Increasing Adherence to Cervical Cancer Screening Guidelines
Constance B. Schwaiger, DNP, FNP-BC, Mary M. Aruda, PhD, PNP-BC, Sheryl LaCoursiere, PhD, FNP-BC, Kristine E. Lynch, PhD, and Richard J. Rubin, MD

ABSTRACT
The dramatic changes in the 2009 American College of Obstetrician and Gynecologists’ (ACOG) cervical cancer screening guidelines created challenges in clinical implementation. When audited in October 2010, adherence to the new guidelines by clinicians in a university health center was 73.95%. After implementation of a multifaceted quality-improvement project, adherence significantly improved to 90.20%. This article discusses the components of a quality-improvement project focused on increasing providers’ adherence to guideline-consistent practice.

Keywords: cervical cancer screening guidelines, evidence-based practice change, guideline implementation strategies, quality improvement, university health services
© 2013 Elsevier, Inc. All rights reserved.

Invasive cervical cancer deaths have been reduced by 70% in the United States since the introduction of the Papanicolaou (Pap) test more than 50 years ago.1,2 Providers, following previous guidelines based on the scientific knowledge at the time, performed the annual pap test starting within 3 years of sexual debut.3-5 Current scientific evidence shows that human papillomavirus (HPV) causes cervical cancer; furthermore, research demonstrates that most young women clear cervical HPV without intervention.6,7 It is now known that the early cervical changes from HPV infection in young women resulted in unnecessary procedures and anxiety.6 In this age category, Pap testing led to unnecessary colposcopies and invasive cervical procedures that produced anxiety for young women, increased cost of care, and placed these women at risk for cervical incompetence and premature deliveries.6

Moreover, in the half century since the advent of the original Pap test, newer cancer screening technologies, such as liquid-based cytology and HPV DNA testing, have become available.8,9 These new technologies, specifically the latter, provide greater sensitivity to detect precancer and cancer and increase reproducibility.2,8,9 Advances in the scientific knowledge about the natural course of HPV infection on the cervix and the new screening technologies have led to evidence that supports the current cervical cancer screening (CCS) guidelines of not screening women younger than 21 and less frequent screening for adult women.7,10,11 Although there was scientific evidence to support these practice changes, barriers exist for implementation by providers at the point of care.12

Contributing to the complexity in CCS, more than 3 national organizations have issued guidelines. In 2009, the American College of Obstetricians and Gynecologists (ACOG) presented recommendations for significant practice change for providers, but the American Cancer Society (ACS) and US Preventive Services Task Force (USPSTF) guidelines remained the same.3,4,13 The differences in the guidelines led to confusion for providers of women’s health care. While there was overlap among the guidelines, recommendations regarding the initiation, frequency, and discontinuance of CCS and when to use HPV DNA co-testing varied.1

In 2012, all 3 organizations updated their guidelines to reflect more congruence in the screening protocol.14-16 A summary of the organizations’ guidelines are presented in Table 1.
PROBLEM

Given the recent changes in guidelines and the disparity between knowledge and incorporation of current evidence into practice, providers often experience difficulty integrating the guidelines into practice. To incorporate new screening guidelines, health care practitioners must understand the current science regarding them. It is important for practitioners to understand the evidence that supports changes in guidelines because this has a significant

<table>
<thead>
<tr>
<th>Table 1. Comparison of National Cervical Cancer Screening Guidelines in 2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Cancer Society&lt;sup&gt;14&lt;/sup&gt;</td>
</tr>
<tr>
<td><strong>Screening initiation age</strong></td>
</tr>
<tr>
<td><strong>Screening method and intervals for women 21 to 29</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Screening method and intervals for 30 to 65</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>When to stop Pap test screening</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Screening after hysterectomy with removal of cervix</strong></td>
</tr>
</tbody>
</table>

CIN — cervical intraepithelial neoplasia; DES — diethylstilbestrol; HIV — human immunodeficiency virus; HPV — human papilloma virus.

<sup>12</sup> To incorporate new screening guidelines, health care practitioners must understand the current science regarding them. It is important for practitioners to understand the evidence that supports changes in guidelines because this has a significant
impact in promoting practice change. In order to determine the best intervention for assisting providers to integrate evidence-based guidelines into clinical practice, a literature review was completed.

