

THE GEORGE WASHINGTON UNIVERSITY MEDICAL CENTER  
DEPARTMENT OF PATHOLOGY

ANATOMIC AND CLINICAL PATHOLOGY RESIDENCY  
PROGRAM DESCRIPTION

ACADEMIC YEAR 2011-2012

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## I. INTRODUCTION AND OVERVIEW

## **Synopsis of Program**

The overall goal of the Pathology residency program at the George Washington University Medical Center is to train physicians to become competent and skilled in the practice of pathology (anatomic, clinical, or both). Upon completion of the training program, the resident should be well prepared for subspecialty pathology fellowship training or to assume the role of a practicing pathologist in a general hospital setting, an academic medical center, or a research institute. The resident should, at a minimum, be able to pass the certifying examination(s) of the American Board of Pathology.

The program accomplishes its overall goal by involving the residents in the full breadth and depth of pathology clinical practice in a variety of practice settings; by exposing the residents to basic, applied, translational and/or clinical bio-medical research; and by involving the residents in the teaching of students and other learners in the health care system. The program is headquartered at the George Washington University Hospital, with the Washington Veterans' Affairs Medical Center (VAMC) and the Children's National Medical Center (CNMC) serving as major affiliated institutions. The program is fully accredited by the Accreditation Council for Graduate Medical Education (ACGME). In addition to the residency program, the department also sponsors fellowship programs in Surgical Pathology and Cytopathology.

## **Scope and Duration of Training**

The graduate medical education program in anatomic (AP) and/or clinical pathology (CP) provides a well-organized and comprehensive educational experience for qualified physicians desiring to acquire the basic competence of a pathologist. Our screening process for accepting desirable candidates into the program is careful and stringent, helping to ensure that our trainees are highly qualified and motivated. Our programs are designed to offer residents the opportunity to acquire a broad understanding of AP and/or CP and the routine as well as newly developed techniques and methods of those disciplines. Residents become involved in the day-to-day consultative role that pathologists play in patient-care decision-making. The degree of participation in this role increases as the resident advances in his/her training.

Our program offers a four-year combined AP and CP (AP/CP-4) program and three-year straight AP-3 and CP-3 programs. The majority of our trainees pursue the AP/CP-4 program. In many years, it is not possible for a resident to enroll in either of the straight three-year programs; in those years positions are open only for the combined 4-year AP/CP training program. The AP/CP-4 program includes 25 months of formal education in AP and 19 months of formal education in CP. Four months of electives complete AP/CP-4 training. The scheduling of all rotations and the availability of electives are carefully reviewed in an effort to accommodate residents' interests and to take into account residents' past accomplishments and demonstrated abilities. The AP-3 and CP-3 programs include 24 months of structured AP or CP education. The remaining 12 months of training are a continuation of structured AP or CP education and/or are devoted to training in a sub-specialized area of pathology.

## **Selection of Residents**

The Department of Pathology admits only well-qualified applicants into its residency program. Considerable time and effort is devoted to recruitment and selection of residents. Formal applications to the program are accepted through the Electronic Residency Application System (ERAS). After a rigorous process of screening all complete applications by the Program Director and Residency Training Committee (RTC), selected applicants are invited for a full day of interviews and site visits. The screening process includes a comprehensive review of application forms, academic transcripts, letters of recommendation, Deans' letters, USMLE scores, and the candidates' written statement of their personal reasons for choosing pathology as a career. Interviewed applicants visit individually with five to six faculty members, including the department Chair and Program Director whenever possible, and one or more residents, and each is given a complete tour of facilities at the GWU Hospital and detailed information about the other two affiliated institutions. Each interviewer completes a detailed written evaluation of the applicant, and upon completion of the application process and interviews, the candidates are ranked by the Program Director and RTC according to their suitability for admission to the program.

## **Program Management**

The residency program is managed through a formal administrative structure. The Program Director, with the support and assistance of the Chair of Pathology, assumes full responsibility for the organization, conduct, and evaluation of the program. An advisory committee, the Residency Training Committee (RTC), assists the Program Director and consists of the Program Director (who serves as Chair of the Committee), Chair of Pathology, 6-7 additional faculty members, and the Pathology Chief Residents. Pathology faculty representatives from all major affiliated institutions serve as members of the RTC. The Chair of Pathology appoints the members of the RTC, and the Committee is advisory to him/her and to the Program Director. The RTC is concerned with the selection of residents, evaluation of residents' performance, structure and content of the curriculum, scheduling of rotations, evaluation of the effectiveness of the program and program faculty, and all other matters associated with the residency program. When evaluating residents' performance, the RTC functions as the Clinical Competency and Promotions Committee for the program. The RTC meets at regular intervals, usually 4-6 times per academic year. The Program Coordinator assists the Program Director, Chair of Pathology, and the RTC in the management of the program.

## **Program Curriculum**

The program provides experience in all major areas of pathology practice. The educational program in anatomic pathology (AP) includes autopsy pathology, surgical pathology, cytopathology, pediatric pathology, neuropathology, dermatopathology, forensic pathology, immunopathology, histochemistry, ultrastructural pathology, selected patient procedures (e.g. fine-needle aspiration), and other advanced diagnostic techniques. The educational program in clinical pathology (CP) includes microbiology (including bacteriology, mycology, parasitology, and virology), immunology/serology, blood banking/transfusion medicine, chemical pathology, toxicology, cytogenetics, hematology, coagulation, medical microscopy (including urinalyses), molecular diagnostics, flow cytometry, selected patient procedures (e.g. bone marrow aspiration and biopsy), and other advanced diagnostic techniques. The practice experiences of the resident in both AP and CP emphasize

preparation of the resident as an effective consultant to clinicians in the diagnosis and management of their patients' diseases and in the maintenance of health of the served population. The program also provides instruction and experience in the major aspects of clinical laboratory management and the use and management of laboratory and other health care information systems. Resident educational experiences are provided through specific rotations and other clinical and educational experiences at varying times during each resident's training cycle. These experiences conform to the overall educational goals and objectives of the program.

The overall program curriculum and the curriculum for each rotation are based on the six major core competency areas as defined by the Accreditation Council for Graduate Medical Education (ACGME). These are outlined below, with examples of activities and specific competencies relevant to the practice of anatomic and clinical pathology.

### **Six Major ACGME Core Competency Areas in the Overall Program and Individual Rotational Curricula**

#### **I. Patient Care**

##### **A. Technical Skills**

The resident will master the technical skills relevant for the practice of pathology. Some examples of these technical skills are dissection, gross and/or microscopic morphologic evaluation, interpretation of special stains, performance of aspiration procedures, interpretation of electrophoretic studies, interpretation of immunohematologic workups, extraction of relevant clinical information from a patient's medical record, evaluation of quality control data, etc.

##### **B. Clinical Consultation**

The resident will learn to provide appropriate and effective consultation to clinicians and other health care providers. Consultation may include providing a diagnosis, discussing the implications of a diagnosis in the management of a patient, providing advice regarding ordering of lab tests or blood products, assisting in the interpretation of test results, etc.

#### **II. Medical Knowledge**

##### **A. Fund of Medical Knowledge**

The resident will develop a fund of general medical knowledge and focused pathology knowledge relevant to the practice of pathology. This will include an understanding of basic concepts of disease; the pathophysiology of common disorders; the epidemiologic, clinical, morphologic, biochemical, and/or molecular genetic features of common disorders; the prognostic and general therapeutic implications of common disease states; and the societal impact and preventative aspects of common diseases.

##### **B. Application of Medical Knowledge in the Practice of Pathology**

The resident will learn to effectively apply his/her general and focused medical knowledge in the day-to-day practice of pathology. The resident must be able to apply her/his knowledge of the diagnostic, prognostic, and general therapeutic features of common disease states to analyze clinical situations, construct a reasonable differential diagnosis, establish a definite diagnosis, and discuss the prognostic and general therapeutic implications of a disease state with clinicians.

### III. Practice-Based Learning and Improvement

#### A. Evidence-Based Practice

The resident will learn to make effective use of conferences, lectures, and reading of the medical literature (texts, journals, and other medical databases) to inform her/his day-to-day practice of pathology. The resident must develop the ability to critically evaluate the quality of research studies and to be discriminating in the selection of information sources used to support medical decision making.

#### B. Use of Information Technology

The resident will learn to use a variety of information technologies to inform and improve his/her day-to-day practice of pathology. Examples of information technologies that must be mastered include electronic medical literature databases, Web-based information sources, and computer-based resources (CDs, DVDs, and other media).

### IV. Interpersonal and Communication Skills

#### A. Communication Skills

The resident will learn to communicate effectively and courteously with health care providers, laboratory staff members, administrators, patients, and other individuals in the course of her/his practice. These communications will include verbal (face-to-face and telephone conversations) and written (written reports, notes, e-mail messages, etc.) formats. The resident must strive to communicate in a clear, concise, accurate, and appropriately focused manner. Regarding the production of written reports, the ultimate goal is for the resident to produce essentially letter-perfect reports that require minimal or no modification by the attending pathologist.

#### B. Teamwork

The resident will learn to work as an effective member of the health care team in the course of his/her daily practice. The resident must strive to perform her/his tasks in a responsible and timely fashion, facilitate the tasks of other team members, and be cooperative in his/her interactions with team members. [Note: Other team members may include technologists, transcriptionists, other residents, fellows, attending pathologists, clinicians, administrators, and others.]

### V. Professionalism

#### A. Courtesy and Collegiality

The resident must learn to treat health care providers (including clinicians, nurses, other pathologists, technologists, transcriptionists, etc.), administrators, patients, and others courteously and respectfully. The resident must learn to be collegial in all interactions with other members of the health care team.

#### B. Professional Responsibility

The resident must learn to take his/her professional responsibilities seriously and act accordingly. The resident's professional responsibilities may include clinical service, teaching, administrative tasks, research, institutional tasks, and work with professional organizations. The resident should strive to approach each of these responsibilities with enthusiasm and complete all tasks and assignments effectively and in a timely fashion.

## VI. Systems-Based Practice

### A. The Health Care System and the Role of Pathology

The resident must acquire knowledge of practice and health care delivery systems and an awareness of the role of pathology in the context of the greater health care system. The resident will develop a working knowledge of different inpatient and outpatient delivery systems and the general regulatory and financial aspects of health care delivery. The resident must learn the importance of providing effective and timely consultation to clinicians, advising health care providers in the provision of cost-effective care, and providing statistical and other data in support of quality care.

### B. General Laboratory Administration

The resident will develop an understanding of the general administrative aspects of pathology practice. The resident will learn to understand and apply the principles of quality control, quality assurance, and continuous quality improvement. The resident will develop a working knowledge of laboratory staffing, laboratory instrumentation, workflow, turnaround time management, safety, customer service, regulatory accreditation, budget, and billing practices.

## Resources for Anatomic Pathology

The volume and variety of material available in the AP educational program at the GWU Hospital and at the other affiliated institutions are sufficient to ensure that residents have a broad exposure to both common conditions and unusual entities, develop proficiency in diagnosis and problem-solving, and develop the necessary technical skills to perform the functions of an anatomic pathologist. There is sufficient volume and variety of material available for educational purposes to ensure the opportunity for:

- Performance of at least 50 autopsies per resident during the program, including forensic, pediatric, and neonatal/stillborn autopsies.
- Examination and signing out of at least 2,000 surgical pathology specimens per resident during the program. The available material from the three hospitals provides an excellent mix of cases for exposure to both common and uncommon conditions.
- Examination of at least 1,500 cytologic specimens (including specimens received by the Cytopathology Service, Hematopathology Service, and encountered during intra-operative consultations on the Surgical Pathology Service) per resident during the program. The material examined includes both gynecological and non-gynecological materials, and the resident gains extensive experience in the performance and interpretation of fine-needle aspirations. The cytologic material examined by the resident is augmented by numerous imprint/smear preparations performed and examined as part of intra-operative consultations done during Surgical Pathology rotations.
- Performance of at least 200 intra-operative consultations (involving cryostat sections and/or cytologic imprint/smear preparations) per resident during the program.

## Resources for Clinical Pathology

The volume and variety of material available in the program for training in CP is sufficient to ensure that residents have a broad exposure to both common conditions and unusual entities, develop proficiency in diagnosis and problem-solving, and develop the necessary technical skills to perform the functions of a clinical pathologist. The three major teaching hospitals of the program currently have a combined laboratory workload of approximately 4.6 million reportable tests and provide extensive exposure to clinical case materials in both adult and pediatric age groups. The analytical methods to which residents are exposed include all major laboratory techniques, including the most up-to-date methods (e.g. molecular diagnostics, flow cytometry, etc.). Emphasis is placed on preparing the resident to function as an effective consultant to clinicians regarding patient care decisions.

## Seminars, Conferences, and Rounds

Many regularly scheduled conferences, seminars, and teaching rounds take place at all three of the major training sites. Departmental conferences in AP and CP include didactic sessions, journal club, and conferences devoted to the review, presentation, and discussion of classical, difficult, and unusual cases. Faculty members, fellows, residents, and students attend these conferences and at various times all participate in the presentation of conference materials.

Many inter-departmental conferences are held in conjunction with essentially every other department within the Medical Center. These conferences often involve the review of case materials, which Pathology residents present and discuss as part of the conference proceedings. Regularly scheduled mortality conferences are also held in conjunction with other clinical services.

## Residents as Teachers

In addition to residents' participation in intra-departmental and inter-departmental conferences, as detailed above, all Pathology residents participate in the teaching of sophomore medical students in pathology. In the course of each academic year, each resident spends on average 5-10 afternoons acting as instructors, participating mainly in laboratory and small-group teaching activities. In their first and second years of training, residents typically assist faculty-level instructors in these activities. Third- and fourth-year residents serve as senior instructors and conduct these activities independently. Residents are also responsible for much of the teaching of fourth year medical students who enroll in one of the various senior-year electives offered in the Pathology Department.

## Resident Research

We believe that an understanding of and experience with bio-medical research is essential in the overall professional development of residents in our program, regardless of the future practice setting(s) pursued by our graduates. All residents are required to produce at least one published or publication-quality paper during their training period. Research of a variety of types is allowed, including single case reports,

multi-case series, basic and/or translational bench research, clinical outcomes research, etc. Although not required, residents are also encouraged to present the results of their research at local, regional, national, and international medical meetings, and financial support is provided to residents by the department to allow attendance at these meetings. Research seminars are conducted on a regular basis, both within the department and in other departments at all three training sites. Near the end of each academic year, each resident and fellow is required to submit an updated listing of all research activities conducted by them during that year.

## Resident Awards

The following are annual awards given to members of the Pathology house staff. Each award is presented at the annual House Staff Graduation Dinner and each includes both a certificate and monetary prize.

- The **Resident of the Year Award** is given each year to a Pathology resident in recognition of overall excellence. This is considered the most prestigious of the resident awards. The sum total of the resident's work and accomplishments in the areas of clinical service, learning of pathology, teaching of pathology, research, and professionalism is considered in the selection of the recipient. The selection is made by a vote of the entire teaching faculty in the program.
- The **Frank Miller Award** is given to one of the Pathology residents or fellows in recognition of excellence in teaching. The recipient of this award is selected by the Chair of Pathology, with input from the Director of Undergraduate Pathology Education, Residency Program Director, and other faculty members.
- The **Herschel Sidransky Memorial Award** is given each year to a member of the Department of Pathology house staff in recognition of excellence in research done while in training in our programs. This award is intended to recognize both the quantity and quality of research done during residency and/or fellowship training at GWU, and the selection is based largely on the updated list of research activities provided by each resident and fellow near the end of each academic year. The recipient of this award is selected by a Selection Committee appointed by the Chair of Pathology and made up of faculty members in the department.
- The **Yolanda Oertel Award** is given to a Pathology resident or fellow for excellence in research related to fine needle aspiration cytopathology done while in training in our department. This award requires publication of the research findings in the form of an article in a peer-reviewed journal. The recipient of this award will be determined by a Selection Committee made up of the cytopathologists on the faculty in our department.

