Papincolaou (Pap) smear

Indications
- Well woman exam
- Cervical cancer screening

Screening guidelines
- Perform first screen at age 21
- Women ages 21-29: Screen every three years with cytology (use either liquid based or conventional cytology)
- Women ages 30-65: Screen every 3 years with cytology if no history of invasive carcinoma from CIN_2 or CIN_3, and no risk factors such as HIV infection, immunocompromise, or exposure in utero to diethylstilbestrol or with cytology and HPV testing every 5 years
- Women ages ≥ 65: discontinue screening if ≥ 3 negative cytology tests in a row and no abnormal test results in the past 20 years
- Women with hysterectomy:
    - Discontinue screening if hysterectomy for benign indications and no prior history of high-grade CIN
    - If hysterectomy for CIN_2, CIN_3, or cancer and cervix removed, continue annual screening for 20 years after postsurveillance period

Anatomy
- Cervix: narrow neck/outlet of the uterus, projects into the vaginal inferiorly
    - Ectocervix: exterior/vaginal surface of the cervix, seen upon visualization of the cervix with the speculum
        - Covered by plush, red columnar epithelium (ectropion) surrounding the os and a shiny pink squamous epithelium continuous with the vaginal lining
        - Transformation zone: squamocolumnar junction near the os that is at risk for dysplasia and is sampled by the pap smear
    - Endocervix: interior cervical canal, walls contain numerous folds and pilcae
    - External os: a round, oval or slitlike depression located in the center of the cervix which marks the opening to the endocervical canal
- Hymen: an incomplete partition formed by the mucosa of the distal vaginal orifice, highly vascular
- Introitus: vaginal opening
- Labia majora: hair-covered, elongated fatty skin folds
- Labia minora: thinner pinkish-red folds that extend anteriorly to form the prepuce and the clitoris
- Mons pubis: hair-covered fat pad overlying the symphysis pubis
- Perineum: diamond-shaped region of soft tissues that overly the muscles of the pelvic outlet. Located between the pubic arch anteriorly, the coccyx posteriorly, and the ischial tuberosities laterally
- Vagina:
    - A musculomembranous tube extending upward and posteriorly between the urethra and rectum, approximately 3-4 inches long
    - The upper third of the vagina lies at a horizontal plane and terminates in the cup-shaped fornix
    - Vaginal mucosa lies in transverse folds (rugae)

- Uterus:
    - Flattened fibromuscular structure shaped like an inverted pear
    - Composed of the corpus (or body) and the cervix which are joined at the isthmus
    - Fundus: convex upper surface of the body of the uterus

Equipment

- Cervical specimen collection tool (cervical broom, cervical scrape, endocervical brush, or cotton-tipped applicator)
- Exam light
- Glass slide and fixative or liquid collection medium for specimen preservation
- Sheet to cover patient
- Warmed speculum (Pederson or Graves, select appropriate size)
- Water-based lubrication or warm water

Technique

1. The patient should empty their bladder before the exam
2. Ask the patient to sit at the edge of the exam table and place a sheet over their lap and knees
3. Position the head of the bed at approximately 30°
4. Help the patient lie back, slide down until her buttocks are at the edge of the table, place her feet in the footrests, bend her knees, and open her legs (lithotomy position)
5. The examiner should sit at the foot of the exam table with an exam light shining on the perineum
    a. Remember to reassure the patient, explain what is going on, tell the patient before you touch them, and remind them to tell you if anything is uncomfortable
6. Choose the appropriate speculum
    a. The speculum should be warmed either with warm water or by holding it in the examiner's hand
7. Apply lubrication (if necessary)
    a. Warm water is most commonly used since it does not interfere with cytologic interpretation
    b. Water-based lubricant use is of less concern with liquid-based Pap test techniques
8. Check the location of the cervix with one lubricated finger
9. If needed, enlarge the vaginal introitus by inserting one finger and applying downward pressure at its lower margin
    a. If the patient is not relaxed, direct her to breathe in through her nose and out through her mouth, gently and regularly, rather than hold her breath. Also, direct the patient to identify specific muscle groups that need to be relaxed
10. Hold the speculum with the dominant hand
    a. Hold by the handle with blades completely closed
11. Insert the speculum at a horizontal plane with the width of the blades oblique to the vertical axis of the introitus
    a. Use slight continuous downward pressure to distend the perineum to create space for the speculum to advance
    b. Direct the speculum posteriorly at approximately 45° angle from horizontal
12. Adjust the angle as the speculum is inserted
    a. Take care not to pull no the pubic hair, pinch the labia with the speculum, or place too much pressure on the sensitive urethra