**LITERATURE REVIEW**

To determine the best intervention for a project to help providers implement guidelines, Pub-Med and CINAHL databases were searched using the following keywords: guideline implementation, Internet-based learning, Canadian and European guideline performance, and evidence-based practice. The review revealed that the key barriers were training and knowledge limitations, lack of evidence-based practice experience, fear of regulation intrusion, lack of consensus on best practice, insufficient mentors, lack of administrative support, and no electronic health records (EHRs) in offices. There was a positive effect on learning when health care providers used Internet-based learning, computer-based learning, and EHRs and worked in practices where administration supported an evidence-based practice culture and resources.

Specific to cervical cancer guidelines, Moscicki and Cox recommended Web site development that would include important articles and continuing education programs. Other strategies to improve guideline implementation included peer educators, financial rewards or penalties, performance report cards, and consumer education. Canadian studies recommended using multiple strategies that included education, local opinion leaders, audits, feedback, marketing, reminders in EHRs, and pocket guides.

To support the Institute of Medicine (IOM) goal of providing quality health care for everyone, it is important to identify and tailor interventions that assist providers with integrating evidence-based guidelines into everyday practice. The use of such guidelines improves health care quality, patient outcomes, and health care processes and often leads to reduced health care costs.

The evidence-based 2009 ACOG CCS guidelines were approved by the medical staff for implementation at a university health center in 2010, but an informal audit in September 2010 revealed that a practice change had not occurred. Using the most current guidelines is important in a university health center, where many young women present for their initial Pap tests and begin cervical cancer screenings. The quality improvement (QI) director, medical director, and this author agreed that an intervention was necessary to improve the discord between policy and practice. The purpose of this article is to document results of a QI project (QIP) aimed at improving provider adherence to guideline consistent care, improving the quality of care for college-age women, and reducing unnecessary health care procedures.

**THEORETICAL FRAMEWORK**

The nursing model used in this project is Cox’s Interactive Model of Client Health Behavior (IMCHB). In 1982 Cox reviewed models of health behavior that focused on client health behavior from psychological, sociological, and economical frames of reference. Cox believed that these models did not address the provider’s influence on the client’s health care outcome. Her conceptual model included the categories of client singularity, client-professional interaction, and health outcome.

In this setting the clients were 18- to 29-year-old women who presented for CCS. This project focused on the providers who interacted with these women. According to the IMCHB, the client-professional interaction is a 2-way process that includes the patient’s knowledge and individual background and the provider’s knowledge, teaching ability, and technical competency. A national survey was used to assess the providers’ knowledge, beliefs, and recommendations regarding CCS. Based on this assessment, a computer learning module, pocket guide, and educational session were developed to provide evidence-based science that would improve professional competency and decision making. The expected health outcome was provider acceptance and implementation of the 2009 CCS guidelines.

Deming’s model of Plan, Do, Study, and Act provided the foundation for the development of this QIP. The plan phase involved a comprehensive review of literature for the evidence-based guideline-implementation process. The stakeholders included all university health center clinical providers, support staff, and female students. The first author reviewed the baseline clinician survey, planned and presented the educational session, researched the computer...
module, developed the pocket guide, and created the Excel spreadsheets for data collection.

The implementation, or do, phase, involved the 6-month study process described here in further detail. The study phase involved analyzing the results and disseminating feedback to the providers. Act, the final phase, reviewed changes that should be incorporated based on feedback from the cycle.

METHODS
Based on the findings of the September 2010 internal audit, a QIP was developed and implemented. Its purpose was based on the IOM goals to improve quality of care for women and reduce variation in care and unnecessary health care procedures and expenses. The aims of the QIP were to improve provider adherence to the ACOG guidelines and to reduce costs and unnecessary screenings. The QIP was approved by the institutional review board (IRB) at the university and the clinical practice committee and director at the university health services.

The question guiding this study was Does implementation of an interactive competency-based computer-learning module for current ACOG CCS guidelines and a point-of-service pocket guide improve providers’ screening recommendations and practices?

Setting
A New England public university of 30,000 students provided the study setting. Twenty-four providers (13 physicians [MDs], 9 nurse practitioners [NPs], and 2 physician assistants [PAs]) at the health center performed 125-200 CCS monthly. The QIP was presented to all the providers in May 2011, and informed consent was obtained from every provider before participation in the project. The SAS 9.2 (2009) statistics program was used to analyze the data.