## Resident Evaluation

Residents are evaluated at regular intervals throughout their period of training in our program. Informal verbal feedback is provided to each resident by program faculty members in the course of each rotation. On the GW Surgical Pathology rotation, each resident is given a brief written evaluation, at the end of

each week on the rotation, assessing their performance during that week. Upon completion of each rotation and/or training period, a formal written evaluation, using the E\*Value electronic residency management system, is completed by the physician in charge of the particular rotation and submitted to the Program Director and to the Residency Training Committee. Assessment of resident performance on each rotation is based on a variety of assessment methodologies, including observation of the resident's performance in fulfilling his/her clinical duties and the resident's participation in and performance during conferences and teaching rounds. Additionally, in the course of the academic year the quality of each resident's interactions with selected non-physician members of the laboratory team and with each other is evaluated (so-called "360-degree" evaluation). The Program Director completes a formal semi-annual written summative evaluation for each resident, also using the E\*Value system, and meets with each resident every six months to review his/her evaluations and to discuss each individual's progress and future plans. All residents have full access to all of their own written performance evaluations through password-protected access to the E\*Value system.

Residents participate each year in the Residency In-Service Examination (RISE) sponsored by the American Society for Clinical Pathology, to provide them with an opportunity to compare their level of mastery in each pathology discipline with that of other pathology residents in accredited programs in the United States. Each resident's performance on the RISE is also used by the program as an objective measure of the resident's progress.

## **Evaluation of the Program**

The quality of the program and the success of the program in accomplishing its goals and objectives are evaluated by a number of means. On at least an annual basis, residents provide a confidential and anonymous written evaluation of the program in general, each rotation, and each faculty member, using the E\*Value system. Performance of the residents on the annual RISE and the certifying examinations of the American Board of Pathology (ABP) are used by the program to measure overall performance of the program. Post-graduation written surveys are sent to all graduates of the program, approximately one-year following graduation, to assess the graduates' impression of training received in the program and how well this training prepared them for the next stage of their career. The program is also evaluated on an annual basis by a written survey completed by members of the teaching faculty, to benefit from their unique perspective. Summaries of all program evaluations, surveys, and resident performance on the RISE and ABP certifying examinations are reviewed periodically by the Program Director, the Chair of Pathology, and the members of the Residency Training Committee (RTC), and are used to assess the overall effectiveness of the program and to make periodic improvements. A formal written annual evaluation of program effectiveness is completed by the Program Director and submitted to the GWU Office of Graduation Medical Education.

## II. ANATOMIC PATHOLOGY ROTATIONS

## ROTATION: AUTOPSY – GWU Hospital

Facility: GWU Hospital

Duration: Assigned by rolling roster (described below) over the full training period for each resident

Teaching Staff: Patricia Latham, M.D. (Chief, Autopsy Service; Rotation Director); Alejandro Luiña Contreras, M.D.; Robert Jones, M.D. (Neuropathology)

### Overall Goals and Objectives:

The overall goals of this rotation are for the resident to:

- Learn the procedure and technique of performing an autopsy, including documentation of findings, clinical-pathological correlation, and preparation of a report with a cause of death statement.
- Learn to utilize the autopsy as a means of increasing overall knowledge of medicine and pathology.

### Detailed Goals and Objectives\*\*:

The resident is to achieve a set of competencies based on the six ACGME core competency areas. The following are competencies to be mastered by each resident, with an indication of the level of trainee (Skill Level I or II) expected to master each competency and the ACGME core competency area to which each competency applies.

#### Skill Level I (PGY1) Residents:

##### 1. Competency I: Patient Care

- Be able to perform a complete adult or pediatric autopsy under the supervision of an autopsy attending and with the assistance of an autopsy assistant.
- Know the legal and procedural requirements for obtaining a valid autopsy permit and know the medical-legal requirements regarding cases requiring Medical Examiner approval/clearance.
- Gather and understand essential and accurate information from the medical record of the decedent and care givers.
- Perform an adequate external examination of the remains.
- Perform an adequate dissection of the body.
- Be able to record an adequate description of the pertinent autopsy findings.
- Know how to photograph pertinent gross and microscopic findings for documentation and educational purposes.
- Know how to select appropriate tissues for microscopic evaluation.

- Know when and how to properly submit autopsy tissue and fluids for chemical, toxicological and microbiological studies.
- Demonstrate satisfactory level of diagnostic ability.
- Correlate autopsy findings with clinical course and record any significant discordance.
- Know how to prepare precise *Cause of Death* statements.
- Communicate effectively with clinician
- Become familiar with the basic principles of tissue processing, embedding, sectioning and staining for microscopic examination.
- Become familiar with the routine and simple special stains used to examine autopsy material.

## 2. Competency II: Medical Knowledge

- Become familiar with the gross and microscopic appearance of normal tissue and common pathology (level of MS-II), using autopsy case material, histology texts, study materials, and tutorial sessions with autopsy faculty.
- Increase fund of knowledge by reading textbooks and major pathology journals.
- Perform literature searches and incorporate important recent references in the final anatomic diagnosis.

## 3. Competency III: Practice-Based Learning and Improvement

- Locate, appraise and assimilate evidence from scientific studies related to their cases.
- Use feedback and evaluations of performance by faculty for improvement.
- Learn and improve techniques of examination of vital organs including central and peripheral nervous system.
- Seek expert clinical and pathology faculty help on difficult cases.

## 4. Competency IV: Interpersonal and Communication Skills

- Communicate effectively with clinicians to obtain relevant information and convey autopsy findings of their cases.
- Assist in teaching M-II students.
- Present autopsy findings in intra- and inter- departmental conferences.

## 5. Competency V: Professionalism

- Demonstrate respect, compassion and integrity in discussing autopsy findings with peers, students and clinicians.
- Demonstrate commitment to ethical principles and maintain strict confidentiality.
- Understand legal and ethical issues when dealing with non-medical personnel such as hospital employees, funeral directors and secretaries.

## 6. Competency VI: System-Based Practice

- Demonstrate an awareness and responsiveness concerning the role of autopsy in general including quality assurance and education.
- Develop sensitivity to medical malpractice issues that may come up on the autopsy service.
- Learn how to interact with the Risk Management Office.

- Utilize available resources such as the LIS and Internet to improve the quality of performance.

## **Skill Level II (PGY2, PGY3, and PGY4) Residents:**

### **1. Competency I: Patient Care**

- Consolidate knowledge and skills learned as a Skill Level I resident
- Be able to perform a complete adult or pediatric autopsy with minimal supervision from the attending faculty and minimal or no assistance from the autopsy assistant.
- Be able to perform en bloc or en mass removal of organs, as appropriate.
- Be able to remove brain and spinal cord.
- Be able to remove eyes, tongue, leg veins, joints and bones with the assistance of a skilled autopsy assistant or faculty member.

### **2. Competency II: Medical Knowledge**

- Demonstrate advanced knowledge of medical practice and current literature.

### **3. Competency III: Practice-Based Learning and Improvement**

- Participate in the management of the Autopsy by attending meetings, working on special projects and supervising junior residents.

### **4. Competency IV: Interpersonal and Communication Skills**

- Demonstrate effective communication through interactions with junior residents, autopsy assistants and faculty.
- Be able to play a leadership role in conference arrangements and/ or changes on the Autopsy Service.
- Be able to effectively represent the Autopsy Service at interdepartmental conferences.

### **5. Competency V: Professionalism**

- Demonstrate maturity and problem solving skills.
- Work effectively as a junior member of the Autopsy Service management team.

### **6. Competency VI: System-Based Practice**

- Be able to effectively represent the Autopsy Service to other departments or hospital administration at meetings and on project teams.
- Develop systematic problem solving skills - problem identification, analysis, plan for solution, implementation of solution, and assessment of action

\*\* The detailed resident goals and objectives indicated here are derived from those developed at Virginia Commonwealth University

<http://www.pathology.vcu.edu/education/programs/resident/NewSite/ResManual06-07.pdf>

### Required Reading:

1. Autopsy Manual - Procedures and Protocols 2007. The George Washington Department of Pathology
2. Collins KA and Hutchins GM. Autopsy Performance & Reporting, 2<sup>nd</sup> Edition. College of American Pathologists, Northfield, IL, 2003.

### Conferences:

- Didactic Autopsy Conference: Occurs monthly at 7:30 a.m., 4<sup>th</sup> Thursday. Residents present the clinical, gross (photographic), microscopic, toxicologic, and other findings for an autopsy completed by them in the past, discuss the key findings in the context of the patient's clinical course, and present information on the lesions(s)/disease process(es) identified. All Pathology residents assigned to a GWU Hospital rotation during the month of the conference are **required** to attend. Faculty members and house officers from other departments (e.g. Internal Medicine, Surgery, Radiology) are invited and encouraged to attend.
- Gross Autopsy Conference for Recent Cases: Occurs within 48-72 hours following gross dissection. The gross organs and other available materials from the recent autopsy are presented and the preliminary clinical-pathological correlation is discussed. The Pathology residents and faculty involved in the case are required to attend; other Pathology residents and faculty are encouraged to attend. Members of the clinical care team(s) and other ancillary services (e.g. Radiology) involved in the care of the patient are invited and strongly encouraged to attend. Every attempt is made to arrange this conference at a time convenient for the clinical and ancillary service members.

### Resident Duties and Responsibilities:

The Pathology residents involved in each case assume responsibility for obtaining necessary medical information, ensuring safety, ensuring the observance of appropriate medico-legal protocol, supervising the technical performance of the diener, dissecting the organs for interpretation and presentation, cutting and blocking autopsy brains with the neuropathologist after adequate fixation, reviewing microscopic sections of systemic organs and central nervous system, preparing reports, communicating the findings to medical staff and others, and presenting the findings at conferences. The Skill Level II resident assigned to each case is expected to demonstrate advanced competence and to provide training and guidance to the Skill Level I resident assigned to the case. The residents both work with and coordinate their activities with those of the Pathologist Assistant.

### Rolling Roster System for Assignment of Adult Autopsies:

Adult autopsies done at the GWU Hospital are assigned to residents based on a "rolling roster" system. (Neonatal autopsies at the GWU Hospital are performed by residents on the GW Surgical Pathology rotation, working with the Autopsy Service attending pathologists.) Using this system, residents participate in adult autopsy cases in the order that they appear on the roster. The rolling roster for each month is developed and managed by the Pathology Chief Residents.

The roster is arranged to allow both a Skill Level I (for this rotation, PGY1) and Skill Level II (for this rotation, PGY2, PGY3 or PGY4) resident to participate together as a team in most autopsy cases. For the first three autopsies performed by a Skill Level I resident, a PGY3 or PGY4 resident must (by ACGME rules) work closely with the Skill Level I resident and participate fully in all aspects of the case, including review of the patient's medical record, gross dissection, cutting and blocking of tissues (including brain-cutting with the neuropathologist), examining and interpreting all microscopic sections and other laboratory studies done as part of the case, reviewing all findings with the autopsy attending pathologist, preparing all reports (both the PAD and FAD), communicating the findings to clinical medical staff members, and presenting the findings at conferences. After a Skill Level I resident has performed three autopsies, a Skill Level II resident will be assigned to work with the Skill Level I resident in each case, but the Skill Level I resident will work more independently and involve the Skill Level II resident only as needed to assist and give advice.

For each month, the rolling roster will include the names of all residents assigned to the following GWU Hospital rotations during that month:

For AP/CP-4 Residents: Cytopathology, Clinical Chemistry, Microbiology/Immunology, Blood Bank, Hematopathology, Management/Informatics, and Molecular/Flow Cytometry.

For Straight AP-3 Residents: Cytopathology, Microbiology/Immunology, Hematopathology, Management/Informatics, and Molecular/Flow Cytometry.

The names of Skill Level I and Skill Level II residents available to the rolling roster for that month will appear separately on the list and as each case comes up the next Skill Level I and Skill Level II resident on the list will be assigned as a team to the case. At the beginning of each month, the order of the residents on the roster will be based on the total number of autopsies so far performed by each resident compared to other eligible residents during that month, with the residents with the lower total autopsy numbers listed earlier on the roster. To protect Skill Level I (PGYI) residents from being overwhelmed by autopsy cases in any one month, PGY1 residents will perform no more than two autopsies in any month. Once all PGY1 residents available for a month have performed the maximum two autopsies, all additional adult autopsies for that month will be performed by the available Skill Level II residents, working individually on each case.

If a resident is on pre-approved annual (vacation) or administrative leave during the month in question, that resident must arrange in advance for another resident, if possible of the same Skill Level, to provide coverage for his/her case(s) during the leave period. If a resident is on sick leave or for some other reason is not able to participate in a case, the next resident of the same Skill Level on the roster will move into the absent resident's position. In the unlikely event that no resident of the appropriate Skill Level is available on the roster during the month, the Pathology Chief Resident(s) will assign another appropriate resident to participate in each case.

### **Resident Supervision and Evaluation:**

Supervision of the residents' work on the Autopsy Service is provided by the Autopsy Rotation Director and/or the other attendings on the service. The Rotation Director provides a written evaluation, using the E\*Value system, after the first five autopsies are performed by each resident at GWU Hospital and then a second

written E\*Value evaluation after each resident has completed all rotations on the GWU Hospital autopsy rolling roster.

## ROTATION: AUTOPSY – VAMC

**Facility:** VAMC

**Duration:** 3 months (with shared cytopathology & surgical pathology frozen section responsibilities)

**Teaching Staff:** Suman Chauhan, M.D. (Rotation Director), Jack Lichy, M.D., Ph.D., Min-Ling Liu, M.D., Ph.D, Edina Paal, M.D., Wen Chen, M.D. (for Cytopathology: Suman Chauhan, M.D. and Edina Paal, M.D.)

### Goals and Objectives:

This rotation involves essentially the same activities as on the Autopsy and Cytopathology (and for frozen sections, the Surgical Pathology) rotations at the GWU Hospital and, as such, the overall and detailed goals and objectives of each component of this rotation are the same as for the comparable GWU Hospital rotations.

### Resident Duties and Responsibilities:

#### Autopsy Service –

The resident is responsible for performing autopsies, obtaining necessary medical information, ensuring safety, ensuring the observance of appropriate medico-legal protocol, supervising the performance of the assistant, dissection of the organs for interpretation and presentation, preparation of reports, communication of the findings to medical staff and others, and presentation of the findings at conferences. The attending staff will be available at all times to supervise, depending on the experience and training level of the resident. Residents are expected to complete provisional autopsy diagnoses within **24 hours** of the autopsy, and final reports within **30 days**. Residents on first autopsy rotation should seek help from senior residents on Surgical Pathology, followed by residents on Clinical Pathology. Resident on the Autopsy rotation is expected to provide cross-coverage for the Surgical Pathology Service. When the resident is not actually performing an autopsy, he/she is responsible for frozen sections, and is also expected to review the cytology slides and sign these out with the attending staff (see “Cytopathology Service” below). The resident is responsible for preparing and presenting the ENT Tumor Board conference (alternate Tuesdays at noon), GU Tumor Board (last Monday of the month 12:00 – 1:00 pm) and the Life Conference which is held on occasional Fridays (12:00 – 1:00 pm, upon request). He/she is expected to attend the scheduled surgical pathology, cytopathology, autopsy and clinical pathology resident teaching conferences (as detailed in the General outline).

