

Current Cervical Cancer Screening Practices of Dane County, Wisconsin Primary Care Clinicians

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ABSTRACT

Purpose: This study explores clinician Papanicolaou (Pap) smear collection and management strategies in light of current research, guidelines, and recommendations.

Methods: Two hundred thirty eligible obstetrician/gynecologists, family physicians, and advance practice nurses in Dane County, Wisconsin completed a survey. Descriptive statistics.

Results: The wooden spatula is most frequently (68%) used to collect ectocervical cells; the Cytobrush™ (75%) for endocervical cells. Most clinicians (63%) collect ectocervical cells first, endocervical cells second. Eighty-nine percent of clinicians are familiar with liquid-based Pap smears; 57% use them. Most clinicians (59%) prepare the cervix as needed prior to collecting a sample. Management of inflammation is variable. Forty-five percent of clinicians have no age limit in discontinuing Pap smears; 43% continue after benign hysterectomy. Training for doing Pap smears occurs primarily in residency (89%) or graduate nursing education (83%).

Conclusions: Despite current research and guidelines, great variability exists among clinicians in Pap smear

collection and management. Textbooks, articles, and clinician training must emphasize optimal collection technique and management to improve Pap smear quality and decrease unnecessary costs.

INTRODUCTION

Since the late 1940s, the Papanicolaou smear (Pap smear) has proven to be an effective screening tool for cervical cancer. Optimal Pap smear collection technique minimizes false negative results and identifies precancerous changes for early, more effective interventions. Specifics about proper collection technique are often described in abbreviated fashion or not at all in medical and nursing texts. With notable exceptions,¹⁻⁴ emphasis is given to the evaluation and treatment of pathology, but not to sampling tools and collection technique that are critical to the acquisition of a quality specimen. Sampling, screening, and interpretive errors that can lead to false negatives can range from 8% to 50% of all Pap smears. They are often due to obscuring elements on the slide such as inflammation, mucus and blood, lack of cells from the transformation zone (TZ), or poor fixation.^{5,6} Liquid-based Pap smears have been developed to eliminate obscuring elements and poor fixation, but at higher costs.

This study investigates the spectrum of Pap smear collection techniques and management strategies used by Dane County, Wisconsin clinicians, including obstetrician-gynecologists, family physicians, and advance practice nurses. It also explores whether their practices are in keeping with current research and expert guidelines, and their management strategies where research is lacking.

METHODS

In 1999, after approval from the University of Wisconsin Institutional Review Board Five, 562 obstetrician-gynecologists, family physicians, and advance practice nurses (460 physicians; 102 nurses) in Dane County, Wisconsin were sent a survey. The Wisconsin Department of Regula-

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Table 1. Characteristics of respondents to survey of clinicians' Pap smear collection and management practices in Dane County, Wisconsin, 1999

| | |
|---|------------|
| N | 230 |
| Gender | |
| Female | 52% |
| Male | 48% |
| Specialty | |
| Family Physician | 64% |
| Advanced Practice Nurse | 20% |
| Obstetrics/Gynecology | 16% |
| Practice Setting | |
| Urban | 33% |
| Suburban | 32% |
| Rural | 79 (34%) |
| Patient population risk of sexually transmitted disease as estimated by clinicians * | |
| Low | 69% |
| Moderate | 25% |
| High | 5% |
| Number of years in practice, mean | 13.1 |
| Number of Pap smears per week, mean | 10.8 |
| HMO affiliation | |
| Yes | 95% |

* Four clinicians did not respond to this question.

tion and Licensing provided a list of practitioners and addresses. Eligibility criteria included a clinical practice in Dane County, Wisconsin, that used Pap smear specimen processing at the Dane County Cytology Lab or the University of Wisconsin State Cytology Lab. The survey, which included 21 questions, asked for information about Pap smear techniques and instruments, clinician management of cytology results, especially inflammatory results, clinician demographic information and practice characteristics, training clinicians received on Pap smear collection techniques, perception of level of sexually transmitted disease in their patient population, familiarity with and use of liquid-based Pap smears, whether they reviewed Pap smear results with cytologists, Pap smears after hysterectomy, and patient age when Pap smears are discontinued. Practitioners who were sent a survey but did not meet eligibility criteria were asked to indicate this and return the survey. A second mailing was sent 1 month later. Descriptive statistics including means, standard deviations and percentages were used to analyze results. Comparisons across clinician specialties were done using chi square analysis.

