

Cervical Cancer Prevention



Alliance for Cervical Cancer Prevention

FACT SHEET

Pap Smears: An Important But Imperfect Screening Method

Pap smears are an important but imperfect method of screening for cervical cancer. Global efforts to prevent the disease have focused on screening women using Pap smears (named for inventor Dr. George Papanicolaou) and treating precancerous lesions. Pap smear screening, also called cytologic screening, has achieved impressive results in reducing cervical cancer incidence and mortality in some developed countries.

Cervical cancer incidence theoretically can be reduced by as much as 90 percent where screening quality and coverage are high.¹ But in developing countries—where approximately 80 percent of all new cases occur—many women have never had a Pap smear. Those women who have been screened often are below the age of 30 and therefore at low risk for cervical abnormalities.

Intensive infrastructural requirements and the relatively high rate of false-negative test results (low test sensitivity) are some of the obstacles that make providing effective Pap screening problematic in most developing countries.

The Pap Smear: An Overview

A Pap smear is a cytological test designed to detect abnormal cervical cells. The procedure involves gently scraping cells from the cervix and then smearing and fixing them on a glass slide. The slides are sent to a cytology laboratory and evaluated by a trained cytologist or cytotechnician who determines the cell classification (see table). Most protocols suggest that women with low-grade abnormalities return for regular follow-up smears until the abnormality either resolves or persists, warranting further

investigation. High-grade pre-invasive disease generally is further evaluated by colposcopy (examination of the cervix with a magnifying scope) and biopsy; precancerous lesions then are treated through surgical removal or ablation.

Periodic screening (regardless of the screening method used) and follow-up evaluation of women in their 30s or older is an acceptable, cost-effective approach to preventing cervical cancer, assuming that the screening approach used is accurate and coverage is high. (See the Cervical Cancer Prevention Fact Sheet, *Natural History of Cervical Cancer*.) In general, the low sensitivity of a single Pap test makes it necessary to screen women relatively frequently—every three to five years.

Pap Smear Screening Is Specific, But Only Moderately Sensitive

The Pap smear generally is considered to be a very specific test for high-grade lesions or cancer, but only moderately sensitive. The high specificity means that cytology correctly identifies a high proportion of women who do not have high-grade lesions or cancer. The moderate sensitivity means that cytology identifies only a relatively modest proportion of women who actually do

have high-grade lesions or cancer. In general, it is not possible to increase Pap smear sensitivity while maintaining high specificity.

Several recent meta-analyses have reported quite low Pap smear sensitivities—in the range of 50 percent but as low as 20 percent.^{2,3} In Zimbabwe, a study found that Pap screening had a sensitivity of 44 percent and a specificity of 91 percent in identifying HSIL.⁴ Authors of these studies note that decision makers should consider these findings highlighting low Pap test sensitivity when establishing health policies.

Effective Pap Smear Screening Requires Significant Infrastructural Support

Pap smear screening efforts can succeed only when implemented in an environment that has a reliable infrastructure. Minimum requirements for establishing an effective Pap smear screening effort include:

- *Well-trained Pap smear providers (including non-physicians).* Ongoing training of providers ensures that they can successfully perform pelvic exams and obtain and prepare adequate cervical samples. Training non-physicians to

Terminology for Cervical Abnormalities: A General Comparison

Bethesda System	Cervical Intraepithelial Neoplasia (CIN) System	Common Dysplasia Terminology
Atypical squamous cells of undetermined significance (ASCUS)	Cellular atypia	Unspecified cellular changes
Low-grade squamous intraepithelial lesions (LSIL)	CIN I	Mild dysplasia
High-grade squamous intraepithelial lesions (HSIL)	CIN II CIN III (includes carcinoma <i>in situ</i> [CIS])	Moderate dysplasia Severe dysplasia/CIS

provide Pap smear screening is cost-effective and makes the services more widely accessible to women who need them.

- *Initial and ongoing access to supplies and equipment.* Cytology programs require consistent access to supplies such as sampling spatulas, slides, and fixatives. Programs also must have equipment such as exam tables, specula, a light source, and specimen-tracking forms or log books to function effectively.
- *Linkages, including transportation, to a reliable cytology laboratory.* Any program providing Pap smear screening must be linked to a reliable cytology laboratory. Effective training and quality control mechanisms must be in place to ensure that employees are skilled at interpreting slide specimens. Strong linkages between the screening program and the laboratory ensure that specimens are transported in a timely manner and test results are clearly communicated to the screening program.
- *Proven systems for timely communication of test results to screened women.* All women screened by cytology need to be notified of their test results. Since immediate results are not available, cytology programs must have functional information systems in place to ensure that results are communicated promptly. These systems ensure that all results are recorded, missing results are traced, and abnormal results are followed up.
- *Effective referral systems for diagnosis and treatment.* Programs performing cytologic screening will need to develop an effective referral system for women

who need treatment for precancerous lesions or whose diagnosis is unclear. Treatment or palliative care referrals for women found to have cancer also are necessary.

