



## CYTOPATHOLOGY

### CYTOPATHOLOGY I- GYNECOLOGIC CYTOPATHOLOGY

Cytopathology I is a one-month rotation designed to learn the basics of specimen accessioning, processing, reporting, and maintaining a filing system. Findings in cervical Pap test from normal to reactive to neoplastic are covered. Material is presented in the form of handouts, journal articles, text reading assignments, lectures, microscopic slides (study set and current cases), and computer software. Residents are required to attend and present at the monthly cytopathology conferences and teleconferences. **Pre-test and post-test exams will be administered.**

**Leave during cytology rotations: the resident is responsible for taking the tests, regardless of the amount of leave taken. If the resident's leave will interfere with assignments, cytology faculty (Dr. Akhtar or Geisinger ) should be informed in advance, and plans for rescheduling the exams should be made. The resident may take the test before leave or within 2 weeks after the end of the rotation. (after 5 pm if on another rotation).**

#### **Cytopathology I : Objectives for Six General Competencies:**

##### **Skill level I (GYN Cytology)**

1. Patient Care: Understanding of proper specimen collection and processing, gathering essential clinical data, and providing appropriate consultation to clinicians with suggestions for follow-up.

##### **Assignments:**

- A. Read Cibas 3<sup>rd</sup> Edition
- B. Read The Bethesda system for cervical cytology.
- C. Spend at least one morning with the cytopreparatory personnel to learn processing and staining technique of gyn liquid-based specimens and pap stain technique of conventional smears.
- D. Know the criteria for rejection of gyn specimens.
- E. Read handouts on HPV DNA testing: and Natural History of HPV Infections by Wright.
- F. Spend a part of a day with Clinical Lab personnel (1<sup>st</sup> floor ) learning HPV DNA testing methodology on Thin Prep liquid-based pap samples-
- G. Read ACOG Consensus Guidelines for the Management of Women with Cervical Cytological Abnormalities
- H. Read articles entitled, American Cancer Society Guideline for the Early Detection of Cervical Cancer, and Task Force Announces New Cervical Screening Guidelines.
- I. Sign out Paps and cervical biopsies with attending.

2. Medical Knowledge: Understanding of the Bethesda Classification System (2011), including adequacy criteria, accurate interpretation and formulation of differential diagnoses of gynecologic specimens, application of basic and clinically supportive sciences, and ability to analyze problems with recommendations for solutions.

##### **Assignments:**



- A. Take the gyn **Pre-test** (contact Dr. Cason)
- B. Read The Bethesda System for Reporting Cervical Cytology
- C. Read and understand Chapter one, The Pap Smear, in “little” DeMay textbook, Practical Principles of Cytopathology.
- D. Read and review photos in DeMays Pap test 1<sup>st</sup> edition
- E. As supplemental reading, the resident may want to review any Color Atlas of Normal Cytology.
- F. Read Cibas 3<sup>rd</sup> edition cover to cover
- G. Screen and interpret gyn pap smears on a regular basis, viewing the cases BEFORE sign-out with faculty. Resident should mark cells they have questions about.
- H. Correlate and sign-out “dysplasia clinic” cases (Pap smear with concurrent biopsy/cone).
- I. Work with Zelma Cason when she is available for teaching.
- J. At end of the month, take the gyn and Non Gyn Post-test (contact Ms Cason). To be graded. See Outcomes Assessment below.
- K. As a supplement, the resident may wish to review *The Art and Science of Cytopathology* by DeMay, computer program, available on resident and cytology faculty computers.
- L. Read “The Pap Test and Bethesda 2014. *“The reports of my demise have been greatly exaggerated.”* (after a quotation from Mark Twain) Nayar R.<sup>a, b</sup> · Wilbur D.C.<sup>c, d</sup>

Be Able To Identify: (Included on Pre and Post-test)

Cervical biopsies/Cone: HPV effect (koilocytes), Dysplasia (mild, moderate, severe, CIS) squamous metaplasia and other benign changes.)