    b. It may be helpful to separate the labia majora to avoid this
13. Insert the speculum as far as it will go (in most women the entire length of the speculum length can be inserted)
14. Open the speculum in a smooth, deliberate fashion
15. Gently rotate and adjust the speculum until the cervix comes into view and is cupped by the speculum
    a. Failure to find the cervix most commonly results from not having the speculum inserted far enough
    b. Withdraw the speculum slightly and reposition on a different slope if still having difficulty finding the cervix
16. Lock the speculum into the open position using the thumbscrew
    a. If more space is required, gently expand the vertical distance between the blades by the use of the screw on the handle of the speculum
    b. The speculum usually stays in place without being held
17. Adjust the lamp so the cervix is well visualized
    a. If discharge obscures the view, wipe it away with a large cotton swab
18. Advise the patient they may feel a slight scraping sensation as the specimen is collected
19. Obtain specimens from the endocervix and ectocervix using the examiners preferred method
    a. Cervical broom: rotate the tip of the brush in the cervical os, in a full clockwise direction, then place the sample directly into preservative (liquid-based cytology) or stroke each side of the brush on a glass slide and spray with a fixative or place slide in solution
    b. Cervical scrape: place the longer end of the scraper in the cervical os. Press, turn, and scrape in a full circle, making sure to include the transformation zone and the squamocolumnar junction. Smear the specimen on a glass slide and place it within reach
    c. Endocervical brush: place the brush into the cervical os. Roll it between your thumb and index finger, clockwise and counterclockwise. Remove the brush and pick up the slide previously used for the cervical scrape, smear the slide with the brush, using a gentle painting motion to avoid destroying any cells. Place the slide into an ether-alcohol solution or spray it with a fixative immediately
    d. Note: for pregnant women, the use of a saline moistened cotton-tipped applicator is advised in place of the endocervical brush
20. Tell the patient you are removing the speculum
21. Open the blades of the speculum slighty by putting pressure on the thumb hinge, and completely loosen the thumbscrew
    a. Opening the blades slightly avoids pinching the cervix between the blades
22. Withdraw the speculum approximately 1 inch before slowly releasing the pressure on the thumb hinge
    a. Take care that no pressure is placed on the thumb hinge as the end of the blades approaches the introitus as any pressure can cause the anterior blade to flip up and hit the sensitive vaginal, urethral, and clitoral tissue
23. Remove the speculum completely
24. Wipe off the patient's external genitalia or offer her some tissue so she can do it herself

Classification of Pap Smear Cytology

- Negative for intraepithelial lesion or malignancy

    - Note: other organisms such as *Trichomonas, Candida, or Actinomyces* may be reported in this category as well as bacterial vaginosis and herpes simplex
- Epithelial cell abnormalities (include precancerous/cancerous lesions)
    - Squamous cells
        - Atypical squamous cells (ASC)
        - Low-grade squamous intraepithelial lesions (ASC-US)
        - High-grade squamous intraepithelial lesions (HSIL)
    - Glandular cells
        - Atypical endocervical cells or atypical endometrial cells
        - Atypical glandular cells
        - Favor neoplastic
        - Endocervical adenocarcinoma in situ
        - Adenocarcinoma
    - Other malignant neoplasms (rare)
        - Sarcomas
        - Lymphomas

Diagnostic Accuracy

- Conventional pap smears
    - Sensitivity: 30%-87%
    - Specificity: 86%-100%
- Liquid-based cytology
    - Sensitivity: 61%-95%
    - Specificity: 78%-82%

Notes

- Best results are obtained when the patient is not menstruating
- Advise the patient to avoid intercourse, douching, tampons, contraceptive foams/creams, or vaginal suppositories for 48 hrs before exam

References

1. American Congress of Obstetricians and Gynecologists. New Cervical Cancer Screening Recommendations from the U.S. Preventive Services Task Force and the American Cancer Society/American Society for Colposcopy and Cervical Pathology/American Society for Clinical Pathology. https://www.acog.org/About_ACOG/Announcements/New_Cervical_Cancer_Screening_Recommendations. Last accessed March 18, 2014.
2. Beckman CRB et al. Obstetrics and Gynecology. 7th ed. Philadelphia, PA: Lippincott Williams & Wilkins. 2014;11-14, 409.
3. Bickley LS et al. Bates' Guide to Physical Examination and History Taking. 11th ed. Philadelphia, PA: Lippincott Williams & Wilkins. 2013;539-541, 548-560.
4. Centers for Disease Control and Prevention. Human Papillomavirus: HPV Information for Clinicians. April 2007.
5. Marieb EN, Hoehn K. Anatomy & Physiology. 3rd ed. San Francisco, CA: Pearson Benjamin Cummings. 2008;950-954.
6. U.S. Preventive Services Task Force. Screening for Cervical Cancer. April 2012. http://www.uspreventiveservicestaskforce.org/uspstf/uspscerv.htm. Last accessed March 18, 2014.