When any of these key requirements is missing, cytology programs are not likely to be successful.⁵

Key Recommendations

- Screen all women in their 30s and 40s at least once before expanding services to other age groups or increasing screening frequency.
- Ensure adequate, ongoing access to all supplies necessary for obtaining good quality Pap smears.
- Train non-physicians to successfully perform pelvic examinations and obtain cytological samples to ensure that screening tests are as accessible and accurate as possible.
- Build ongoing training into the program budget to maintain and improve health care providers' screening skills.
- Develop a partnership with a reliable cytological laboratory that provides accurate and prompt test results.
- Establish reliable follow-up systems and referral procedures so that women with low-grade lesions can be screened more frequently and women with more serious abnormalities receive necessary treatment and follow-up.
- Monitor and support strategies for maximizing the quality of all technical phases of Pap screening, including specimen sampling and laboratory processing.
- Support research that explores strategies to maximize the accuracy of cytological or other screening approaches.
- Base health care policy decisions on current and rigorous research,

New Technologies May Improve Test Accuracy

Several new technologies are being explored in an effort to improve the accuracy of Pap smears. While these approaches appear promising, they are expensive and rely heavily on technology.⁶ Fluid-based, thin-layer processing of cervical samples (such as the ThinPrep™ Pap Test) attempts to reduce sampling errors and improve specimen adequacy by suspending cervical cells in a liquid solution. The solution is applied to the slide so that the cells form a thin layer, theoretically making it easier to successfully evaluate cervical cells. Automated Pap testing (such as PAPANET® and AutoPap®) attempts to reduce laboratory interpretation errors by using computerized analysis to evaluate Pap smear slides. This type of technology highlights potentially abnormal cervical cells, which are then analyzed by cytotechnicians.

taking into consideration recent findings highlighting that Pap test sensitivity is lower than conventionally assumed.

References

1. Eddy DM. Secondary prevention of cancer: an overview. *Bulletin of the World Health Organization* 64(3):421–428 (1986).
2. Nanda K, McCrory D, Myers E, et al. Accuracy of the Papanicolaou test in screening for and follow-up of cervical cytologic abnormalities: a systematic review. *Annals of Internal Medicine* 16;132(10): 810–819 (May 2000).
3. Fahey M, Irwig L, Macaskill P. Meta-analysis of Pap test accuracy. *American Journal of Epidemiology* 141:680–689 (1995).
4. University of Zimbabwe/JHPIEGO. Visual inspection with acetic acid for cervical cancer screening: test qualities in a primary care setting. *Lancet* 353(1156):869–873 (March 1999).
5. Herdman C, Sherris J. *Planning Appropriate Cervical Cancer Control Programs*. 2nd Ed. Seattle, Washington: PATH (2000).
6. Brown AD, Garber AM. Cost-effectiveness of 3 methods to enhance the sensitivity of Papanicolaou testing. *Journal of the American Medical Association* 27;281(4):347–353 (January 1999).

Alliance for Cervical Cancer Prevention Members

EngenderHealth, 440 Ninth Avenue, New York, New York 10001 USA, Tel: (212) 561-8000

IARC (International Agency for Research on Cancer), 150, cours Albert-Thomas, F-69372, Lyon cedex 08, FRANCE, Tel: (011) 33-472738599

JHPIEGO Corporation, 1615 Thames Street, Baltimore, Maryland 21231 USA, Tel: (410) 955-8618

PAHO (Pan American Health Organization), 525 Twenty-Third Street, N.W., Washington, DC 20037 USA, Tel: (202) 974-3890

Program for Appropriate Technology in Health (PATH), Alliance coordinating agency, 1455 NW Leary Way, Seattle, Washington 98107 USA, Tel: (206) 285-3500

Support for development of this document was provided by the Bill & Melinda Gates Foundation through the Alliance for Cervical Cancer Prevention (ACCP). For more information, please visit the ACCP website: www.alliance-cxca.org. The Alliance can be contacted by writing to the ACCP in care of PATH or by email: accp@path.org.
October 2002