Cervical/Vaginal pap smears:

Normal elements: Squamous (Basal, parabasal, intermediate, superficial)  
Endocervical cells, Endometrial cells (stromal and epithelial, including “exodus”)

Metaplastic changes: Squamous metaplasia, tubal metaplasia (cilia, nuclei may appear hyperchromatic)

Benign Cellular changes: Inflammatory, reactive/reparative changes in all cell types

Glandular cells in post-hysterectomy smear: Most common reason is wrong history or mislabeled card  
Parabasal cells of atrophy simulating ecc's,  
Fallopian tube prolapse or post-hyst. implant, bartholin's  
Endometriosis, mesonephric remnants, rectovag. fistula

Infectious: Trichomonas, “Trich halo,” Bacterial vaginosis (clue cells), Leptothrix (seen with Trich),  
Candida (spores and pseudohyphae), Actinomyces (including sulfur granule), Herpes simplex, Cytomegalovirus (CMV)

Cytolysis (many bare nuclei, cellular remnants, caused by overgrowth of lactobacilli)

Atrophic smear or Progesterone dominant smear: (parabasal cells single or in sheets, intermediate cells) (post-menopausal, post-partum, Depo-provera)



Follicular cervicitis: polymorphous lymphocytes, tingible-body macrophages.

Hyperkeratosis (single and clumps of anucleated squamous cells)

Squamous Dysplasia: LGSIL (HPV-koilocytes, mild dysplasia) HGSIL (moderate, severe, carcinoma in-situ)

Squamous cell carcinoma: well-differentiated, moderately differentiated, may see “tadpole” or “fiber cell

Tumor diathesis: background necrosis (“cotton candy”), blood, neutrophils

Adenocarcinoma: Appropriate differential diagnosis, if applicable.  
 Endocervical (rosettes, “feathering,” “picket fence”, mitotic figures)  
 Endometrial (vacuolated or lacy cytoplasm, rounded cells, neutrophils within cells)

Metastatic carcinoma: clean background (no diathesis), correlate with patient history, radiology.

**Understand and be able to identify these entities: (not included on Cytopath I tests):**

Radiation changes: (cytomegaly, large nucleus or multinucleated but N/C ratio maintained, Vacuolation, polychromasia, smudgy chromatin)

Post-radiation dysplasia: same criteria as ordinary dysplasia. Poor prognosis in patients with hx SCC.

Folic Acid Deficiency (pregnancy, certain drugs/chemo, dietary). Cytomegaly, enlarged nucleus.

Atypical parakeratosis: small, dyskeratotic squamous cells, usually a component of mild dysplasia/ HPV or may be seen as surface reaction on an underlying HGSIL)

Keratinizing dysplasia: Miniature or spindled dysplastic keratinized cells. Sometimes difficult to grade. May be LGSIL, HGSIL or SCC. Call HGSIL if numerous cells or suspect SCC if pleomorphic features.

Microglandular Hyperplasia (pseudoparakeratosis) : presumed to be degenerated endocervical cells.  
 Freq. associated with the Pill. Can mimic dysplasia

Atypical Repair: Repair but with atypia, worrisome for dysplasia or carcinoma. Freq. called ASC-US

ASC-US: Some but not all features of mild dysplasia, HPV

ASC-H: Some but not all features of high grade dysplasia; frequent problem is the presence of few cells.

Microinvasive carcinoma: difficult to diagnose. Nucleoli, squamous pearl, no diathesis, may see dysplasia also.



Co-Occurrence of Squamous dysplasia and Endocervical Adenocarcinoma in-situ: not uncommon

Endocervical Adenocarcinoma in-situ vs invasive adenocarcinoma: May be difficult to differentiate.