After obtaining informed consent, each provider was E-mailed the survey with a completion deadline of 2 weeks. The survey from the National Cancer Institute, “National Survey of Primary Care Physicians’ Recommendations and Practice for Cervical Cancer Screening,” that included vignettes and questions regarding beliefs and recommendations about CCS was used before and after intervention.  
A limitation noted in this national study of provider adherence to CCS guidelines by Yabroff et al. was the reliance on provider survey alone and the inability to review clinician practice.

Along with this survey, this QIP used chart audits before and after intervention to validate providers’ information about their actual practice. The educational tools implemented after completion of the survey included a pocket guide of the 2009 ACOG guidelines, a computer module, and an education session. The interactive CCS computer module from the Institute for Clinical Systems Improvement was used to give the providers an in-depth review of the guidelines, including additional references regarding the evidence-based science.

The CCS guideline implementation QIP comprised 5 steps:

Step 1. QIP Provider Survey 1: In May 2011, providers were given an initial survey to measure baseline knowledge, beliefs, and recommendations about CCS.

Step 2. QIP Chart Audit 1: In June 2011 the pre-intervention chart audit covering the period of October 1 to 31, 2010, was completed. The audit provided data to determine how frequently the ACOG guidelines were being followed. These data were compared to the postintervention data gathered in October 2011. October was chosen because providers historically performed the largest number of Pap tests during this month.

Step 3. QIP Education: A nationally accepted computer module algorithm for CCS guidelines was introduced in June 2011. A pocket guide for the 2009 ACOG guidelines, developed by the author, was given to each provider to use and as an educational tool to inform patients of the guideline changes in Pap test frequency. This multifaceted approach was necessary for this site because computers were not available in the exam rooms and EHRs were not in use. Based on the Step 1 survey results, a 15-minute educational session to review the guideline and tools was presented to providers in August 2011 and questions were answered. As the providers had agreed to implement the guidelines, they were instructed that implementation of the 2009 guidelines was expected.
Step 4. QIP Provider Survey 2: All providers were re-surveyed in November 2011.
Step 5. QIP Chart Audit 2: In November 2011 a post-intervention chart audit using the established inclusion and exclusion criteria from chart audit 1 to compare guideline-consistent screening practices was completed for October 1 to 31, 2011.

RESULTS
Step 1. Pre-Intervention Provider Survey
An interdisciplinary practice team of 24 MDs, NPs, and PAs voluntarily agreed to be involved in the QIP for implementation of CCS guidelines. An online survey was taken by the providers in May 2011 after completion of informed consent. The response rate to the survey was 91.3%.

Step 2. Chart Audit 1
A retrospective chart audit of patients seen during October 1 to 31, 2010, identified 138 charts with the diagnosis of gynecological exam, Pap test, women’s health exam, or complete physical exam. The age range of the women whose charts were reviewed was 18-29. The charts were reviewed in a private office with patient identifiers removed. The charts were separated into 2 groups: under age 21 and age 21-29. The information was entered in the Excel spreadsheet developed for the project.

The categories created for data collection were no CCS under age 21, CCS beginning at age 21, CCS every 2 years for ages 21-29, and increased CCS frequency if history of abnormal cervical test, HIV infection, immunocompromise, or exposure to diethylstilbestrol in utero. Other patient factors considered out of the provider’s control included women who were new to the health center who had not been screened appropriately in the past. Pap test result was noted on the sheet; if a result was abnormal, this was noted in the comment column; if done correctly according to the ACOG guidelines, the comment “okay” was entered in the comment column; and if done early, the comment “early” was entered. Length of time from last Pap was noted in months.

A total of 119 charts fit the criteria for inclusion in the review. Exclusion criteria included improperly coded charts, such as travel or sports physicals and birth control-monitoring appointments not requiring Pap tests and women age 30 and older. Sixty-two percent (n = 74) of the preintervention charts were completed by NPs and 38% (n = 45) by MDs. Individual provider identifiers, per protocol, were removed from the spreadsheet.

