https://doi.org/10.1007/s10552-015-0542-3. [PubMed: 25754108]

12. Rositch AF, Nowak RG, Gravitt PE. Increased age and race-specific incidence of cervical cancer after correction for hysterectomy prevalence in the United States from 2000 to 2009. Cancer. 2014; 120(13):2032–2038. https://doi.org/10.1002/cncr.28548. [PubMed: 24821088]

13. Sherman SM, Castanon A, Moss E, Redman C. Cervical cancer is not just a young woman's disease. BMJ. 2015; 350:h2729. https://doi.org/10.1136/bmj.h2729. [PubMed: 26077735]

14. Cuzick J, Myers O, Hunt WC, et al. A population-based evaluation of cervical screening in the United States: 2008–2011. Cancer Epidemiol Biomarkers Prev. 2014; 23(5):765–773. https://doi.org/10.1158/1055-9965.EPI-13-0973. [PubMed: 24302677]

15. Elit L. Role of cervical screening in older women. Maturitas. 2014; 79(4):413–420. https://doi.org/10.1016/j.maturitas.2014.09.012. [PubMed: 25449664]

16. Brouwer AF, Eisenberg MC, Carey TE, Meza R. Trends in HPV cervical and seroprevalence and associations between oral and genital infection and serum antibodies in NHANES 2003–2012. BMC Infect Dis. 2015; 15(1):1. https://doi.org/10.1186/s12879-015-1314-0. [PubMed: 25567701]

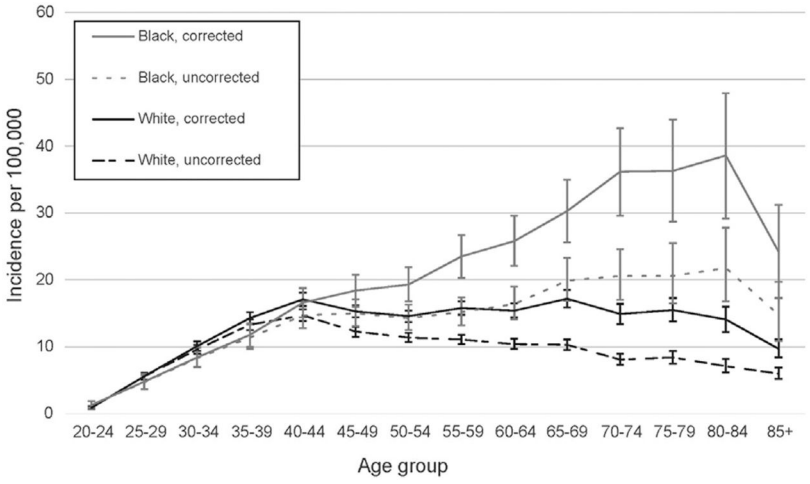

Figure 1.

Age-specific incidence and 95% CI of cervical cancer in the U.S., 2013, corrected and uncorrected for hysterectomy, by race.

Table 1

Women Aged 41–70 Years Not Recently Screened for Cervical Cancer, NHIS 2013 and 2015

	Not recently screened,[a] % (95% CI), *n*				
Age group, years	**Total**	**Non-Hispanic white**	**Non-Hispanic black**	**Hispanic**	**Asian**
41–45	12.1 (10.6, 13.8), 2,338	11.3 (9.2, 13.7), 1,279	7.1 (4.6, 10.7), 348	16.4 (12.9, 20.6), 534	14.5 (10.1, 20.5), 157
46–50	11.7 (10.2, 13.4), 2,255	10.5 (8.7, 12.7), 1,312	13.1 (9.1, 18.3), 332	14.9 (11.3, 19.4), 436	12.1 (8.1, 17.7), 154
51–55	11.3 (9.8, 12.9), 2,227	9.6 (7.9, 11.6), 1,355	13.3 (10.0, 17.6), 384	17.5 (12.7, 23.5), 344	14.0 (8.2, 22.8), 124
56–60	17.1 (14.0, 19.4), 2,175	16.5 (14.0, 19.3), 1,434	16.9 (12.4, 22.6), 326	18.9 (13.6, 25.6), 283	20.0 (12.2, 30.9), 111
61–65	18.4 (16.2, 20.8), 1,937	17.9 (15.4, 20.9), 1,326	22.4 (16.4, 29.9), 270	16.2 (11.5, 22.4), 231	22.3 (13.5, 34.7), 95
66–70	23.6 (20.8, 26.6), 1,586	22.4 (19.1, 26.1), 1,070	24.3 (17.5, 32.8), 218	28.1 (19.8, 38.1), 205	32.0 (20.9, 45.6), 79

[a]Women were identified as not recently screened if they reported never having a Pap test or if the last Pap test was >5 years ago. NHIS, National Health Interview Survey.