IUD-associated changes: atypia in glandular or metaplastic cells, hypervacuolated, nucleoli, clean background

Contaminants: Cockleburrs (hematoidin crystals), vegetable matter and other fecal matter from recto vaginal fistula, cotton fibers, talc, Pollen, Carpet beetle, Pin worm ova, Aspergillus

Miscellaneous: Pregnancy changes: Navicular cells (heavy glycogen), Decidual cells, Trophoblastic cells derived from Arias-Stella reaction, Psammoma bodies  
Sperm, Seminal vesicle cells

Malignant, suggestive of : Melanoma, Adenosquamous carcinoma, Small cell carcinoma of cervix, Sarcoma, Mixed Mullerian Tumor, Lymphoma

3. **Practice-Based Learning and Improvement:** Understanding of principles of data management for quality assurance, billing, and clinical research. Knowledge and application of regulatory and safety requirements (CAP, JCAHO), ability to locate and understand scientific literature related to gynecologic cytopathology, and ability to use computer technology for education and patient support.

**Assignments:**

- A. Attend the monthly Departmental Quality Assurance meeting to review pathology quality assurance (QA/QI) monitors.
- B. Accurately apply charge codes and correlation codes to gyn cases.
- C. Read and interpret assigned articles from scientific literature and perform literature searches on appropriate cases.

4. **Interpersonal and Communication Skills:** Knowledge of basic principles to enable transmission of the cytologic diagnosis in an informative, timely, and succinct way that best serves patient and clinician needs utilizing communication skills and laboratory information systems. Ability to present cytologic cases at conferences in an organized, succinct, and informative manner.

**Assignments:**

- A. Notify, explain, and suggest recommendations to clinicians regarding pap test or biopsy results.
- B. Able to write accurate and succinct reports on cytological and histological gyn specimens, including discrepancy issues.

5. **Professionalism: Demonstrate** a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to a diverse patient and clinician population as well as to research.

6. **Systems-Based Practice:** Understand how laboratory management effects other health care



professionals and organizations, understand legal issues associated with cytopathology, and how information technology is utilized to relay and store data from one system to another.

**Assignments:**

- A. Understand and use the computer program designed for reporting results on MS State Board of Health pap smears, including how corrected reports are issued as well as how to document correlation cases and QA monitors.
- B. Understand medical legal issues relating to pap smears, including importance of high quality preparations, adequacy of smears, accurate interpretation and timely reporting and **follow-up**.

**Outcomes Assessment:**

1. Objective evaluation:

The resident will take a pre and post-test on instructor canvas encompassing the entities listed under Medical Knowledge above. The cases used for the post-test may not be the exact same cases used for the pre-test; however, the subject matter will be similar.

The Bethesda system classification system will be utilized for Pap test. A score of 70% on the post-test is required. If less than 70%, another test is repeated in two weeks. Additional assignments will also be given. Repeated failures will necessitate meeting with staff to discuss problems, solutions.

2. Subjective evaluation:

Observation checklist: The resident will use the Resident Assignment Check List as a guide to facilitate completion of assignments. As each task is accomplished, a check mark should be made on the form and returned to staff at the end of the rotation. Faculty will observe the resident and complete a standard competency-based evaluation form at the end of the rotation.



**Resident Assignment Checklist**  
**Cyto I, GYN Cytology**

Check off each assignment when completed.  
 This list is a summary. See rotation objectives for full, detailed assignments.  
 Return to cytology faculty at end of rotation.

1. Read and understand rotation objectives and assignments. \_\_\_\_\_
2. Take the gyn **Pre-test** \_\_\_\_\_
3. Learn processing techniques. Spend at least ½ day in prep area. \_\_\_\_\_
4. Read assigned texts/handouts/literature \_\_\_\_\_
5. Learn HPV DNA testing methodology in Clinical lab. \_\_\_\_\_
6. Review and interpret assigned gyn smears \_\_\_\_\_
7. Review and interpret assigned “MSDH” cases \_\_\_\_\_
8. Write-up reports on gyn cases, include billing and Snomed codes \_\_\_\_\_
9. If applicable, work with Zelma Cason \_\_\_\_\_
10. Attend and prepare cytology conferences, teleconferences, monthly QA Meeting \_\_\_\_\_
11. Use the MS State Dept. of Health computer program for gyn cases \_\_\_\_\_
12. Take the gyn **Post-test** \_\_\_\_\_