RESULTS

Demographics

Of 562 clinicians, 341 (60%) responded to the survey.

One hundred eleven of the responders either did not do Pap smears (32 physicians, 28 nurses), did not practice in Dane County, or sent specimens to the study labs (44 physicians, 7 nurses). A total of 230 clinicians were eligible and completed the survey. The number of Pap smears performed by clinicians ranged from 1 to 75 per week, with a mean of 10.8 per week (S.D. 11.9). Most respondents were family physicians. Responding clinicians were balanced in terms of gender, location of practice, and years in practice. Most reported the perceived sexually transmitted disease risk of their patient populations receiving Pap smears as low to moderate. Only 5% reported high-risk populations in their care. Nearly all clinicians were affiliated with a health maintenance organization. (Table 1)

Collection Technique

Most clinicians reported swabbing the cervix prior to Pap smear collection occasionally or as needed, versus never or always. Sixty-three percent sampled the ectocervix first, followed by the endocervix, with 20% sampling in the reverse order, and 17% sampling both at once. Devices used for the collection of cells were varied but the Cytobrush™ was used primarily for the endocervix, and the curved wooden spatula for the ectocervix.

Training

Physicians were trained on Pap smear collection and management primarily in residency (89%), and advance practice nurses in graduate school/nurse practitioner training (83%). (Table 2)

Management Strategies

Most clinicians were familiar with liquid-based Pap smears, and more than half used them. Most used them for the following reasons: follow up abnormal Pap smear result (35%), follow up on ASCUS (atypical squamous cells of undetermined significance) report (30%), obscuring blood (26%), prior Pap with inflammation (16%), always do liquid-based Pap smears (13%), high-risk patients (8%), follow up inadequate sample (6%), follow up thick smear with mucus (2%), patient request (2%), and long interval since last Pap (>5 years), very tight cervical os, or if insurance covered it (1%).

Most clinicians reported that they do not review Pap smear results with cytopathologists. Inflammation on Pap smear reports was treated in a variety of ways. Obstetrician-gynecologists significantly less often repeated a Pap after treating for infection and did nothing with an initial inflammatory result more often than family physicians and advance practice nurses. (Table 3)

Table 2. Pap smear collection techniques of respondents to survey of clinicians' Pap smear collection and management practices in Dane County, Wisconsin, 1999

| | Family Physicians (n=148) | Advance Practice Nurses (n=45) | Obstetrician Gynecologists (n=37) | Total (n=230) |
|---|------------------------------|--------------------------------------|---|------------------|
| Swab cervix before Pap smear | | | | |
| Always | 22% | 22% | 14% | 20% |
| Occasionally | 59% | 58% | 68% | 60% |
| Never | 19% | 20% | 19% | 19% |
| Instrument, ectocervix | | | | |
| Cotton swab | 2% | 0 | 5% | 2% |
| Wooden spatula, curved end | 68% | 62% | 76% | 68% |
| Wooden spatula, blunt end | 7% | 4% | 3% | 6% |
| Plastic spatula | 7% | 2% | 3% | 5% |
| Broom | 16 | 38% | 22% | 21% |
| Cytobrush™ | 4% | 4% | 5% | 4% |
| Instrument, endocervix | | | | |
| Cotton swab | 4% | 4% | 3% | 4% |
| Wooden spatula, curved end | 3% | 2% | 3% | 3% |
| Broom | 18% | 36% | 19% | 20% |
| Cytobrush™ | 78% | 62% | 81% | 75% |
| Collection order | | | | |
| First ectocervix, then endocervix | 64% | 52% | 69% | 63% |
| First endocervix, then ectocervix | 21% | 18% | 19% | 20% |
| Both at same time | 15% | 30% | 11% | 17% |
| Familiar with liquid-based Pap smear | | | | |
| Yes | 86% | 93% | 97% | 89% |
| Use liquid-based Pap smear in practice | | | | |
| Yes | 52% | 64% | 70% | 57% |

Few clinicians discontinue Pap smears at age 65, and 45% report no age limit. Most clinicians continue to perform Pap smears on patients who have had hysterectomies and have no cervix. Forty-three percent of clinicians and nearly two thirds of advance practice nurses continue to perform Pap smears on women who have had hysterectomies for benign conditions. Most continue doing Pap smears after hysterectomy for malignancy. (Table 3)