#### Cytopathology Service–

The residents' responsibilities include signing out cases, performing fine needle aspirations, and participating in the bi-weekly Cytopathology Conference.

The trainees are exposed to a variety of cytologic material. Fundamental issues relating to attention to details, evaluation of the technical quality of the cytologic preparations, elimination of discrepancies, sense of responsibility, and the need to compose readable and relevant reports are emphasized. Written comments must be relevant and oriented as a guide to the clinicians. Residents have ready access to textbooks, journals and other publications.

*Resident's daily assignment:*

The residents review gynecologic, medical, and fine needle aspiration material and render their opinions in writing. The gynecologic cases at VAMC are all liquid-based preparation (ThinPrep®) and presently include all submitted smears (not pre-screened), as well as all negative smears from patients with a newly diagnosed high grade lesion or carcinoma. All cases are signed-out with the attending pathologist during daily sign-out sessions over a multiheaded microscope.

*Role of residents as consultants:*

The residents interact with clinicians and learn to demonstrate the right degree of comfort when discussing aspects of cases. The residents communicate and discuss the results of all malignant, infectious, suspicious and interesting diagnoses with the clinical staff. They also act as consultants to the clinical staff; and they frequently discuss and review the cytologic material with clinicians, residents, and medical students. The Pathology attending staff members are available for back-up or further discussion as necessary.

*Role of residents in fine needle aspirations:*

The residents learn the technique of fine needle aspiration and are encouraged to perform the procedure with appropriate supervision by the staff pathologists. The importance of localizing the lesion and getting adequate material is stressed as being an integral part of reaching a correct diagnosis. Lymph nodes, salivary glands, and palpable soft tissue lesions are the most commonly aspirated sites in our department. Fine needle aspiration of internal organs and non-palpable deep-seated lesions are performed by the radiologists under CT or ultrasonic guidance. Trans-bronchial Wang needle aspiration, a relatively common procedure at our department is performed by the pulmonologists. The residents have ample opportunity to attend these procedures and at times under direct supervision by the attending cytopathologist are asked to evaluate the adequacy of aspirated material.

*Cyto-Histologic correlation:*

Cytopathology and Surgical Pathology Services interact very closely since all staff members involved in Cytopathology are also involved in Surgical Pathology. Our cytology working draft automatically shows if the patient has any current or previous surgical pathology specimens. As part of the quality assurance program, cyto-histologic correlation is obtained on all suspicious, malignant, premalignant, and interesting cases. All cases showing discrepancy are reviewed and discussed during our quality assurance conference.

**Resident Supervision and Evaluation:**

Supervision of the resident's day-to-day activities is provided by the Rotation Director and the other attending pathologists. At the conclusion of the rotation, the Rotation Director provides a written evaluation, using the E\*Value system, reflecting the resident's performance in all component of the rotation.

## ROTATION: SURGICAL PATHOLOGY – GWU Hospital

Facility: GWU Hospital

Duration: 6-7 rotations; 13 months total training

Teaching Staff: Sana Tabbara, M.D.; (Service Chief and Rotation Director); Samantha Easley, M.D.; Robert Jones, M.D.; Patricia Latham, M.D. (Liver Pathology); Alejandro Luña Contreras, M.D.; Norris Nolan, M.D.; M. Katayoon Rezaei, M.D.; Arnold Schwartz, M.D., Ph.D.; Michael Stamatakos, M.D.; Lysandra Voltaggio, M.D.

### Overall Goals and Objectives:

The overall goal of the surgical pathology rotation is for the resident to master the range of knowledge, technical skills, administrative principles, and attitudes necessary for the practice of surgical pathology.

### Detailed Goals and Objectives:

The resident on the surgical pathology rotation is to achieve a set of competencies based on the six ACGME core competency areas. The following are competencies to be mastered by each resident, with an indication of the level of trainee (Skill Level I or II; year in the residency program) expected to master each competency and the ACGME core competency area(s) to which each competency applies.

#### Skill Level I Residents:

1. The resident has a working knowledge of proper collection, handling, fixation and storage of surgical pathology specimens.

**First year residents**

**(Competency I, Patient Care; Competency II, Medical Knowledge)**

2. The resident has a working knowledge of proper accessioning of surgical pathology specimens and understands the importance of proper documentation of the specimen ( labeling of specimen containers, receipt of properly completed requisition forms, etc.)

**First-year residents**

**(Competency I, Patient Care)**

3. The resident has a good working knowledge of the expected gross appearance of common lesions encountered on an inpatient or outpatient surgical pathology service.

**First year residents**

**(Competency I, Patient Care; Competency II, Medical Knowledge)**

4. The resident is able to properly dissect and describe simple to moderately complex surgical specimens , collect appropriate samples, arrange samples in properly labeled tissue processing cassettes and select

appropriate fixatives and other media for special studies (flow cytometry, molecular analysis, EM, etc.)

**First year residents**

**(Competency I, Patient Care; Competency II, Medical Knowledge)**

5. The resident is able to properly handle as described in #3 commonly encountered complex surgical specimens (radical en bloc resections, limb resections, bone specimens, etc.), with proper orientation, documentation, and marking of resection margins.

**First-second year residents**

**(Competency I, Patient Care; Competency II, Medical Knowledge)**

6. The resident understands the importance of a complete clinical history in the establishment of a surgical pathology diagnosis.

**First-second year residents**

**(Competency I, Patient Care; Competency II, Medical Knowledge)**

7. The resident has a good working knowledge of the histopathologic findings in the common diseases encountered on an inpatient or outpatient surgical pathology service.

**First-second year residents**

**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**

8. The resident understands the appropriate role of the intraoperative consultation, including the limitations of rendering an intraoperative diagnosis and the importance of clear communication with the surgeon.

**First year residents**

**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency IV, Interpersonal and Communication Skills; Competency V, Professionalism; Competency VI, Systems-Based Practice)**

9. The resident is able to use the laboratory information system for production and editing of reports, searching for laboratory data and previous pathology reports on individual patients, performing case searches using common search criteria (specimen type, diagnosis, etc.), and other functions relevant to surgical pathology.

**First year residents**

**(Competency I, Patient Care; Competency IV, Interpersonal and Communication Skills; Competency V, Professionalism; Competency VI, Systems-Based Practice)**

10. The resident makes effective use of conferences, lectures, and reading of the medical literature (texts, journals, and other medical databases) to inform and improve her/his day-to-day practice of pathology. The resident has developed the ability to critically evaluate the quality of research studies and to be discriminating in the selection of information sources used to support medical decision making.

**First-second year residents**

**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**

11. The resident is able to use a variety of information technologies to inform and improve his/her day-to-day practice of pathology. Examples of information technologies which must be mastered include

electronic medical literature databases, Web-based information sources, and computer-based resources (CDs and other media).

**First-second year residents**

**(Competency I, Patient care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**

12. The resident is able to work as an effective member of the health care team in the course of his/her daily practice. The resident performs her/his tasks in a responsible and timely fashion, facilitates the tasks of other team members, and is cooperative in his/her interactions with team members. [Note: Other team members may include technologists, transcriptionists, other residents, fellows, attending pathologists, clinicians, administrators, and others.]. The resident communicates effectively and courteously with health care providers, laboratory staff members, administrators, patients, and other individuals in the course of her/his practice. Communications include verbal formats (face-to-face and telephone conversations) and written formats (written reports, notes, e-mail messages, etc.).

**First year residents**

**(Competency I, Patient Care; Competency IV, Interpersonal and Communication Skills; Competency V, Professionalism; Competency VI, Systems-Based Practice)**

**Skill Level II Residents:**

13. The resident has a good working knowledge of disease mechanisms relevant to surgical pathology.

**Second-third year residents**

**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**

14. The resident is able to construct a reasonable differential diagnosis in cases likely to be encountered on an inpatient or outpatient surgical pathology service and is able to establish a definitive diagnosis in cases of common diseases.

**Second-third year residents**

**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**

15. The resident understands the role of and can apply special diagnostic techniques, including histochemistry, immunohistochemistry, electron microscopy, flow cytometry and molecular analysis in the establishment of a definitive diagnosis in surgical pathology.

**Second-third year residents**

**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement; Competency VI, Systems-Based Practice)**

16. The resident is able to provide appropriate and effective consultation to clinicians and other health care providers. Consultation may include providing a diagnosis, detailing the criteria used to establish a diagnosis, discussing the implications of a diagnosis in the management of a patient, etc.

**Third-fourth year residents**

**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement; Competency IV, Interpersonal and Communication Skills; Competency V, Professionalism; Competency VI, Systems-Based Practice)**

17. The resident is able to provide appropriate intra-operative consultation, including proper specimen dissection, sampling lesions and resection margins, preparation and staining of imprints and smears, production and staining of cryostat sections, interpretation of gross and microscopic findings in the context of the clinical history and operative findings, and communication with the surgeon

**Third-fourth year residents**

**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement; Competency IV, Interpersonal and Communication Skills; Competency V, Professionalism; Competency VI, Systems-Based Practice)**

18. The resident is able to properly complete a surgical pathology report, using clear and concise language and incorporating all necessary elements, including, when appropriate, a comment which provides clarification of the diagnosis and/or guidance to the clinician regarding management of the patient. [Note: The goal is for the resident to produce essentially letter-perfect reports that require minimal or no modification by the attending pathologist.]

**Third-fourth year residents**

**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement; Competency IV, Interpersonal and Communication Skills; Competency V, Professionalism; Competency VI, Systems-Based Practice)**

19. The resident has a working knowledge of quality control and quality assurance relevant to surgical pathology.

**Third-fourth year residents**

**(Competency I, Patient Care; Competency VI, Systems- Based Practice)**

20. The resident has a general knowledge of management issues relevant to a surgical pathology service, including equipment selection and maintenance, supply management, staffing, safety, procedure (CPT) coding, diagnosis (ICD-9) coding, and billing.

**Third-fourth year residents**

**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement; Competency VI, Systems-Based Practice)**

21. The resident has a general knowledge of regulatory issues relevant to a surgical pathology service, including the requirements for retention of patient materials (wet tissues, tissue blocks, microscopic slides, reports, etc.).

**Third-fourth year residents**

**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement; Competency VI, Systems-Based Practice)**

**AY 2011-2012 – New Guidelines for Residents in Surgical Pathology:**  
**Rotation Requirements and Expectations**

The following is a newly refined list of rotation requirements and resident expectations, introduced in AY 2011-2012.

**First Year Resident (PGY1)**

**Rotation 1 (2 Months)**

1. The resident has a working knowledge of proper collection, handling, fixation and storage of surgical pathology specimens.

**(Competency I, Patient Care; Competency II, Medical Knowledge)**

2. The resident has a working knowledge of proper accessioning of surgical pathology specimens and understands the importance of proper documentation of the specimen ( labeling of specimen containers, receipt of properly completed requisition forms, etc.)

**(Competency I, Patient Care)**

3. The resident is able to properly dissect and describe simple to moderately complex surgical specimens , collect appropriate samples in the proper size and thickness, arrange samples in properly labeled tissue processing cassettes and select appropriate fixatives and other media for special studies (flow cytometry, molecular analysis, EM, etc.)

**(Competency I, Patient Care; Competency II, Medical Knowledge)**

4a. The resident understands the appropriate role of the intraoperative consultation and the importance of clear communication with the surgeon.

4b. The resident is able to prepare smears and cut frozen sections using the cryostat and choose the appropriate staining method and produce good quality stained sections and smears

**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency IV, Interpersonal and Communication Skills; Competency V, Professionalism; Competency VI, Systems-Based Practice)**

5. The resident is able to use the laboratory information system for production and editing of reports, searching for laboratory data and previous pathology reports on individual patients.

**(Competency I, Patient Care; Competency IV, Interpersonal and Communication Skills; Competency V, Professionalism; Competency VI, Systems-Based Practice)**

6. The resident makes effective use of conferences, lectures, and reading of the medical literature (texts, journals, and other medical databases) to inform and improve her/his day-to-day practice of pathology. This includes becoming proficient in surgical pathology terminology; demonstrating knowledge of normal anatomy and histology, demonstrating knowledge of tumor staging, learning the billing system, as well as learning the pathology of common and uncomplicated lesions.

**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**

7. The resident has good organizational skills and is able to work as an effective member of the health care team in the course of his/her daily practice.

7a. The resident performs her/his tasks in a responsible and timely fashion, including grossing, editing gross descriptions and reports, previewing assigned cases.

7b. The resident facilitates the tasks of other team members, as above as well as obtaining history, pulling previous related pathology material, assigning billing codes .

7c. The resident is cooperative in his/her interactions with team members. [Note: Other team members may include technologists, transcriptionists, other residents, fellows, attending pathologists, clinicians, administrators, and others.].

7d. The resident communicates effectively and courteously with health care providers, laboratory staff members, administrators, patients, and other individuals in the course of her/his practice. Communications include verbal formats (face-to-face and telephone conversations) and written formats (written reports, notes, e-mail messages, etc.).

**(Competency I, Patient Care; Competency IV, Interpersonal and Communication Skills; Competency V, Professionalism; Competency VI, Systems-Based Practice)**

### **First Year Resident (PGY1)**

#### **Rotation 2 (2 Months)**

**The resident continues to build on requirements in rotation 1 and in addition:**

1. The resident has a good working knowledge of the expected gross appearance of common lesions encountered on an inpatient or outpatient surgical pathology service.

**(Competency I, Patient Care; Competency II, Medical Knowledge)**

2. The resident understands the importance of a complete clinical history in the establishment of a surgical pathology diagnosis.

**(Competency I, Patient Care; Competency II, Medical Knowledge)**

3a. The resident has a good working knowledge of the normal and abnormal histologic findings in the common specimens encountered on an inpatient or outpatient surgical pathology service.

3b. The resident is able to describe reactive conditions (abscess, scars, granulation tissue, and chronic active inflammation) and tumors (architectural patterns and cytology)

**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**

4. The resident understands the appropriate role of the intraoperative consultation, including the limitations of rendering an intraoperative diagnosis and the importance of clear communication with the surgeon.

**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency IV, Interpersonal and Communication Skills; Competency V, Professionalism; Competency VI, Systems-Based Practice)**

5. The resident is able to use the laboratory information system for production and editing of reports, searching for laboratory data and previous pathology reports on individual patients, performing case searches using common search criteria (specimen type, diagnosis, etc.), and other functions relevant to surgical pathology.

(Competency I, Patient Care; Competency IV, Interpersonal and Communication Skills; Competency V, Professionalism; Competency VI, Systems-Based Practice)

6. The resident makes effective use of conferences, lectures, and reading of the medical literature (texts, journals, and other medical databases) to inform and improve her/his day-to-day practice of pathology. (Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)

### Second Year Resident (PGY2)

The resident continues to build on requirements for the first year and in addition:

1. The resident is able to properly handle as described in #3, rotation 1, commonly encountered complex surgical specimens (radical en bloc resections, limb resections, bone specimens, etc.), with proper orientation, documentation, and marking of resection margins.