## **CYTOPATHOLOGY II, NON-GYNECOLOGIC CYTOPATHOLOGY**

Cytopathology II is a one-month rotation encompassing all non-gynecologic cytology, including fluids, fine needle aspirations, brushes, and lavages. Through the use of microscopic slides (current cases and study set), reading and literature assignments, and computer software, the resident should be able to classify as negative/inflammatory/reactive, atypical or suspicious for malignancy, or malignant, those entities assigned in the rotation goals and objectives, as well as perform and diagnose FNA's. Refining and expansion of skills will continue into Cytopathology III and cytology electives. Residents are required to attend and prepare for cytology conferences, including teleconferences, and complete and pass the post-test.

### **Cytopathology II: Objectives for Six General Competencies:**

#### **Skill Level I (Non-GYN)**

1. **Patient Care:** Understanding of proper specimen collection and processing, gathering essential data, providing effective consultation to clinicians with appropriate recommendations, and mastering the technique of fine needle aspiration.

#### **Assignments:**

- A. Read cytoprep techniques in *The Manual of Cytochemistry*, 7<sup>th</sup> ed. p 412-413, and pg. 420-430.
- B. Read handout entitled Non-Gynecologic Cytology Practice Guideline, printed by the American Society of Cytopathology.
- C. Spend two mornings with the cytoprep personnel to learn processing and staining techniques of all types of non-gyn specimens. Be able to perform the following stains:  
Romanovsky (Diff Quik) (air-dried smears)                      Quick Pap stain (air-dried smears)  
Rehydrated H&E (air-dried smears)
- D. Know reasons for rejection of specimens in the laboratory.
- E. Be able to obtain informed consent from the patient for FNA procedure, explaining the procedure as well as possible complications in a sensitive, compassionate, and professional manner.
- F. Be able to perform an FNA on any superficial mass, utilizing local anesthesia and aseptic technique, with subsequent preparation of slides and material for cell block or ancillary studies such as flow cytometry or electron microscopy. Perform a minimum of 10 FNA's.
- G. Be able to properly triage an FNA specimen based on preliminary diagnosis.
- H. Read "The Bethesda system for reporting Thyroid Cytopathology.
- I. Be able to interpret stains commonly utilized in cytopathology: Pap, H&E (formalin fixed), Diff Quik, and immunoperoxidase stains.
- J. Give appropriate suggestions to clinicians based on cytologic findings, both current and previous material, for further management.
- K. For current cases, correlate patient records, clinical and radiographic findings, and



- previous cytologic or histologic material with the cytology findings.
- L. Interpret cervical biopsies/cone specimens each afternoon.





2. **Medical Knowledge:** The trainee should be able to view cytology from various body sites and properly classify them as negative, inflammatory/reactive, atypical or suspicious for malignancy, and positive for malignancy for both aspiration and exfoliative samples. The resident should have an understanding of adequacy and the ability to recognize material with limited interpretation due to poor fixation or stain quality, insufficient quantity, or lack of appropriate cell types, and how these problems affect the final written report. They should be able to apply basic and clinically supportive sciences to the practice of cytology.

**Assignments:**

- A. Take the Non-gyn **Pre-test** (Instructor Canvas)
- B. Read and understand the following chapters in “little” DeMay, *Practical Principles of Cytopathology*,: The Respiratory Tract, Fluids, Introduction to FNA biopsy, The Gut Course, Salivary Gland, Thyroid, Breast and Liver.
- C. Interpret fluids and FNA specimens on a regular basis, first pre-screened, then later in the month, screen them yourself.
- D. Retrieve and correlate non-gyn specimens with pertinent previous material from the file/archive room.
- E. Review and learn criteria on cases assigned from the study set.
- F. Take the Non-gyn Post-test. (Instructor canvas) To be graded. See Outcomes Assessment last page.