DISCUSSION

Despite this sample of Dane County clinicians being primarily HMO-affiliated, the variability of collection and management practices is striking. In the current practice climate of clinical guidelines and evidence-based practice, more uniformity of practice might be expected. Clinicians demonstrate more uniformity in using the optimal collection devices such as the wooden spatula and the Cytobrush™, but less uniformity in all other areas of Pap smear collection and management. This study design is limited in that reasons for clinician behavior and choices were not elicited. For example, decisions regarding what instruments to stock and use

may be based on current evidence or economic choice rather than individual clinician choice. Another study limitation includes the defined survey area due to funding constraints, which limits the generalizability of results to other areas of the country. In addition, Dane County, Wisconsin has a high degree of HMO penetration, which may not reflect other areas of the country or Wisconsin.

Study practitioners treat inflammation in a variety of ways. Their practices reflect the current lack of evidence and consensus regarding the best course of action with inflammatory Pap smears. Prior to 1989, inflammatory atypia was classified with squamous atypia, endocervical atypia, and persistent inflammatory atypia. A number of studies in the 1980s correlated inflammatory atypia with the later development of cervical invasive neoplasia (CIN). After the Bethesda System of cytological classification was instituted in 1989, there have been no studies on inflammation itself and the development of cervical cancer. Inflammation is common and its significance is often unclear.

Persistent inflammation, however, is viewed differently and further investigation is often advised, but

Table 3. Pap smear management techniques of respondents to survey of clinicians' Pap smear collection and management practices in Dane County, Wisconsin, 1999

| | Family Physicians (n=148) | Advance Practice Nurses (n=45) | Obstetrician Gynecologists (n=37) | Total (n=230) |
|---|------------------------------|--------------------------------------|---|------------------|
| Review Pap smear results with cytologist | | | | |
| Yes | 32% | 40% | 70% | 40% |
| Follow-up procedures for inflammatory Pap smear | | | | |
| Treat infection and repeat Pap smear | 32% | 36% | 11%* | 30% |
| Treat infection only | 19% | 24% | 24% | 21% |
| Repeat Pap smear only | 13% | 13% | 8% | 12% |
| Nothing | 24% | 7% | 41%* | 23% |
| Other | 11% | 20% | 16% | 14% |
| Age Pap smears are discontinued | | | | |
| 65 | 18% | 13% | 3% | 14% |
| 70 | 38% | 20% | 11% | 30% |
| 80 | 14% | 4% | 3% | 10% |
| No limit | 30% | 62% | 84% | 45% |
| Perform Pap smear post-hysterectomy | | | | |
| Yes, after benign hysterectomy | 36% | 64%** | 43% | 43% |
| Yes, after benign and malignant reasons for hysterectomy | 86% | 93% | 92% | 88% |
| No | 14% | 7% | 8% | 12% |

Significance * p=.01; **p=.02.

studies that recommend further evaluation are from the pre-Bethesda system era where persistent inflammation was associated with atypia.⁷⁻¹¹ None of these recommendations are based on current research.

Despite 2001 changes in the Bethesda System, inflammation is still not addressed and will continue to plague clinicians regarding its significance and management. More research is needed in determining the source and significance of inflammation not related to infection or pathology, and ways to reduce it to decrease false negatives and the need for more expensive technologies such as the liquid-based Pap smears. Cytology guidelines suggest the use of a large cotton swab, cotton ball, or sponge in clearing inflammatory exudate from the cervix prior to collecting the Pap smear.¹² Eisenberg et al reported that if the CytobrushTM was used first in collecting the endocervical sample, then the spatula second for the ectocervix, the amount of blood significantly increased. They recommended that the ectocervix be sampled first, prior to using the CytobrushTM for the endocervix. Eisenberg et al also found that the sequence of collection did not affect air-drying artifact.⁵ Hild-Mosley et al did not report increased obscuring blood with the wiping of the cervix prior to collection.¹³ There are not enough studies to determine whether swabbing the cervix prior to

Pap smear, or sequence of collection, i.e. endocervix or ectocervix first, is more efficacious and produces better quality Pap smears. Our study reflected the resulting spectrum of practices regarding these aspects of collection.