(Competency I, Patient Care; Competency II, Medical Knowledge)

2a. The resident has a good working knowledge of the histopathologic findings in the common diseases encountered on an inpatient or outpatient surgical pathology service.

2b. The resident is able to formulate a differential diagnosis and **narrow** it down to the final diagnosis.

2c. The resident begins to utilize effectively ancillary studies (special stains, immunohistochemical stains and molecular studies) and knows when to order them, as well as the limitations of the tests.

2d. The residents starts to understand the clinical aspect of disease processes and diagnostic implications to management.

(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)

3. The resident makes effective use of conferences, lectures, and reading of the medical literature (texts, journals, and other medical databases) to inform and improve her/his day-to-day practice of pathology. The resident has developed the ability to critically evaluate the quality of research studies and to be discriminating in the selection of information sources used to support medical decision making.

(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)  
Systems-Based Practice)

4. The resident is able to use a variety of information technologies to inform and improve his/her day-to-day practice of pathology. Examples of information technologies which must be mastered include electronic medical literature databases, Web-based information sources, and computer-based resources (CDs and other media).

(Competency I, Patient care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)

### Third Year Rotation (PGY3)

The resident continues to build on requirements in the previous two years and in addition:

1. The resident has a good working knowledge of disease mechanisms relevant to surgical pathology.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**
  
2. The resident is able to construct a reasonable differential diagnosis in cases likely to be encountered on an inpatient or outpatient surgical pathology service and is able to establish a **definitive** diagnosis in cases of common diseases.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**
  
3. The resident understands the role of and can apply special diagnostic techniques, including histochemistry, immunohistochemistry, electron microscopy, flow cytometry and molecular analysis in the establishment of a definitive diagnosis in surgical pathology.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement; Competency VI, Systems-Based Practice)**
  
4. The resident is able to provide appropriate and effective consultation to clinicians and other health care providers. Consultation may include providing a diagnosis, detailing the criteria used to establish a diagnosis, discussing the implications of a diagnosis in the management of a patient, etc.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement; Competency IV, Interpersonal and Communication Skills; Competency V, Professionalism; Competency VI, Systems-Based Practice)**
  
5. The resident is able to provide appropriate intra-operative consultation, including proper specimen dissection, sampling lesions and resection margins, preparation and staining of imprints and smears, production and staining of cryostat sections, interpretation of gross and microscopic findings in the context of the clinical history and operative findings, and communication with the surgeon  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement; Competency IV, Interpersonal and Communication Skills; Competency V, Professionalism; Competency VI, Systems-Based Practice)**
  
6. The resident is able to properly complete a surgical pathology report, using clear and concise language and incorporating all necessary elements, including, when appropriate, a comment which provides clarification of the diagnosis and/or guidance to the clinician regarding management of the patient. [Note: The goal is for the resident to produce essentially letter-perfect reports that require minimal or no modification by the attending pathologist.]  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement; Competency IV, Interpersonal and Communication Skills; Competency V, Professionalism; Competency VI, Systems-Based Practice)**
  
7. The resident has a working knowledge of quality control and quality assurance relevant to surgical pathology.  
**(Competency I, Patient Care; Competency VI, Systems- Based Practice)**

8. The resident has a general knowledge of management issues relevant to a surgical pathology service, including equipment selection and maintenance, supply management, staffing, safety, procedure (CPT) coding, diagnosis (ICD-9) coding, and billing.

**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement; Competency VI, Systems-Based Practice)**

9. The resident has a general knowledge of regulatory issues relevant to a surgical pathology service, including the requirements for retention of patient materials (wet tissues, tissue blocks, microscopic slides, reports, etc.).

**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement; Competency VI, Systems-Based Practice)**

#### **Fourth Year Rotation (PGY4)**

**The resident continues to build on requirements in the previous three years and in addition:**

1. The resident gains additional experience.
2. The resident is able to carry all functions of a surgical pathologist independently, seeking advice as needed.
3. The resident is able to act as a consultant.
4. The resident is able to teach junior residents in all aspects of surgical pathology.
5. The resident is able to independently research, present and educates his/her peers as well as more experienced audience in and outside the pathology department.

#### **Resident Duties and Responsibilities:**

The rotations combine didactic instruction, practice, monitoring, and testing in order to improve the clinical service and performance skills of the residents. Residents are involved in all aspects of tissue acquisition, gross description, slide review and sign-out, evaluation of special procedures (histochemistry, immunohistochemistry, flow cytometry, and electron microscopy), and intra-operative consultations. The residents learn from the pathologist assistant(s), more senior residents, fellows, and attending faculty pathologists, and are expected to augment this more formal instruction with their own readings. The fellows and faculty members monitor the activities of the residents, closely supervising junior residents but allowing senior residents to work more independently. Training in subspecialty areas of surgical pathology (e.g. hepatic pathology, dermatopathology, nephropathology, neuropathology, bone and soft tissue pathology, etc.) are included, with case reviews, conferences, and resident presentations supplementing the case material available in the University Hospital.

Each surgical pathology rotation lasts for 1 to 3 months; a total of 6-7 rotations (overall 13 months of training) completes the basic experience for residents in combined AP/CP training. Residents in AP-only training receive additional rotations to gain added expertise. All residents, junior and senior, are expected to perform all the functions in the surgical pathology rotation, although we expect a greater level of skill from more experienced residents and consequently enable more senior residents to act more independently. The residents follow their cases by participating in the gross description, slide review, case sign-out with the fellow and attending faculty, and intra-operative consultations in each case. All residents are expected to preview the

slides and formulate their own diagnosis for selected cases prior to sign-out, discuss the case with the fellow and/or attending pathologist at sign-out, and be prepared to communicate pathologic findings to clinicians.

### AY 2011-2012 – New Surgical Pathology Sign Out System

A new sign-out system is introduced in AY 2011-2012. The following is a brief description of the new system.

#### **Faculty and Resident Roles**

1 frozen section attending per week	2 sign out residents per week
2 teaching attendings per week	1 'blue' resident per week *
2 non teaching attendings per week	1 'red' resident per week *

\* the blue and red residents will alternate grossing and frozen duties every other day for the week, as shown below:

Blue resident's schedule → GS, FS, GS, FS, GS

Red resident's schedule → FS, GS, FS, GS, FS

The grossing resident will have the responsibility of reviewing his/her gross dictations by the end of the grossing day as we are moving to real time transcription. The gross descriptions will have to be modified and finalized in the laboratory information system. The rough drafts will be printed by 7:00 AM the next morning to be paired with the slides in Histology. Any grosses from gray cases that are not available by the evening will be available by mid morning the next day for review. Those rough drafts will be printed by noon to be paired with gray cases in Histology.

On frozen section day following a day of grossing, the resident can have a chance to review his/her slides from cases that they grossed.

The teaching attendings will be the same faculty members throughout the week, allowing for continuity with their paired sign out resident to follow up stains, recuts, etc.

Resident duties can be rotated on a weekly basis with the exception of the first month of service for PGY1 residents. During such a month, two PGY1 residents will alternate days of grossing and frozen sections for the entire month. Drs. Luiña Contreras and Easley have agreed to provide direct supervision in the gross room of PGY1 residents during these particular months.

#### **Gray Cases**

All gray cases grossed in a particular day will be divided among the four sign out attendings. The two piles of cases designated for the teaching attendings will be given to the sign-out residents by early afternoon the day after the cases are grossed.

#### **Biopsy Cases**

The attending on frozen sections for the day will divide evenly all of the biopsy cases in the morning among the four sign-out attendings.

### **Teaching Attendings**

A teaching attending with their sign-out resident will start the day signing out their share of biopsy cases in the morning, followed by their gray cases in the afternoon. By late afternoon, sign-out will have been completed and the resident will begin previewing the gray cases designated to be signed out by their teaching attending the next day.

### **Non Teaching Attendings**

This role can change from day-to-day as needed, based on meetings, conferences, and other coverage duties. Slides (to include biopsies and grays) with paired paperwork will be given directly to the nonteaching attendings each morning.

### **Call**

One of the sign-out residents per week will take the weekend call (to include grossing cases on the weekend and weekend frozen sections). This also means that during the first month of service for PGY1 residents, the more senior residents who are signing out during the week will cover the weekend call.

Overnight call during the week can still be covered by the resident doing frozen sections that day (even if a first-year), as no frozen section procedures would go unsupervised.

### **Paperwork**

The biopsy paperwork will be provided to Histology by 7:30 AM where it will be paired with the trays of slides. Histology will deliver all the biopsy slides and paired paperwork to the AP Sign-Out room, to the frozen section attending, first thing the morning after these cases are grossed.

Gray paperwork will be given to Histology by noon the day after these cases are grossed, to pair with slides prior to delivery of those trays to the sign out residents by late afternoon.

### **Neonatal Autopsies**

All neonatal autopsies are now performed by residents on the GW Surgical Pathology rotation. The grossing resident for the day will be responsible for the case, with supervision provided by the Autopsy Service attending pathologists as outlined in the Autopsy–GWU Hospital section (beginning on page 13). The initial dissection, blocking, and other gross examination will generally take place in the Gross Room.

### **Resident Supervision and Evaluation:**

The Chief of the Surgical Pathology Service/Rotation Director, working with the teaching staff, provides overall supervision of the residents on the service. The teaching staff consists of the surgical pathology fellow, the active surgical pathology faculty, and additional faculty members interested in subspecialty areas of surgical pathology (e.g. hepatic pathology, nephropathology, dermatopathology, etc.). The fellows and faculty meet periodically and evaluate each resident's performance in fulfilling his/her clinical duties and in participating in conferences and other learning activities. At the end of each week, a brief written evaluation is provided to

each resident on the rotation, to give the resident feedback regarding their performance and progress during that week. At the end of each rotation (block of 1-3 months), a formal written evaluation, using the E\*Value system, is completed by the Chief of Surgical Pathology/Rotation Director, based on the performance of each resident on the service during that academic year and as judged by consensus opinion of the teaching staff. The Chief of Surgical Pathology/Rotation Director meets periodically with each resident to discuss their evaluation and offer suggestions for improvement.

## ROTATION: SURGICAL PATHOLOGY – VAMC

Facility: VAMC

Duration: 4 months (with dermatopathology component)

Teaching Staff: Min-Ling Liu, M.D., Ph.D., (Rotation Director), Suman Chauhan, M.D.; Edina Paal, M.D.; Wen Chen, M.D. (General Surgical Pathology and Dermatopathology)

### Overall Goals and Objectives:

The overall goals and objectives of the surgical pathology rotation are for the resident to master the range of knowledge, technical skills, administrative principles, and attitudes necessary for the practice of surgical pathology, with particular attention to dermatopathology when the resident is at a more senior level.

### GENERAL SURGICAL PATHOLOGY COMPONENT

#### Detailed Goals and Objectives:

The resident on the surgical pathology rotation is to achieve a set of competencies based on the six ACGME core competency areas. The following are competencies to be mastered by each resident, with an indication of the level of trainee (Skill Level I or II; year in the residency program) expected to master each competency and the ACGME core competency area(s) to which each competency applies.

#### Skill Level I Residents:

1. The resident has a working knowledge of proper collection, handling, fixation and storage of surgical pathology specimens.

**First year residents**

**(Competency I, Patient Care; Competency II, Medical Knowledge)**

2. The resident has a working knowledge of proper accessioning of surgical pathology specimens and understands the importance of proper documentation of the specimen ( labeling of specimen containers, receipt of properly completed requisition forms, etc.)

**First year residents**

**(Competency I, Patient Care)**

3. The resident has a good working knowledge of the expected gross appearance of common lesions encountered on an inpatient or outpatient surgical pathology service.

**First year residents**

**(Competency I, Patient Care; Competency II, Medical Knowledge)**

4. The resident is able to properly dissect and describe simple to moderately complex surgical specimens , collect appropriate samples, arrange samples in properly labeled tissue processing cassettes and select appropriate fixatives and other media for special studies (flow cytometry, molecular analysis, EM, etc.)

**First year residents**

**(Competency I, Patient Care; Competency II, Medical Knowledge)**

5. The resident is able to properly handle as described in #3 commonly encountered complex surgical specimens (radical en bloc resections, limb resections , bone specimens, etc.), with proper orientation , documentation , and marking of resection margins.

**First-second year residents**

**(Competency I, Patient Care; Competency II, Medical Knowledge)**

6. The resident understands the importance of a complete clinical history in the establishment of a surgical pathology diagnosis.

**First-second year residents**

**(Competency I, Patient Care; Competency II, Medical Knowledge)**

7. The resident has a good working knowledge of the histopathologic findings in the common diseases encountered on an inpatient or outpatient surgical pathology service.

**First-second year residents**

**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**

8. The resident understands the appropriate role of the intraoperative consultation, including the limitations of rendering an intraoperative diagnosis and the importance of clear communication with the surgeon.

**First year residents**

**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency IV, Interpersonal and Communication Skills; Competency V, Professionalism; Competency VI, Systems-Based Practice)**

9. The resident is able to use the laboratory information system for production and editing of reports, searching for laboratory data and previous pathology reports on individual patients, performing case searches using common search criteria (specimen type, diagnosis, etc.), and other functions relevant to surgical pathology.

**First year residents**

**(Competency I, Patient Care; Competency IV, Interpersonal and Communication Skills; Competency V, Professionalism; Competency VI, Systems-Based Practice)**

10. The resident makes effective use of conferences, lectures, and reading of the medical literature (texts, journals, and other medical databases) to inform and improve her/his day-to-day practice of pathology. The resident has developed the ability to critically evaluate the quality of research studies and to be discriminating in the selection of information sources used to support medical decision making.

**First-second year residents**

**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**

11. The resident is able to use a variety of information technologies to inform and improve his/her day-to-day practice of pathology. Examples of information technologies which must be mastered include electronic medical literature databases, Web-based information sources, and computer-based resources (CDs and other media).

**First-second year residents**

**(Competency I, Patient care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**

12. The resident is able to work as an effective member of the health care team in the course of his/her daily practice. The resident performs her/his tasks in a responsible and timely fashion, facilitates the tasks of other team members, and is cooperative in his/her interactions with team members. [Note: Other team members may include technologists, transcriptionists, other residents, fellows, attending pathologists, clinicians, administrators, and others.]. The resident communicates effectively and courteously with health care providers, laboratory staff members, administrators, patients, and other individuals in the course of her/his practice. Communications include verbal formats (face-to-face and telephone conversations) and written formats (written reports, notes, e-mail messages, etc.).

**First year residents**

**(Competency I, Patient Care; Competency IV, Interpersonal and Communication Skills; Competency V, Professionalism; Competency VI, Systems-Based Practice)**

**Skill Level II Residents:**

13. The resident has a good working knowledge of disease mechanisms relevant to surgical pathology.

**Second-third year residents**

**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**

14. The resident is able to construct a reasonable differential diagnosis in cases likely to be encountered on an inpatient or outpatient surgical pathology service and is able to establish a definitive diagnosis in cases of common diseases.

**Second-third year residents**

**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**

15. The resident understands the role of and can apply special diagnostic techniques, including histochemistry, immunohistochemistry, electron microscopy, flow cytometry and molecular analysis in the establishment of a definitive diagnosis in surgical pathology.