Analysis of the data indicated that there were discrepancies in following the 2009 guidelines. Providers were not following them 31.37% of the time for women younger than 21. Overscreening was being performed 22.72% of the time for women age 21-29. The cost of overscreening, based on the cost of the Pap test alone, for 1 month totaled $1,250, with an estimated annual cost of $15,010. The cost of visits remains the same since annual visits are still recommended for comprehensive reproductive health counseling. The overscreening indicated a provider knowledge gap between the state of science and implementation of practice guidelines.

Step 3. Educational Session on CCS Guidelines
A pocket guide and computer module were given to each provider in June 2011. Based on the data results from the Step 1 online provider survey and the Step 2 audit, an educational session on the 2009 ACOG guidelines was developed. All of the providers participated in the educational session on the evidence-based science supporting the need for a practice change regarding CCS.

Step 4. Post-Intervention Provider Survey
There was an 86.96% response rate to the post survey, which showed improvement in provider beliefs and recommendations regarding the 2009 guidelines. Because of the restrictions established by the practice director and IRB, provider anonymity prevented any negative consequences.

Step 5. Chart Audit 2 Post-Intervention
Chart audit 2 was completed 1 year after audit 1 and identified 154 charts for review using the same inclusion/exclusion criteria. Charts of patients who had met the inclusion criteria were identified as either “early” for screening or “okay” based on the ACOG guidelines. The Excel spreadsheet with the same categories as audit 1 was used for audit 2. A total of 102 charts fit the criteria for inclusion in the review. Chart
review identified an NP as the provider for 77% of the women (n = 79) and a physician for 23% (n = 23).

A total of 221 charts were audited (audit 1 = 119, audit 2 = 102). Descriptive statistics were used to analyze the chart audit data before and after intervention (summary data presented in Table 2). Chi-square analysis was used to determine the difference in the proportion of charts recorded as “early” vs “okay” between chart audit 1 and 2. The proportion of charts identified as “early” in the preintervention group was significantly higher than in the post-intervention group (26.05% and 9.8%, respectively) ($\chi^2 = 9.59, P < 0.01$).

**LIMITATIONS**
Provider identity was kept anonymous, thus prohibiting provider before and after comparisons and limiting the ability to state whether the practice changes of the individual provider could be attributed to the tools. In hindsight, linking the before and after clinician surveys and chart audits through confidential code assignment would have increased our ability to compare results.

The final chart audit analysis was generalized to the entire practice. The first author’s accessibility throughout the project as an in-house expert to answer clinical questions provided an additional resource beyond the computer module and pocket guide and may have affected the study results.

After summer vacations, a 15-minute educational booster session was given in August that may have affected the postintervention survey results. The satisfaction survey revealed that the providers found the pocket guide more helpful than the computer module. This may be the result of not having computers within point-of-service exam rooms.

Another limitation was the small sample size and single setting. Further study is warranted with the use of these tools on a larger scale. Performing a study without the restriction of provider anonymity or linking before and after surveys might improve the significance of the results. Discussion about provider bias and barriers, although relevant, could not be addressed in this article for space constraints. The project did not incorporate patient education about the guideline changes except as providers personally educated their patients through utilization of the pocket guide. Future sources for patient education will need to be developed as patient influence affects guideline implementation. 20

**IMPLICATIONS**
This QIP expanded upon the nationally conducted survey project by Yabroff et al that evaluated only

Table 2. Chart Audit Summary

<table>
<thead>
<tr>
<th>Chart Audit Criteria 2009 ACOG Guidelines</th>
<th>Care Provided Consistent with Guidelines</th>
<th>Preintervention Chart Audits (N = 119)</th>
<th>Postintervention Chart Audits (N = 102)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Correct</td>
<td>Incorrect</td>
<td>Correct</td>
</tr>
<tr>
<td>No cervical cancer screening under age 21</td>
<td>35</td>
<td>16</td>
<td>32</td>
</tr>
<tr>
<td>Cervical cancer screening beginning at age 21</td>
<td>11</td>
<td></td>
<td>19</td>
</tr>
<tr>
<td>Cervical screening every 2 years age 21-29</td>
<td>27</td>
<td>15</td>
<td>25</td>
</tr>
<tr>
<td>More frequent screening for women with abnormal Pap smears or history of CIN 2 or CIN 3</td>
<td>11</td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>History of HIV, immunocompromise, or diethylstilbestrol exposure requires more frequent screening</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Patient factors delaying screening</td>
<td>3</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Total chart audits</td>
<td>88</td>
<td>31</td>
<td>92</td>
</tr>
<tr>
<td>Percentage</td>
<td>73.95%</td>
<td>26.05%*</td>
<td>90.20%</td>
</tr>
</tbody>
</table>

*Significant improvement in guideline correct cervical screening ($\chi^2 = 9.59, P < 0.01$).
providers’ adherence to guideline changes based on a personal response to the survey.\textsuperscript{28} This QIP used the before and after intervention chart audits to validate providers’ information about their actual practice. Significant practice change was demonstrated as summarized in Table 2.