Numerous studies have investigated which collection devices best obtain the cells from the TZ.^{5,14-16} Studies of conventional Pap smears collection methods have shown the superiority of sampling the ectocervix with the AyreTM spatula and the endocervix with the CytobrushTM, rather than using either collection instrument alone or with another type of collection device.^{5,17-20} The cotton swab was shown to be inferior to the CytobrushTM in obtaining endocervical cells.^{18,20-22} Consistent with current evidence, in our study clinicians predominantly use the CytobrushTM to sample the endocervix and the wooden spatula for the ectocervix.

Of the Wisconsin clinicians surveyed, 89% are familiar with liquid-based Pap smears, but fewer use them. The largest group using them is the obstetrician-gynecologists. Liquid-based Pap smears have been introduced to minimize obscuring inflammation, blood and debris, poor fixation, and "thick" areas of cells, optimize the quality of the Pap smear slide, and reduce false negative results.²³⁻²⁵ Optimal collection technique

that minimizes these obscuring elements could reduce the need for this more expensive screening test. One text notes specific American College of Obstetricians and Gynecologists (ACOG) recommendations for optimal Pap smear technique that includes the removal of excess vaginal discharge on the cervix prior to collecting cells.²⁶ This strategy has also been recommended in 3 recent articles.^{11,27,28} Small studies evaluating the removal of cervical mucus prior to pap smear collection did not find that this improved the overall quality of Pap smears.^{13,29} Evidence remains limited in determining whether wiping the cervix prior to collection can decrease obscuring inflammation, and more research in the area of cervix preparation for collection is needed.

The US Preventive Services Task Force Guidelines of 1996 recommend discontinuing Pap smears in low-risk women after age 65 whose Pap smears have consistently been normal.³⁰ The 2001 American Cancer Guidelines recommend discontinuing at age 70.³¹ Unnecessary Pap smears and interventions for false positive results can be avoided if clinicians follow these guidelines. Significant cost savings can result. Few clinicians in this study discontinue Pap smears at age 65.

Despite studies recommending the discontinuation of Pap smears after hysterectomies for benign conditions,³²⁻³⁵ a significant number of study participants continue to screen women with Pap smears. This finding corroborates the results of a Wisconsin survey in which 55% of 2393 women who were asked if they had a Pap smear after benign hysterectomy reported yes.³⁶ If Pap smears were discontinued after benign hysterectomies, our study suggests significant cost savings. Pearce et al estimated that 90.7% of women in their large cohort study had a hysterectomy for benign reasons, and calculated the positive predictive value of the Pap smear for detecting vaginal cancer at 0% when the cervix is no longer present.³⁴ Fetters et al estimated annual cost savings between \$43.5 and \$350 million if Pap smears were discontinued after benign hysterectomy.³³ No studies have examined the utility of continuing Pap smears after hysterectomy for malignancy, but research is needed in this area.

Participants received their Pap smear training primarily in residency or graduate nursing education. Evidence-based education could have a strong impact in determining more optimal future practice. Textbooks and articles need to emphasize evidence-based collection technique, rather than focusing primarily on pathology. Detailed instruction on optimal collection technique could improve the quality of Pap smears, decrease false negatives, and improve the quality of both conventional and liquid-based Pap smears.

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Appendix 1.

Recommendations

(Adapted from the ACS Guideline for the Early Detection of Cervical Neoplasia and Cancer)

When To Start Pap Screening

Begin 3 years after onset of intercourse but no later than age 21.

When to Discontinue Pap Screening

Discontinue Paps in those 70 and older who have had at least 3 consecutive normal cytology and no abnormal cytology within the prior 10 years.

(Others with history of cervical carcinoma, DES, HIV or immunocompromised should continue as long as health permits.)

Screening after hysterectomy

Vaginal cytology is not recommended following total hysterectomy for benign disease. (Others with history of cervical carcinoma, DES, HIV or immunocompromised should continue as long as health permits.)

Screening Interval

Annually with conventional smears OR every 2 years using liquid-based cytology; at or after age 30, women who have had three consecutive negative cytology may be screened every 2-3 years. (Unless they have a history of cervical carcinoma, DES, HIV or immunocompromised by transplantation, chemotherapy or chronic cortocosteroids.)



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