**Second-third year residents**

**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement; Competency VI, Systems-Based Practice)**

16. The resident is able to provide appropriate and effective consultation to clinicians and other health care providers. Consultation may include providing a diagnosis, detailing the criteria used to establish a diagnosis, discussing the implications of a diagnosis in the management of a patient, etc.

**Third-fourth year residents**

**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement; Competency IV, Interpersonal and Communication Skills; Competency V, Professionalism; Competency VI, Systems-Based Practice)**

17. The resident is able to provide appropriate intra-operative consultation, including proper specimen dissection, sampling lesions and resection margins, preparation and staining of imprints and smears, production and staining of cryostat sections, interpretation of gross and microscopic findings in the context of the clinical history and operative findings, and communication with the surgeon

**Third-fourth year residents**

**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement; Competency IV, Interpersonal and Communication Skills; Competency V, Professionalism; Competency VI, Systems-Based Practice)**

18. The resident is able to properly complete a surgical pathology report, using clear and concise language and incorporating all necessary elements, including, when appropriate, a comment which provides clarification of the diagnosis and/or guidance to the clinician regarding management of the patient. [Note: The goal is for the resident to produce essentially letter-perfect reports that require minimal or no modification by the attending pathologist.]

**Third-fourth year residents**

**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement; Competency IV, Interpersonal and Communication Skills; Competency V, Professionalism; Competency VI, Systems-Based Practice)**

19. The resident has a working knowledge of quality control and quality assurance relevant to surgical pathology.

**Third-fourth year residents**

**(Competency I, Patient Care; Competency VI, Systems- Based Practice)**

20. The resident has a general knowledge of management issues relevant to a surgical pathology service, including equipment selection and maintenance, supply management, staffing, safety, procedure (CPT) coding, diagnosis (ICD-9) coding, and billing.

**Third-fourth year residents**

**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement; Competency VI, Systems-Based Practice)**

21. The resident has a general knowledge of regulatory issues relevant to a surgical pathology service, including the requirements for retention of patient materials (wet tissues, tissue blocks, microscopic slides, reports, etc.).

**Third-fourth year residents**

**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement; Competency VI, Systems-Based Practice)**

### **Resident Duties and Responsibilities:**

The resident has hands-on training in gross and microscopic diagnostic procedures including immunohistochemistry. The resident is expected to gross in large resections or other complex specimens (as assessed by the attending staff) on all days. Every morning (except Tuesday), the resident is expected to preview the microscopic slides, formulate a diagnosis, and then sign out the cases with the attending pathologist starting late morning/early afternoon. The resident will then dictate the final reports for transcription, or put in requests for special histochemical and/or immunohistochemical stains, as needed. On most days, the number of cases allows for sign out to be completed by early afternoon, permitting completion of grossing in the late afternoon. The Surgical Pathology resident is responsible for preparing and presenting cases at the Wednesday 4:00 PM GI conference and the Thursday 11:00 AM Surgery conference. He/she is expected to attend the regularly scheduled surgical pathology, cytopathology, autopsy and clinical pathology resident teaching conferences (as detailed elsewhere). The resident on the Surgical Pathology Service is also expected to cover the Autopsy Service on an emergency basis and train junior residents on their first autopsy rotation.

### **Resident Supervision and Evaluation:**

Supervision of performance is provided by the Rotation Director and attending pathologists. The residents are evaluated as to their progress by the Service Director and attending pathologists and are given verbal feedback during the rotation and a formal written evaluation at the end of the rotation and/or period of training.

## **DERMATOPATHOLOGY COMPONENT**

### **Detailed Goals and Objectives:**

During the Surgical Pathology rotation at the VAMC, the resident is to achieve a set of competencies in dermatopathology based on the six ACGME core competency areas. The following are competencies to be mastered by each resident, with the ACGME core competency area(s) to which each competency applies. Because special emphasis will be placed on dermatopathology competencies when more senior residents are on this rotation, the competencies are all considered appropriate for Skill Level II residents.

1. The resident will be familiar with the proper gross dissection and description of dermatopathologic specimens.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**
2. The resident will be able to develop a differential diagnosis in all dermatopathologic cases and will be able to establish a definitive diagnosis in dermatopathologic cases commonly encountered on a general surgical pathology service.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**

3. The resident will have a working understanding of the use of immunohistochemical and other special stains used to evaluate common dermatologic diseases.  
(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)
4. The resident will be able to produce an accurate, clear, and concise report in dermatopathologic cases.  
(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement; Competency IV, Interpersonal and Communication Skills; Competency V, Professionalism)

#### **Resident Duties and Responsibilities:**

The resident is responsible for previewing and signing out dermatopathologic cases as encountered during his/her regular surgical pathology sign-out. For routine dermatopathologic cases, sign-out with the surgical pathology attending regularly assigned to the case will be considered sufficient. For any more challenging and/or unusual dermatopathologic cases, the resident will, with the concurrence of the surgical pathology attending, seek out the subspecialty opinion of and review the case with Dr. Wen Chen. The resident is expected to review dermatopathologic study set slides and PowerPoint-type presentations on dermatopathologic topics provided by the department. In addition, all residents on the Surgical Pathology Service at the VAMC are expected to regularly attend the Dermatopathology conferences held at the VAMC during the month(s) of rotation.

#### **Resident Supervision and Evaluation:**

Overall supervision and evaluation of the resident's performance is provided by the Surgical Pathology Rotation Director, attending pathologists, and particularly by Dr. Wen Chen for dermatopathologic cases. At the conclusion of the rotation, a detailed written performance evaluation is completed, using the E\*Value system, by the Rotation Director and reviewed with the resident, with particular attention to competency in dermatopathology for more senior residents.

## ROTATION: CYTOPATHOLOGY – GWU Hospital

Facility: GWU Hospital

Duration: 3 months

Teaching Staff: Sana Tabbara, M.D. (Rotation Director); M. Katayoon Rezaei, M.D. (Service Chief); Michael Stamatakos, M.D.; Lysandra Voltaggio, M.D.

### Overall Goals and Objectives:

The overall goal of the Cytopathology rotation is for residents build a strong base in the discipline of cytopathology and become acquainted with the standard and special technical and diagnostic aspects of cytopathology.

### Detailed Goals and Objectives:

The resident on the Cytopathology rotation is to achieve a set of competencies based on the six ACGME core competency areas. The following are competencies to be mastered by each resident, with an indication of the level of trainee (Skill Level I or II) expected to master each competency and the ACGME core competency area(s) to which each competency applies.

### Skill Level I Residents:

1. The resident understands the importance of verifying the accuracy of the information provided on the requisition form, slide labels and working drafts, and reconciling any discrepancy.  
**(Competency I, Patient Care; Competency II, Medical Knowledge)**
2. The resident has adequate knowledge of cytopathology preparatory techniques, and appropriate submission of various samples.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**
3. The resident understands the importance of proof reading the final report draft and is attentive to the accuracy and details of ALL the information provided in the body of the report.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency IV, Interpersonal and Communication Skills; Competency V, Professionalism)**

4. The resident has a working knowledge of the latest Bethesda System terminology in reporting Gyn Cytology.  
(Competency I, Patient Care; Competency II, Medical Knowledge; Competency IV, Interpersonal and Communication Skills; Competency VI, Systems-Based Practice)
5. The resident is able to properly recognize LSIL and HSIL in both conventional and liquid-based preparations.  
(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)
6. The resident is able to properly recognize infectious organisms in cervical cytologic preparations.  
(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)

**Skill Level II Residents:**

7. The resident is able to construct a reasonable differential diagnosis in evaluating body cavity fluid samples and can distinguish most cases of metastatic carcinoma and other malignant neoplastic cells from reactive mesothelial cells.  
(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)
8. The resident is able to construct a reasonable differential diagnosis in evaluating medical cytology samples (including urinary, respiratory, GI system specimens and preparations).  
(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)
9. The resident is able to recognize Pneumocystis (PCP) in preparations stained with DQ, Pap and GMS stains.  
(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)
10. The resident understands the importance of and can conduct cyto-histologic correlation.  
(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement; Competency V, Professionalism; Competency VI, Systems-Based Practice)
11. The resident is able to communicate clearly with clinicians.  
(Competency I, Patient Care; Competency IV, Interpersonal and Communication Skills; Competency V, Professionalism; Competency VI, Systems-Based Practice)
12. The resident is familiar with the technical aspects of and is capable of performing the fine-needle aspiration (FNA) procedure.  
(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement; Competency IV)

13. In the performance of FNAs, the resident shows good bedside manner, is able to clearly explain the FNA procedure to the patient, demonstrates the appropriate level of confidence, and is able to make the patient feel comfortable and relaxed during the FNA procedure.  
**(Competency I, Patient Care; Competency III, Practice-Based Learning & Improvement; Competency IV, Interpersonal and Communication Skills; Competency V, Professionalism)**
14. The resident has acquired appropriate knowledge in the interpretation of FNAs of various organ systems.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**
15. The resident is able to use the laboratory information system to produce and edit reports, search for laboratory data and previous pathology reports on individual patients, and order stains and perform other functions relevant to cytopathology.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement; Competency VI, Systems-Based Practice)**
16. The resident understands the role of special diagnostic techniques, including cytochemistry, immunocytochemistry, flow cytometry, electron microscopy, and molecular analysis, in the work-up of a cytology case.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**
17. The resident is able to properly complete a cytopathology report using clear and concise language and incorporating all necessary elements, including, when appropriate, a comment which provides clarification of the diagnosis and/or guidance to the clinician regarding management of the patient.  
[Note: The goal is for the resident to produce essentially letter-perfect reports that require minimal or no modification by the attending pathologist.]  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement; Competency IV, Interpersonal and Communication Skills; Competency V, Professionalism)**
18. The resident has a general knowledge of laboratory management issues relevant to cytopathology.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement; Competency V, Professionalism; Competency VI, Systems-Based Practice)**
19. The resident has a working knowledge of regulatory and accreditation requirements contained in the CLIA 88 regulations, current proficiency testing requirements, the departmental quality assurance measures and activities, and the requirements for retention of patient materials (negative Gyn, positive Gyn, non-Gyn microscopic slides, reports, etc.).  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement; Competency V, Professionalism; Competency VI, Systems-Based Practice)**

## **Resident Duties and Responsibilities:**

The resident's basic responsibilities include previewing and signing out cases, performing fine needle aspirations, and organizing the weekly Cytopathology Conference. The resident is exposed to a balanced variety of cytologic material. Fundamental issues relating to attention to details, evaluation of the technical quality of the cytologic preparations, elimination of discrepancies, sense of responsibility, and the need to compose readable and relevant reports are emphasized. The resident has ready access to and is encouraged to utilize study sets, textbooks, journals, and other publications in augmenting the clinical work performed during the rotation. The resident is also encouraged to participate in research activities.

### Daily Resident Assignments:

The resident reviews gynecologic, medical, fine needle aspiration and consultation cases and renders his/her opinion in writing. The gynecologic cases include abnormal smears (reactive change and worse), 10% of negative cases, as well as all negative smears from patients with a newly diagnosed high-grade lesion or carcinoma. All cases are signed-out with the fellow and/or attending pathologist during daily sign-out sessions at the multi-headed microscope. Learning to screen cytologic preparations is also fundamental in cytology, and the residents are assigned to screen non-gynecologic material.

### Role of the Resident as a Consultant:

The resident interacts with clinicians and learns to demonstrate the right degree of comfort when discussing aspects of cases. The resident communicates and discusses all malignant, infectious, suspicious and interesting diagnoses with the clinical staff. The Cytopathology fellow and attending staff members are available for back-up or further discussion, as necessary.

### Role of the Resident in Performing Fine Needle Aspirations (FNAs):

The resident learns the technique of fine needle aspiration and performs the procedure with appropriate supervision by the fellow and/or staff cytopathologist. The importance of localizing the lesion and getting adequate material is stressed as integral to reaching a correct diagnosis. Thyroid, breast, lymph node, salivary gland, and palpable soft tissue lesions are the most commonly aspirated sites in our department. Fine needle aspiration of internal organs and nonpalpable deep-seated lesions is performed by radiologists under roentgenographic or ultrasonic guidance. The residents have the opportunity to attend these procedures.

### Role of the Resident in Cytohistologic Correlation:

The Cytopathology and Surgical Pathology Services interact very closely, as most staff members involved in Cytopathology are also involved in Surgical Pathology. The laboratory information system automatically shows if a patient has any current or previous surgical pathology specimens. As part of the quality assurance program, cyto-histologic correlation is obtained on all suspicious, malignant, premalignant, and interesting cases. All cases showing a discrepancy are reviewed and discussed during the weekly Cytopathology Conference. The resident is integrally involved in all cyto-histologic correlation activities, assisting the fellow and attending cytopathologists in the identification and review of relevant cases.

### Differences in the Roles of the Resident and Fellow:

The daily workload in Cytopathology is shared by the resident(s) and the fellow on the service. Because the fellow spends a full year on the service, he/she is granted more independence, is responsible for coordinating the quality assurance activities, oversees the various cytopathology conferences, and toward the end of the fellowship is responsible, along with attendings, for teaching the residents.

### **Resident Supervision and Evaluation:**

Supervision of the resident is provided by the Rotation Director and attending pathologists. The residents are evaluated as to their progress by the Service Director and attending pathologists and are given verbal feedback during the rotation and a formal written evaluation at the end of the rotation and/or period of training.

## ROTATION: FORENSIC PATHOLOGY – OCME, DC

Facility: Office of the Chief Medical Examiner of the District of Columbia (OCME, DC)

Duration: 1 month

Teaching Staff: Marie-Lydie Pierre-Louis, M.D. (Chief Medical Examiner); Deputy Medical Examiners; Staff of the Medical Examiner's Office.

### Overall Goals and Objectives:

The overall goals of this rotation are for the resident to learn the procedures and operations of the Chief Medical Examiner's Office, how to perform forensic and medical-legal autopsies, how to perform death scene investigation, and how to apply toxicologic and other special laboratory methods to forensic investigations.

### Detailed Goals and Objectives:

The resident on the Forensic Pathology rotation is to achieve a set of competencies based on the six ACGME core competency areas. The following are competencies to be mastered by each resident, with the ACGME core competency area(s) to which each competency applies. This rotation is typically done by more senior residents (during the second, third, or fourth year of training) and the competencies are, thus, all considered appropriate for Skill Level II residents.

1. The resident develops an understanding of the role of forensic analysis in the investigation of death and the importance of forensic investigation to public health, law enforcement, the criminal justice system, and society in general.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency V, Professionalism; Competency VI, Systems-Based Practice)**
2. The resident understands the criteria for designating a case as requiring investigation by a medical examiner or coroner.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement; Competency V, Professionalism; Competency VI, Systems-Based Practice)**
3. The resident is able to perform the external examination and dissection of organs and to properly describe the findings in a forensic autopsy.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement; Competency IV, Interpersonal and Communication Skills)**

4. The resident is able to identify, properly examine, and categorize traumatic injuries encountered in forensic autopsies, including contusions, incisions, lacerations, stab wounds, thermal and chemical burns, electrical injuries, gunshot wounds, and other traumatic injuries.  
(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement; Competency IV, Interpersonal and Communication Skills)
5. The resident is able to properly categorize a death as being natural, accidental, self-inflicted, or the result of homicide.  
(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)
6. The resident is familiar with the general principles of and common procedures used in forensic death-scene investigation.  
(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)
7. The resident is familiar with the role of toxicologic, molecular, and other special laboratory analyses in the forensic investigation of death.  
(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)
8. The resident is generally familiar with the legal aspects of forensic investigation and the principles of giving testimony in court proceedings.  
(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement; Competency IV, Interpersonal and Communication Skills; Competency V, Professionalism; Competency VI, Systems-Based Practice)

#### **Resident Duties and Responsibilities:**

During this rotation, the resident is to assist in and perform forensic and medical-legal autopsies and selected death scene investigations under supervision of the staff of the DC Office of the Chief Medical Examiner.