**Pre and Post-test (Be able to identify on Diff Quik, Pap, and H&E stains):**

All Types of Non-gyn Specimens:

Normal constituents	Small cell carcinoma
Inflammatory with mild reactive changes	Adenocarcinoma (well-diff.)
Atypical or Suspicious for malignancy	Squamous cell carcinoma
Malignancy (NOS)	Lymphoma Sarcoma (NOS)

Infectious: Herpes, CMV, Pneumocystic carinii, Histoplasmosis, Cryptococcus, Blastomycosis, Apergillus, Candida, Mucormycosis, Coccidioides

Fine Needle Aspirates:

Normal elements of Breast, Liver, Lung, Salivary Gland, Thyroid, Lymph node, and Kidney

Breast:	Carcinoma, fibrocystic changes, fibroadenoma, lactating adenoma
Lung:	Small cell and Non-small cell carcinoma, benign cells
Liver:	Hepatocellular carcinoma, adenocarcinoma (including metastatic carcinoma), benign cells



Thyroid: Bethesda classification. Resident should know all VI categories Hyperplasia (benign goiter), Thyroiditis, Papillary carcinoma, follicular neoplasm  
 Salivary gland: Sialadenitis, Warthin's tumor, Pleomorphic adenoma, Adenoid cystic carcinoma. MEC, MASC  
 Lymph node: Reactive Hyperplasia, Hodgkins, Non-Hodgkins Lymphoma, metastatic carcinoma  
 Kidney: Renal cell carcinoma (clear cell, granular cell), benign cells

### **CYTOPATHOLOGY III**

Cytopathology III/Cytogenetics is a combined one-month rotation, 2 weeks of which are allotted to cytopathology. The resident will use this time to gain additional experience in both gyn and Non-gyn cytology. Pre and Post-tests will be administered.

#### **Cytopathology III: Objectives for Six General Competencies:**

##### **Skill Level II** (combined gyn and Non-gyn )

#### **1. Patient Care**

##### **Assignments:**

- A. If needed, perform and/or assist in fine needle aspirate activities.
- B. Interpret the cervical biopsy/cone specimens each afternoon.
- C. Preview the Non-Gyn specimens and write a preliminary report

#### **2. Medical Knowledge**

##### **Assignments:**

- A. Take the gyn, Non-gyn **Pre-test** (Instructor canvas)
- B. Read *Practical Principles of Cytopathology*, DeMay,; Chapters on GI tract, Urine, CSF, Pancreas and Adrenal gland.
- C. Review and interpret cases assigned from study set or current cases.
- D. Take the Post-test (Instructor Canvas). To be graded. See Outcomes Assessment last page.

#### **Pre and Post-test (Be able to Identify on Diff Quik, Pap, and H&E stains):**

Entities included on Cytopathology I and II Post-tests.

In addition: GI tract, Urine, CSF, Pancreas, Adrenal, Ovarian (peritoneal wash)



Entities reviewed from study set assignments

### 3. Practice-Based Learning and Improvement

**Assignment:**

Read and understand the College of American Pathology inspection checklist for cytopathology.

### 4. Interpersonal and Communication Skills

**Assignments:**

Sharpen written and verbal communication skills by assuming increasing responsibility in final sign-out of cases. Present cases at cytology conference.

### 5. Professionalism: see Cytopathology I and II

### 6. Systems-Based Practice

**Assignments:**

- A. Read the handout entitled Review of Gyn Cytology Samples: Guidelines for Review of Gyn Cytology Samples in the Context of Litigation or Potential Litigation, pg 1-3
- B. Read the handout entitled What Went Wrong? Lessons learned from breast pathology malpractice claims, pg 1-6.
- C. Read the journal article entitled, Diagnostic Value and Cost-effectiveness of On-Site Evaluation of Fine Needle Aspiration Specimens: Review of 5,688 cases. Diagnostic Cytopathology. 2002. Jul;27(1):1-4.

### Outcomes Assessment:

1. Objective evaluation:  
The resident will take a pre and post-test to include gyn and Non-gyn cytology. Passing requirements the same as Cytopath I and II.
2. Subjective evaluation:  
Faculty will observe and complete a standard competency-based resident evaluation at the end of the rotation.