The literature review demonstrated that guideline-inconsistent practice affects both cost and quality of care. Women who are screened before age 21 may undergo additional tests and procedures that potentially impact their cervical competency, especially during pregnancy, as well as add stress and unnecessary anxiety for a condition that has been found to self-resolve.\textsuperscript{30} Yet many clinicians who were trained and have spent careers providing annual Pap tests to all sexually active women regardless of age may be reluctant to change practice.

The 2009 ACOG guidelines represented a radical change, especially for clinicians providing care to young women for whom the first Pap test is now recommended at age 21. For successful practice change as demonstrated in this project, an initial survey of clinician knowledge and attitudes was done and then a brief, targeted education session was conducted. A nationally accepted computer module algorithm, a portable pocket guide, and a knowledgeable on-site clinician resource provided additional support to break longstanding clinical habits and to support practice change.

The final chart audit revealed an overall statistically significant change postintervention of correct guideline-consistent CCS ($P \leq 0.01$). Calculations from the final chart audit indicated a Pap test cost of $4,842 per year from overscreening, which is significantly lower than the initial chart audit showing a cost of $15,010 annually. This indicated a potential Pap test savings of $10,168 per year with implementation of the evidence-based guidelines.

It is important to note that frequency of visits may not change. Annual reproductive health visits are still recommended.\textsuperscript{30} Providers implementing the new CCS guidelines can focus on other important preventive women’s health care issues during the annual exam—contraception, safe sex practices, screening for sexually transmitted infections (STIs) and partner violence, smoking cessation, and HPV vaccination. Although there has been an increase in reported STIs nationally by the Centers for Disease Control and Prevention, screening is completed on only half of the eligible women.\textsuperscript{31} The cost of treatment for STIs is $17 billion a year, and the failure to screen is an extremely important public health concern as this may affect future childbearing ability.\textsuperscript{31}

Furthermore, half of all US teen pregnancies for women age 18-19 are unintended, and much counseling needs to occur to support contraceptive choice over a woman’s lifespan.\textsuperscript{32} The annual women’s health exam is about more than just the Pap test, and providers knowledgeable about evidence-based practice can play a significant role in the health and well-being of all women.

**CONCLUSION**

This multifaceted QIP resulted in a significant increase in guideline-consistent CCS within a university health center. The utilization of a baseline survey to determine clinician knowledge, attitudes, and recommendations was effective in developing an educational session tailored to meet their needs regarding current evidence-based CCS. The project results suggest that tailored clinician education, a computer module algorithm, and an easily accessible pocket guide were effective tools to improve guideline-consistent CCS in a college-age population. In order to achieve guideline implementation in a specific clinical setting, various strategies tailored to the practice may be necessary to affect the desired outcomes. Further replications of this project, including before and after intervention chart audits, are recommended. As all 3 organizations have recently updated their CCS recommendations, ongoing QIPs are necessary to monitor clinical practice and incorporate current evidence-based care.\textsuperscript{14-16}

**References**


Constance B. Schwaiger, DNP, FNP-C, is a family nurse practitioner and Richard J. Rubin, MD, is a senior physician at the University Health Services at the University of Massachusetts in Amherst; she can be reached at schwaiger@uhs.umass.edu. Mary M. Aruda, PhD, PNP-BC, FNP-C, FAANP, is a clinical associate professor in the School of Nursing at the University of Massachusetts in Lowell. Sheryl LaCoursiere, PhD, FNP-C, is an assistant professor at the University of Massachusetts in Boston. Kristine E. Lynch, PhD, is a postdoctoral fellow in epidemiology at the University of Massachusetts in Amherst. In compliance with national ethical guidelines, the authors report no relationships with business or industry that would pose a conflict of interest.