#### **Resident Supervision and Evaluation:**

Supervision and evaluation of each resident's rotation rests with staff pathologists at the DC Office of the Chief Medical Examiner, under the overall supervision of the DC Chief Medical Examiner, who submit a detailed written evaluation of the resident's performance, using the E\*Value system, at the conclusion of the rotation.

## ROTATION: PEDIATRIC ANATOMIC PATHOLOGY – CNMC

Facility: Children's National Medical Center (CNMC)

Duration: 1 month

Teaching Staff: Ashley Hill, M.D. (Chief of Anatomic Pathology); Emily Howard, M.D.;  
Christine Reyes, M.D. (Rotation Director); Christopher Rossi, M.D.

### **Overall Goals and Objectives:**

The overall goal is for the resident to become familiar with pediatric surgical pathology, hematopathology, and autopsy procedures and the pathologic diagnosis of major diseases affecting pediatric patients.

### **Detailed Goals and Objectives:**

This rotation is designed for the resident who has already completed some surgical pathology, hematopathology, and autopsy pathology training at his/her primary institution. The specific goals and objectives of this rotation are identical to those for the adult surgical pathology, hematopathology, and autopsy pathology rotations, but modified to apply to diseases commonly encountered in children, and are based on the six ACGME core competencies. Because this rotation is done by more senior (second-, third-, or fourth-year) residents, all competencies to be mastered are considered appropriate for Skill Level II residents.

### **Resident Duties and Responsibilities:**

The resident's duties include gross dissection and dictation at the surgical pathology bench and microscopic examination of all surgical pathology and hematopathology cases encountered. The resident will also assist in prosection in pediatric autopsies. The resident is expected to utilize the extensive study set material on pediatric anatomic pathology available at the CNMC. The resident is required to attend the weekly conference for intradepartmental review of cases. The resident is also strongly encouraged to attend and asked to assist in case presentations at the multidisciplinary conferences (renal, muscle, neuropathology, cardiology, GI, general surgery, NICU, PICU, hematology-oncology) held at the CNMC. Opportunities for participation in a research project in pediatric pathology are provided.

### **Resident Supervision and Evaluation:**

The resident is supervised and evaluated by the Rotation Director and the attending pathologists. The Rotation Director provides a written evaluation of the resident's performance, using the E\*Value system, at the conclusion of the rotation.

### III. CLINICAL PATHOLOGY ROTATIONS

## CLINICAL PATHOLOGY ROTATIONS AT THE GWU HOSPITAL: OVERVIEW

### GENERAL INFORMATION

#### General Responsibilities of Clinical Pathology (CP) Residents at the GWU Hospital:

- A. The CP resident is expected to be accessible at all times during regular working hours, from 8:00 AM to 5:00 PM, Monday through Friday. If the resident is away from the service for any reason, he/she should arrange coverage and inform the appropriate laboratory(ies) who is covering and for how long. This pertains to administrative absences as well as sick and annual leave. Under some circumstances, the chief of the service may require longer or different hours of attendance, as needed.
- B. CP residents should meet regularly with, and perform tasks assigned by, the Chief of the service to which they are assigned. The time and frequency of meetings will be determined by the Chief of the service and the need for consultation on specific cases.
- C. In order to provide effective liaison between clinical services and the laboratory, CP residents are expected to periodically attend various clinical activities, such as work rounds, grand rounds, morning report, etc.
- D. CP residents are expected to provide support for the reporting of critical laboratory values to the clinical services. For the reporting of critical values for outpatients and discharged inpatients, the resident will be asked to report critical results to the appropriate clinician or ancillary staff member according to the guidelines provided for each laboratory section.
- E. CP residents will participate in the review of quality control data, proficiency testing challenges, and other quality assurance materials on the service to which they are assigned.
- F. CP residents will periodically be asked to provide continuing education presentations for medical technologists in the service lab to which the resident is assigned.
- G. During CP rotations, attendance at mandatory Department of Pathology conferences is expected, including:
  - 1. Tuesday, 8:00 a.m. - 10:00 a.m. - Anatomic and Clinical Pathology Didactic Lecture Series (Ross Hall 561).
  - 2. Wednesday, 9:00 a.m. – 10:30 a.m. - Clinical Pathology Case Presentation Conference (Ross Hall 561)
  - 3. 4<sup>th</sup> Thursday of month, 7:30 a.m. - Autopsy Conference (Ross Hall 561).
- H. All CP residents are expected to contribute to maintaining an orderly, professional appearance in the CP Sign-Out room and other work areas.

### CP Laboratory Services:

The Division of Clinical Pathology is headed by Division Director Dr. Louis DePalma, and divided into the following services, each headed by a section chief and/or assistant chief:

- Blood Bank/Transfusion Medicine: Elsie Lee, M.D.
- Clinical Chemistry: Donald S. Karcher, M.D.
- Clinical Immunology: John F. Keiser, M.D., Ph.D.
- Hematology/Coagulation/Urinalysis: Louis DePalma, M.D.
- Medical Microbiology: John F. Keiser, M.D., Ph.D.
- Molecular Diagnostics: Louis DePalma, M.D.  
Alejandro Luiña Contreras, M.D.
- Flow Cytometry: Donald S. Karcher, M.D.

### CP Laboratory Administrative Sections:

The CP laboratories are divided into three administrative sections and two special-function areas:

1. Automated Section: Comprises the Chemistry, Hematology (including Coagulation and Urinalysis), Molecular Diagnostics, and Flow Cytometry Laboratories.
  - Supervisor: Ms. Martha Fales
  - Technical Specialist, Chemistry: Ms. Estella Day
  - Technical Specialist, Hematology: Ms. Martha Fales
2. Non-Automated Section: Comprises the Microbiology and Clinical Immunology Laboratories and Laboratory Client Services.
  - Supervisor: Ms. Terry Costa
  - Technical Specialist, Microbiology: Ms. Salome Mendosa
3. Blood Bank Section.
  - Supervisor: Ms. Faiqa Sadique
4. Point-of-Care Testing and Quality Assurance Area
  - Coordinator: Ms. Cheryl Hackett
5. Laboratory Information System Area
  - Coordinator: Ms. Kathy Hardy

An organizational chart is available from the Director of Laboratories.

### CP Resident On-Call Responsibilities:

- A. Residents are on call for 7 days at a time, beginning each Friday at 5:00 p.m. Call coverage is weekdays from 5:00 PM to 8:00 AM the following day, and all day Saturday, Sunday, and holidays. The on-call resident is responsible for all the clinical laboratory services at the GWU Hospital and Washington VAMC.
- B. All calls regarding Blood Bank/Transfusion Medicine should be recorded on the appropriate audit forms. These forms should be forwarded to the attending clinical pathologist on-call and/or Chief, Transfusion Service on the next regular duty morning for review.
- C. Any difficult problems should be referred to the attending clinical pathologist on-call. The attending is available on the same schedule as the resident. The resident should check in with the GWU Hospital attending on Friday before call begins in order to establish how the attending should be contacted and to be apprised of any problems that may require the resident's attention during the on-call period. In addition, each resident on a Clinical Pathology rotation at GWU Hospital or VAMC should check in with the resident covering CP call to apprise the on-call resident of ongoing cases. This communication should occur on the Friday afternoon when the on-call period begins.
- D. Every reasonable attempt should be made to report critical laboratory results to the ordering physician, covering physician, or appropriate ancillary staff member when asked to do so by any of the clinical laboratories. If the resident is unable to properly report critical laboratory results after hours, this should be followed up immediately the next morning.

## ROTATION: CLINICAL MICROBIOLOGY/SEROLOGY/IMMUNOLOGY – GWU HOSPITAL

Facility: GWU Hospital

Duration: 3 months

Teaching Staff: John Keiser, M.D., Ph.D. (Service Chief)

### Overall Goals and Objectives:

The overall goals of this rotation are for the resident to develop an understanding of:

- the clinical features of, laboratory diagnosis of, and general therapeutic approach to common infectious diseases.
- the principles and use of serologic diagnosis of infectious diseases.
- diseases of the immune system, the effect of common diseases on the immune system, and the use of the laboratory in diagnosis and management of diseases affecting the immune system.

### Detailed Goals and Objectives:

The resident on the Clinical Microbiology/Serology/Immunology rotation is to achieve a set of competencies based on the six ACGME core competency areas. The following are competencies to be mastered by each resident, with an indication of the level of trainee (Skill Level I or II) expected to master each competency and the ACGME core competency area(s) to which each competency applies.

#### Skill Level I Residents:

##### Microbiology and Serology

[Please note that clinical virology is covered during the rotation in the Microbiology Laboratory at Children's National Medical Center.]

1. The resident understands the principle of and basic methods for collection and transport of specimens for identification of bacterial and other pathogens.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**
2. The resident understands the principles of and laboratory methods for performing the Gram stain and can identify most common microorganisms or groups of microorganisms on Gram stains of clinical specimens and cultures.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**

3. The resident understands the principles of, general laboratory methods for, and appropriate applications of other direct microscopic techniques for identification of microorganisms, including the acid-fast stain and dark field and fluorescence microscopy.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**
4. The resident understands the principles of and general laboratory methods for culturing specimens for bacterial identification, including plating and/or inoculating specimens, incubation conditions, protocols for identifying growth of microorganisms, basic identification of colony characteristics, subculturing, and specific identification using biochemical and other methods.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**
5. The resident understands the principles of and general laboratory methods for performing anti-microbial susceptibility testing for common bacterial pathogens. The resident has a general knowledge of the mechanisms of anti-microbial resistance.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**
6. The resident understands the principles of, general laboratory methods for, and appropriate applications of direct antigen testing for bacterial and other pathogens.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**
7. The resident has a working knowledge of the causes, clinical presentation, microbiologic diagnosis, treatment, and prognosis of common pulmonary infections, particularly community-acquired and hospital-acquired pneumonia.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**
8. The resident has a working knowledge of the causes, clinical presentation, microbiologic diagnosis, treatment, and prognosis of common urinary tract infections.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**
9. The resident has a working knowledge of the causes, clinical presentation, microbiologic diagnosis, treatment, and prognosis of common gastrointestinal infections.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**
10. The resident has a working knowledge of the causes, clinical presentation, microbiologic diagnosis, treatment, and prognosis of common infections in the central nervous system.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**

11. The resident has a working knowledge of the causes, clinical presentation, microbiologic diagnosis, treatment, and prognosis of common post-partum and peri-natal infections.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**
12. The resident has a working knowledge of the causes, clinical presentation, microbiologic diagnosis, treatment, and prognosis of common wound and other bacterial skin infections.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**
13. The resident has a working knowledge of mycobacteriology (including the principles of and general laboratory methods for the isolation and identification of mycobacteria) and the clinical presentation, treatment, and prognosis of common mycobacterial infections.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**
14. The resident has a working knowledge of clinical mycology (including the principles of and general laboratory methods for the isolation and identification of fungal pathogens) and the clinical presentation, treatment, and prognosis of common fungal infections.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**
15. The resident has a working knowledge of clinical parasitology (including the principles of and general laboratory methods for the isolation and identification of human parasitic pathogens) and the clinical presentation, treatment, and prognosis of common parasitic infections.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**

**Skill Level II Residents:**

16. The resident understands the principles of, general laboratory methods for, and appropriate applications of molecular DNA and RNA detection in the identification of bacterial and other pathogens, including understanding the use of these methods to quantify the number organisms present (e.g. viral load testing).  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**
17. The resident has a working knowledge of the usual immune responses to infection with common bacterial and other pathogens, including the sequence and evolution of these responses in the course of active infection and the convalescence phase after infection.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**

18. The resident has a working knowledge of the various types of serologic tests used to evaluate for infectious diseases and understands the principles of and general laboratory methods used in performing these tests.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**
19. The resident has a working knowledge of the appropriate use of serologic tests in establishing present or past infection with common bacterial and other pathogens, including which test(s) to perform, when to perform the test(s), and interpretation of the test results.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**
20. The resident has a working knowledge of the serologic diagnosis of syphilis, including diagnosis during the various phases and forms of the disease (e.g. neurosyphilis).  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**
21. The resident has a working knowledge of the serologic and molecular diagnosis of the various types of viral hepatitis, including which test(s) to perform, the appropriate timing of performing these tests, interpretation of the test results, and how to use these results in patient management (including use in monitoring the effects of treatment of hepatitis C).  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**
22. The resident has a working knowledge of the serologic and molecular diagnosis of infection with HIV, including which screening and confirmatory test(s) to perform, the appropriate timing of performing these tests, interpretation of the test results, and how to use these results in patient management (including use in monitoring the effects of anti-retroviral therapy).  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**
23. The resident is able to effectively provide consultation to clinical health care providers in the selection of appropriate microbiologic and serologic tests, interpretation of test results, and appropriate use of these results in the care of their patients.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement; Competency IV, Interpersonal and Communication Skills; Competency V, Professionalism; Competency VI, Systems-Based Practice)**
24. The resident has a general knowledge of the role of the microbiology laboratory in supporting the infection control and safety activities in the hospital.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement; Competency IV, Interpersonal and Communication Skills; Competency V, Professionalism; Competency VI, Systems-Based Practice)**

25. The resident has a general knowledge of the role of the microbiology laboratory in the event of a suspected bio-terrorist attack.  
(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement; Competency IV, Interpersonal and Communication Skills; Competency V, Professionalism; Competency VI, Systems-Based Practice)
26. The resident has a general knowledge of the aspects of laboratory management unique to the microbiology laboratory, including special regulatory and informatics needs.  
(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement; Competency VI, Systems-Based Practice)

### Immunology

1. The resident has a general knowledge of diseases of the immune system, including common immunodeficiency states and autoimmune disorders.  
(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)
2. The resident understands the principles of and general laboratory methods used in testing various aspects of the immune system, including the cellular and humoral components of the immune system.  
(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)
3. The resident has a working knowledge of the common forms of autoimmune disease, including the clinical presentation, laboratory diagnosis, general aspects of treatment, and prognosis of these disorders.  
(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)
4. The resident has a working knowledge of protein electrophoresis and immunofixation electrophoresis (IFE) performed on serum, urine, and cerebrospinal fluid specimens, including an understanding of the principles of and laboratory methods for performing protein electrophoresis and IFE, indications for performing these analyses, and interpretation of the results of these studies.  
(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)
5. The resident is familiar with the aspects of laboratory management unique to the clinical immunology laboratory.  
(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement; Competency IV; Competency VI, Systems-Based Practice)

## Resident Duties and Responsibilities:

The clinical microbiology rotation is based on the following five activities: 1) Weekly bench rotations in the microbiology laboratory, 2) attendance at Infectious Diseases laboratory and ward rounds, 3) case studies from text books and journals, 4) slide reviews, and 5) computer-based CD-ROM learning programs and daily review of selected internet sites. The rotation utilizes a case-based learning program based on the "*Cases in Medical Microbiology and Infectious Diseases*" book by Gilligan et al 2003. This text provides an excellent systematic approach to the pathologic diagnosis of relevant clinical syndromes. The resident participates in at least one working rounds session per week with the Infectious Diseases service, learning the clinical presentation of various diseases.

### Specific Duties:

A. The resident should meet with the Chief of Clinical Microbiology and develop a schedule for rotating on the different technical benches. This is invaluable experience for reading cultures, understanding susceptibility testing, and attaining an in-depth understanding of how the Microbiology Lab works and what daily issues must be solved. The laboratory bench rotations typically occur as follows:

- Week One: Specimen processing, stains, microscopy and LIS.
- Week Two: Respiratory Bench.
- Week Three: Wound and Fluids Bench.
- Week Four: Stools and Miscellaneous.
- Week Five: Blood Cultures and Urines.
- Week Six: Anaerobes/Special Pathogens/Susceptibility Testing.
- Weeks Seven/Eight: Mycology/Mycobacteriology.
- Weeks Nine/Ten: Parasitology.
- Weeks Eleven/Twelve: Serology/Molecular Methods.

B. The following cultures will require the approval of the resident before additional work-ups are done by the laboratory:

- Wound cultures (aerobic and anaerobic) or urine cultures with three or more organisms
- CSF culture requests for M. tuberculosis.
- Urine cultures with colony counts of less than 10,000.

In these situations, the clinician may ask the resident to approve identification and susceptibility testing on all isolates. In each case, the resident should discuss with the clinician the clinical need for identification of the mixed culture, and review the plates and gram stain. The resident will decide which organisms to work-up and which ones to list.

C. The resident provides liaison and coordination for the culture and identification of all unusual or fastidious organisms. This may include consultation regarding proper collection, transport, and media requirements.

D. When necessary, the resident should participate in obtaining specimens at the patient's bedside for special viral, bacterial, and mycotic pathogens.

- E. On Monday's, Wednesday's and Friday's at 1-2 p.m., the resident will review Gram-stains and parasitology slides with the infectious disease team.
- F. The resident should review malaria smears with the Hematopathology resident. The smears are prepared by the Hematology Lab and signed out by the attending on call in consultation with the Chief of Microbiology. A guide to identification of the different Plasmodium species can be found in several textbooks in the residents' room as well as in the Parasitology Lab. The CDC form for reporting malaria infections will be completed by the resident.
- G. The resident should attend Infection Control and Safety Committee meetings.
- H. The resident should attend medicine grand rounds when infectious disease topics are being presented.
- I. The resident should review the acid fast bacilli susceptibility reports and the daily organism isolate reports looking for unusual patterns, discrepancies between the gram stain and the organisms isolated, and unusual or highly resistant organisms.
- J. The Microbiology Lab will ask the resident to help contact physicians in order to report positive cultures.
- K. Every day, a stack of addendum reports on discharged hospital patients will appear on the Microbiology resident's desk. These reports should be reviewed and physicians called if critical results are noted. Positive blood cultures should be called if the patient is still alive. In addition, the reports should be sorted so that the secretaries mail out only those that meet the following criteria:
- Any results with numbers, or that are number-like (e.g., positive vs. negative serology screens).
  - Any pathogen-positive cultures, even if apparently contaminants (including urine cultures with > 3 organisms).
  - Any culture result (positive or negative) involving acid fast organisms or fungi.
  - All neonatal metabolic screens.
  - Any serology result.
  - Any blood bank antibody interpretation report. Do not mail preliminary culture results since the final report will follow shortly.
- L. The resident will review requests for selected tests to be sent to reference labs. Laboratory Client Services will call the Microbiology resident to review requests for unusual or expensive tests which are not performed in-house. In all cases, the resident should contact the clinician and discuss the clinical condition of the patient, the differential diagnosis, and the need or utility of the requested test. Occasionally, the test requested will not provide the needed data, and consultation as to which test should be ordered can be given.

Examples of tests requiring approval include:

- Hepatitis C Viral Load
- Parvovirus B-19 serology.
- HIV-1 by PCR.

- Beta-2-transferrin (to detect CSF leaks).
  - CMV, HSV, Toxoplasmosis culture or PCR on CSF specimens:
  - Review results of glucose, protein and cell counts on the specimen before calling the clinician
  - Legionella IFA, DFA, and Urinary Assays.
  - Histoplasma urinary antigen.
  - Unusual Parasitology Antibody Assays.
  - Other miscellaneous tests if location of the patient is other than that expected for the test, or if the test is very unusual or expensive.
- M. The resident will conduct a Gram-stain review of selected slides for all medical students on electives in Clinical Pathology and for the fourth year students rotating on the Infectious Disease Service.
- N. The resident will review discrepancies between HIV-1/HIV-2 screen and Western blot results.
- O. The resident will review all requests for additional antibiotic susceptibility testing.
- P. The resident will accompany the director on monthly safety rounds in the laboratory as well as selected floors in the hospital.
- Q. The resident will prepare and sign-out with the attending serum, urine, and CSF protein electrophoresis and immunofixation electrophoresis.
- R. The Serology two-week rotation consists of observing the following tests:
- C. difficile Toxin A
  - Cryptococcal Antigen, Qualitative
  - Cryptococcal Antigen, Quantitative
  - Mononucleosis
  - Rapid HIV
  - RPR, Qualitative
  - RPR, Quantitative
  - RPR, Premarital
  - Trepo-MHA
  - VDRL
  - Protein electrophoresis(serum, urine, CSF)

Interpretation of these assays is correlated with their respective clinical presentations.

### **Resident Supervision and Evaluation:**

The Chief of Microbiology/Rotation Director provides supervision and evaluation of the resident. The Rotation Director completes a written evaluation, using the E\*Value system, at the conclusion of the rotation and/or training period.

## ROTATION: HEMATOPATHOLOGY – GWU HOSPITAL

Facility: GWU Hospital

Duration: 4 months

Teaching Staff: Louis DePalma, M.D. (Service Chief and Rotation Director); Donald Karcher, M.D.; Elsie Lee, M.D.

### Overall Goals and Objectives:

The overall goal of the rotation is for the resident to attain clinical competence in hematopathology and hematological aspects of clinical pathology.

### Detailed Goals and Objectives:

The resident on the Hematopathology rotation is to achieve a set of competencies based on the six ACGME core competency areas. The following are competencies to be mastered by each resident, with an indication of the level of trainee (Skill Level I or II) expected to master each competency and the ACGME core competency area(s) to which each competency applies.

### Skill Level I Residents:

1. The resident has a general knowledge of the function of a general hematology laboratory and hematopathology service.  
(Competency I, Patient Care; Competency II, Medical Knowledge)
2. The resident has a good working knowledge of the general mechanisms of common hematologic diseases and is able to correlate the clinical picture, laboratory findings, and morphologic features to construct a reasonable differential diagnosis.  
(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)
3. The resident has a working knowledge of proper collection, handling, fixation (as appropriate), and storage of specimens submitted to the general hematology laboratory and hematopathology service.  
(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)

4. The resident has a working knowledge of the analytical technology and operation of automated cell counters in general, and is capable of analyzing data produced by the cell counters currently used in the Hematology Laboratory (the Advia system).  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**
  
5. The resident is familiar with the morphologic characteristics of normal and common abnormal blood cells and is able to accurately assess peripheral blood smears to verify the WBC differential count and identify the presence of abnormal red cells, white cells, and/or platelets.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**
  
6. The resident has a working knowledge of the common analytical technologies used in the general hematology laboratory, including the routine and special stains used for peripheral blood and bone marrow specimens, reticulocyte count (raw, corrected, and absolute counts), erythrocyte sedimentation rate, Betke-Kleihauer test, and body cavity fluid analysis (total cell counts, cytocentrifuge preparation, differential cell count, and recognition of normal and common abnormal cells).  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**
  
7. The resident has a working knowledge of the analytical technology and interpretation of laboratory tests used to evaluate for hemoglobinopathies and thalassemias, including hemoglobin electrophoresis (including knowing the position of the normal and common abnormal hemoglobins on alkaline and acid gels), methods to accurately quantitate minor hemoglobins (hemoglobins A<sub>2</sub> and F), and screening tests for sickling hemoglobin. The resident is able to correlate the findings in these tests with the patient's clinical picture, CBC findings, and peripheral blood smear morphology to arrive at a correct diagnosis in common hemoglobinopathies and thalassemia syndromes. The resident has a general knowledge of special laboratory analyses that may be used to evaluate for uncommon hemoglobinopathies, including isoelectric focusing and tests for unstable hemoglobins.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**
  
8. The resident has a general knowledge of special laboratory analyses used to evaluate hematologic disease, including red cell enzyme studies for deficiency of G-6-PD and other red cell enzymes, the osmotic fragility test and other methods for diagnosis of red cell membrane disorders (hereditary spherocytosis, etc.), and the glucose hemolysis test and other methods for diagnosis of paroxysmal nocturnal hemoglobinuria.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**

**Skill Level II Residents:**

9. The resident has a working knowledge of the procedure for acquiring bone marrow aspirate and core biopsy specimens and has demonstrated competency in this area by performing at least five such procedures during residency training.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement; Competency IV, Interpersonal and Communication Skills; Competency V, Professionalism)**
  
10. The resident has a working knowledge of bone marrow pathology, including the morphologic assessment of bone marrow aspirates, touch preps, core biopsies, and clot sections. The resident is able to accurately assess bone marrow specimens and correlate the morphologic features with the patient's clinical picture and the results of ancillary studies (including cytochemical, immunohistochemical, flow cytometric, cytogenetic, and molecular analyses).  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**
  
11. The resident has a working knowledge of anemias, other cytopenias, and related conditions, including their classification, pathophysiology, epidemiology, clinical features, morphologic characteristics, laboratory features, and general therapeutic considerations.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**
  
12. The resident has a working knowledge of leukemias, chronic myeloproliferative disorders, myelodysplastic syndromes, and related conditions, including their classification, pathophysiology (especially molecular pathophysiology), epidemiology, clinical features, morphologic characteristics, laboratory features, prognosis, and general therapeutic considerations.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**
  
13. The resident has a working knowledge of the lymphoproliferative disorders, including their classification, pathophysiology (especially molecular pathophysiology), epidemiology, clinical features, morphologic characteristics, laboratory features, prognosis, and general therapeutic considerations. The resident is able to accurately assess lymph node and other specimens involved by lymphoproliferative disorders.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**

14. The resident is able to effectively communicate with clinicians and other health care providers regarding the evaluation and diagnosis of hematologic disorders and can generate clear, concise, and appropriately focused written reports for evaluation of bone marrow, lymph node, and other relevant specimens. [Note: The goal is for residents to produce essentially letter-perfect reports that require minimal or no modification by the attending pathologist.]  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement; Competency IV, Interpersonal and Communication Skills; Competency V, Professionalism)**
15. The resident has a working knowledge of urinalysis, including the analytical technology used to perform general chemical and morphologic assessment of urine specimens and interpretation of the findings of this assessment. The resident is able to accurately identify cells, casts, and other particulate matter present in urine (by microscopic analysis of urine sediment and automated analysis using the Yellow IRIS system).  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**
16. The resident has a general understanding of the aspects of laboratory management unique to the hematology/coagulation/urinalysis laboratories, including quality management, instrument procurement and maintenance, special staffing needs, and regulatory requirements.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement; Competency VI, Systems-Based Practice)**

### **Resident Duties and Responsibilities:**

The resident's duties on this rotation involve review and sign-out of a variety of specimens. The time of sign-out will vary with the daily work load, attending, and other activities. In general, sign-out begins between 1:00-2:00 p.m. Consult with the attending on a daily basis to establish the actual time for that day. The following are the major review and sign-out activities on the service:

- A. Daily evaluation of peripheral blood smears, bone marrow aspirates and biopsies, fluids and hemoglobin electrophoretic patterns. Some specimens are STAT and should be handled at once; otherwise bring to sign-out.
- Peripheral blood smears: Smears with questionable cells or unusual findings will be brought by hematology technologists throughout the day. They will appear on the resident's desk with a copy of the Advia printout. The resident should review the smear, formulate an opinion, and bring the case to the daily sign-out for review by the attending. An interpretive footnote will be written by the attending and signed. After sign-out, the slide and signed sheet should be brought to the lab for the technologist to enter the comment into the computer.
  - Body Cavity Fluids: As for smears, fluid cytopins with questionable cells or unusual findings will be brought by the technologist along with a copy of the cell count. The resident should review the cytopin,

formulate an opinion, and bring the slide and sheet to sign-out. As for smears, the slide and signed sheet should be brought to the lab for the comment to be entered in the computer.

- Malaria smears: Review and speculate. Sign-out with Dr. Keiser and the Microbiology resident, in cooperation with the Hematopathology attending.
- Kleihauer-Betke stains (fetal hemoglobin stains): Assess approximately 5000 cells (20 fields at 50 x oil) and determine percentage of cells containing abundant fetal hemoglobin. The fetal cells are bright pink: the adult cells are "ghosts." This test is used to calculate the dosage of Rhogam or to assess for intrauterine fetal trauma.
- Bone Marrow Aspirates and Biopsies: This represents the bulk of the work on the rotation.
  - (a) The bone marrow paperwork and the aspirate and biopsy slides and peripheral smears will be brought to the CP resident's office.
  - (b) The resident should screen all cases before sign-out and write down his/her impressions.
  - (c) If the patient has HIV/AIDS, quickly review the biopsy for granulomas and, if present, order AFB (Ziehl-Nielsen, not Fite) and GMS stains to be done STAT (i.e., available the same day), using the lab information system.
  - (d) If the patient has previous relevant reports, these should be obtained from the lab information system. If necessary, slides from previous studies should be retrieved prior to sign-out.
  - (e) After sign-out each day, all reports should be dictated as soon as possible. Old reports may be used as examples of the preferred format. The secretary will bring the report the same afternoon or the next day for corrections. The resident is to make corrections in the lab information system and then give the paperwork to the attending.
- B. Hemoglobin Electrophoresis: These are generally run two or three times per week and will appear on the resident's desk along with a peripheral smear. The resident should:
  - a) Assess red cell indices.
  - b) Assess peripheral smear, noting any red blood cell abnormalities.
  - c) Assess gel: First look at alkaline, then acid gel.
  - d) Look at densitometry tracing
  - e) Pertinent history should be obtained (e.g. recent transfusions, iron studies, other studies)
  - f) Sign-out the cases with the attending. If possible prior to sign-out, the percentages of the hemoglobin fractions in each case should be entered into the lab information system.

- C. Evaluation of Surgical Pathology Cases of Lymphoproliferative Disorders: These will be brought up by the Surgical Pathology resident and will be reviewed with the attending hematopathologist. The Hematopathology resident should be present at time of case review.
- D. Approval of Cytogenetic, Flow Cytometric and Molecular Analysis: The Hematopathology resident will be contacted by Lab Client Services to approve these requests. This must be done with an attending hematopathologist.
- E. Bench Rotations: Over the 4-month period, rotation in each laboratory area listed below should occur. These rotations should be arranged with Ms. Martha Fales, Supervisor of the Automated Section.
- Blood smear preparation and staining.
  - Advia theory, operation, quality control, and printout interpretation.
  - Platelet count by phase microscopy, erythrocyte sedimentation rate (Wintrobe and Westergren), reticulocyte staining and counting, LAP staining and counting.
  - Review concept of osmotic fragility test, auto-hemolysis test, Betke-Kleihauer stain and interpretation.
  - Hemoglobin electrophoresis (alkaline and acid), quantitation of hemoglobins A2 and F (column chromatography, and alkali denaturation, respectively).
  - Body cavity fluids: Cell counting, cyto-centrifuge operation, reviewing stained cyto-centrifuge slides, crystal identification by polarized light.
  - Urinalysis - Routine urinalysis by manual methods and the Yellow IRIS.
  - Urinalysis - Confirmatory chemistry tests, urine pregnancy test.

E. Clinical Consultation

1. Critical Results - The resident will be called about critical values. Usually, these have already been called to the floor/clinic/office. The resident should evaluate the result and decide whether clinical consultation is necessary.
  2. Requests for cytogenetic, flow cytometric and molecular diagnostic studies must be approved by the attending hematopathologist. The resident will be contacted by Lab Client Services when such a request is received. The resident should then obtain a peripheral blood or intraoperative consultation smear if possible. These and the relevant paperwork should be brought to the attending who will review the request with the resident and decide which tests (if any) should be performed. The completed requisition should then be returned to Lab Client Services.
- F. Performance of Bone Marrow Aspiration and Biopsy: While on the service, the resident must perform at least 5 bone marrow aspirates and biopsies. The resident should contact the Clinical Hematology fellow to coordinate his/her experience and should notify the Chief of the Hematopathology service whenever such biopsies and aspirates have been performed. Each resident must document this experience using the ACGME Case Log system.

**Resident Supervision and Evaluation:**

The Chief of Hematopathology/Rotation Director provides supervision and evaluation of the resident. The Rotation Director completes a written evaluation, using the E\*Value system, at the conclusion of the rotation and/or training period.

## ROTATION: CLINICAL CHEMISTRY – GWU HOSPITAL AND VAMC

Facility: GWU Hospital and VAMC

Duration: 2 months

Teaching Staff: Elsie Lee, M.D. (Rotation Director), Donald Karcher, M.D., Louis DePalma, M.D., John Keiser, M.D., Ph.D., D. Robert Dufour, M.D.

### Overall Goals and Objectives:

The overall goal of this rotation is for the resident to:

- develop a working knowledge of the major clinical chemical aspects of common disorders
- understand the analytic principles used in common chemical assays and the operating principles of major automated chemical analyzers
- be able to interpret the results of common chemical assays and correlate these results with associated clinical conditions

Training consists of a two-month core rotation during the first or second year of residency. During the rotation, the resident will be expected to acquire a fundamental knowledge of clinical chemistry and automated testing through direct and indirect participation in the day-to-day operation of the Chemistry part of the Automated Laboratory Section in the Clinical Pathology Laboratory. The resident is expected to function as a liaison between the laboratory staff and clinical care providers. The resident is expected to become proficient in the interpretation of chemistry laboratory results through review of cases, readings, preparation of case presentations, and didactic sessions with the teaching staff.

### Detailed Goals and Objectives:

The resident on the Clinical Chemistry rotation is to achieve a set of competencies based on the six ACGME core competency areas. The following are competencies to be mastered by each resident, with an indication of the level of trainee (Skill Level I or II) expected to master each competency and the ACGME core competency area(s) to which each competency applies.

#### Skill Level I Residents:

1. The resident has a good working knowledge of the general biochemical characteristics of common diseases and is able to correlate the clinical picture and laboratory findings to construct a reasonable differential diagnosis.  
(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)

2. The resident has a working knowledge of proper collection, handling, and storage of specimens submitted to the clinical chemistry laboratory.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**
3. The resident has a working knowledge of the analytical technology used in commonly used automated chemical analyzers.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**

**Skill Level II Residents:**

4. The resident has a working knowledge of the analytical technology and interpretation of laboratory tests used for evaluation of the following disorders and/or clinical scenarios:
  - A. Myocardial dysfunction, ischemia, and infarction
  - B. Liver function abnormalities
  - C. Pancreatic dysfunction
  - D. Disorders of lipids, lipoproteins, and apo-lipoproteins
  - E. Endocrine abnormalities
  - F. Serum, urine, and cerebrospinal fluid protein abnormalities
  - G. Disorders of the immune system
  - H. Renal dysfunction
  - I. Acid base imbalance
  - J. Detection and monitoring of malignant neoplasms (tumor markers)
  - K. Toxicologic disorders
  - L. Monitoring of therapeutic drug levels (therapeutic drug monitoring)**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**
5. The resident has a working knowledge of the appropriate use of, analytical technology used in, and laboratory management of point-of-care laboratory testing.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement; Competency VI, Systems-Based Practice)**
6. The resident is able to effectively communicate with clinicians and other health care providers regarding the evaluation and diagnosis of biochemical disorders and is able provide guidance to clinicians in the interpretation and appropriate ordering/use of biochemical assays.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement; Competency IV, Interpersonal and Communication Skills; Competency V, Professionalism; Competency VI, Systems-Based Practice)**

7. The resident has a general understanding of the aspects of laboratory management unique to the clinical chemistry laboratory, including quality management, instrument procurement and maintenance, special staffing needs, and regulatory requirements.  
(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement; Competency VI, Systems-Based Practice)

### Resident Duties and Responsibilities:

#### GWU Hospital

The resident will be expected to perform a number of functions during the hours of 8:00 AM to 5:00 PM, when present at the GWU Hospital (Mon., Tues., Wed., and Fri.). The resident:

1. Should report to the Chemistry Technical Specialist or designee each morning to find out if there are any problems or interesting cases. The Chemistry staff will also forward clinical problems to the resident as they arise during the workday from 8:00 AM to 5:00 PM, Monday through Friday
2. Review the preceding day's exception report for the Chemistry section each weekday morning
3. Review delta check failures that have not been resolved by the chemistry staff
4. Review all high digoxin levels, sub-therapeutic and supra-therapeutic drug monitoring results that appear on the exception report
5. Perform clinical consultations on selected abnormal chemistry laboratory results (by lab initiative) or when requested by the clinical service
6. Provide consultations on the appropriate selection and interpretation of tests
7. Review selected requests for referral of chemistry tests to a reference laboratory, reviewing them for appropriateness and discussing questionable cases with the clinicians
8. Review requests for uncommonly ordered chemistry tests for appropriateness and discuss diagnostic strategies with clinicians
9. Review unusual laboratory results for problems, clinical correlation, and clinically important changes in the patient's condition, and discuss this information with the clinical providers
10. Investigate and report the nature and consequences of laboratory errors for review (as part of the Quality Assurance Committee of the Clinical Pathology Division)
11. Meet with the Clinical Pathology attending physicians and supervisors/technical specialists on a scheduled basis to discuss study topics. Dr. Lee will distribute a list of recommended readings and a didactic session schedule at the beginning of each rotation. It is expected that the resident will have read about each topic before each scheduled session. The topics include:
  - Laboratory principles and instrumentation
  - Point-of-care testing
  - Immunology
  - Therapeutic drug monitoring
  - Toxicology
  - Cardiac profiles
  - Tumor markers
  - Liver function tests
  - Tests of pancreatic function/dysfunction
  - Lipids, lipoproteins, apo-lipoproteins
  - Endocrine studies

- Serum and urine protein electrophoresis and immunofixation electrophoresis
  - Renal function
  - Acid base balance
  - Selected aspects of urinalysis
12. Present current cases and/or problems to attending physicians as the basis for discussion
  13. Perform initial interpretation on all protein electrophoresis and immunofixation electrophoresis
  14. Prepare a case presentation for each weekly GWU Hospital Clinical Pathology Case Conference and a brief case presentation (less than 20 minutes) for the Chemistry Laboratory staff at the end of the two-month rotation
  15. Search for opportunities to participate in research projects on the Chemistry Service

#### VAMC

On each Thursday during the rotation, the resident is to spend the day working with Dr. Robert Dufour at the Washington VAMC. Dr. Dufour will discuss cases with the resident, conduct seminars with the resident and others on his service, and preside over selected conferences (e.g. Endocrinology Conference). The resident is expected to participate fully in all of these activities and to complete any work assignments given by Dr. Dufour.

#### **Resident Supervision and Evaluation:**

Supervision of the resident on this rotation is provided by the Rotation Director and other attending pathologists. The Rotation Director provides a written evaluation of the resident's performance, using the E\*Value system, at the conclusion of the rotation and/or training period.

## ROTATION: TRANSFUSION SERVICE/COAGULATION – GWU HOSPITAL

Facility: GWU Hospital

Duration: 3 months

Teaching Staff: Elsie Lee, M.D. (Rotation Director); Louis DePalma, M.D.

Note: During this rotation, the resident will cover both the Blood Bank and Coagulation Laboratories.

### TRANSFUSION SERVICE

Teaching Staff: Elsie Lee, M.D. (Transfusion Medicine Service Chief); Louis DePalma, M.D (Coagulation)

#### **Overall Goals and Objectives:**

The major goals of this part of the rotation involve the following three principal subject areas:

- Immunohematology
- Transfusion therapy
- Adverse effects of transfusion.

#### **Detailed Goals and Objectives:**

The resident on the Transfusion Medicine part of this rotation is to achieve a set of competencies based on the six ACGME core competency areas. The following are competencies to be mastered by each resident, with an indication of the level of trainee (Skill Level I or II) expected to master each competency and the ACGME core competency area(s) to which each competency applies.

#### **Skill Level I Residents:**

1. The resident has a working knowledge of the principles of the ABO and Rh blood group systems and their significance in transfusion medicine.  
(Competency I, Patient Care; Competency II, Medical Knowledge)
2. The resident understands the significance of red blood cell allo- and autoantibodies in transfusion practice, including the special significance in pregnancy.  
(Competency I, Patient Care; Competency II, Medical Knowledge)
3. The resident understands the principles of and laboratory methods for blood group testing.  
(Competency I, Patient Care; Competency II, Medical Knowledge)

4. The resident understands the principles of and laboratory methods for antibody screening and identification.  
**(Competency I, Patient Care; Competency II, Medical Knowledge)**
5. The resident understands the principles of and laboratory methods for compatibility testing (crossmatching) of blood products.  
**(Competency I, Patient Care; Competency II, Medical Knowledge)**
6. The resident has a working knowledge of the major blood group systems, the frequency of the antigens in different populations, chemistry and genetics of the system, clinical significance, and the methods used in detecting antibodies against the important antigens.  
**(Competency I, Patient Care; Competency II, Medical Knowledge)**

**Skill Level II Residents:**

7. The resident understands the indications for transfusion of and has a working knowledge of dose calculations, monitoring methods, and administration techniques for RBCs, FFP, platelets, cryoprecipitate, Rh immune globulin, and factor VIII concentrates.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**
8. The resident has a working knowledge of the pathophysiology, epidemiology, diagnosis, prevention strategies, and management of the major types of adverse reactions to transfusion, including those in the following categories: Immunologic, infectious, physical, metabolic.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**
9. The resident understands the operation of a blood donor facility, including the principles and major techniques of donor selection and the collection, processing, testing, and storage of blood products.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement; Competency VI, Systems-Based Practice)**
10. The resident is familiar with the principles and practice of quality control and quality assurance (including the principles of good manufacturing practice) unique to the blood bank.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement; Competency VI, Systems-Based Practice)**
11. The resident is able to function effectively as a liaison between the Transfusion Service technical staff and clinical health care providers.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency IV, Interpersonal and Communication Skills; Competency V, Professionalism; Competency VI, Systems-Based Practice)**

12. The resident is able to function effectively as a consultant on the Transfusion Service, including the ability to gather pertinent clinical data, integrate patient history and laboratory findings, and provide advice to clinical health care providers regarding the appropriate use of blood products in the care of their patients.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement; Competency IV, Interpersonal and Communication Skills; Competency V, Professionalism; Competency VI, Systems-Based Practice)**
13. The resident understands the principles of blood product inventory management and is able to effectively communicate with clinical health care providers regarding the availability and appropriate use of special blood products (e.g. CMV negative, irradiated, leucoreduced, volume-reduced, washed, etc.).  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency IV, Interpersonal and Communication Skills; Competency V, Professionalism; Competency VI, Systems-Based Practice)**
14. The resident understands the laboratory approach to diagnosis and management of platelet transfusion refractoriness.  
**(Competency I, Patient Care; Competency II, Medical Knowledge)**
15. The resident understands the technologies, medical indications, and patient management protocols for therapeutic apheresis procedures.  
**(Competency I, Patient Care; Competency II, Medical Knowledge)**
16. The resident understands the technologies, medical applications, and standards for procuring, testing, and use of hematopoietic stem cells and progenitor cells obtained by bone marrow harvesting, peripheral blood apheresis, and umbilical cord blood processing.  
**(Competency I, Patient Care; Competency II, Medical Knowledge)**
17. The resident understands the role of the transfusion service director in prospectively and retrospectively auditing transfusion events for clinical appropriateness and is able to effectively perform prospective and retrospective audits.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement; Competency IV, Interpersonal and Communication Skills; Competency V, Professionalism; Competency VI, Systems-Based Practice)**
18. The resident understands the role of the transfusion service director in providing leadership, advice, and/or statistical data to support the activities of the medical staff group that monitors transfusion service practices in the hospital (e.g. Transfusion Advisory Committee or similar group).  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement; Competency IV, Interpersonal and Communication Skills; Competency V, Professionalism; Competency VI, Systems-Based Practice)**

19. The resident has a general knowledge of the special regulatory requirements of transfusion services and blood donor facilities, including the special information system requirements, as mandated by the FDA, AABB, CAP, Joint Commission, ISO, and OSHA .  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement; Competency VI, Systems-Based Practice)**
20. The resident is able to effectively provide teaching services to technologists, students, house officers, and other clinical health care providers in the area of transfusion medicine and blood banking.  
**(Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement; Competency IV, Interpersonal and Communication Skills; Competency V, Professionalism; Competency VI, Systems-Based Practice)**

### **Resident Duties and Responsibilities:**

The following are the major duties and responsibilities of the resident on this part of the rotation:

1. Review exceptions to the Maximum Surgical Blood Order Schedule (MSBOS); review the OR posting daily and consult with physicians to assist technical staff in coordinating preparation of blood orders for operating room.
2. Review all questionable requests for FFP, platelets, and cryoprecipitate, consulting with the requesting physicians as needed to plan optimal transfusion therapy.
3. Consult with requesting physicians when blood shortages may require delay in surgery or transfusion, or when an order cannot be completely provided due to unavailability of a product (single-donor platelets, CMV-negative, etc.).
4. Monitor and consult in cases of massive transfusion.
5. Review all questionable requests for HLA-matched components, CMV-negative components, granulocyte concentrates, irradiated components, and washed cells.
6. Review antibody panels and compatibility problems. Review problems with autologous and directed-donor transfusions.
7. Review all transfusion reaction reports and participate in laboratory and clinical management cases as necessary.
8. Participate in the interpretation of work-ups for hemolytic disease of the newborn, including amniocentesis and antibody evaluation.
9. Attend meetings on treatment of hematologic diseases, such as Heme-Onc and Coagulation rounds and Bone Marrow Transplantation Conference.

10. Review cases of transfusion-transmitted diseases (HIV, Hepatitis, etc.), recalls, and lookbacks in consultation with the Chief of the Transfusion Service.
11. Audit transfusion events for appropriateness according to the screening criteria for retrospective (ER, OR) and prospective review. In order to complete this evaluation, it may be necessary to review the patient's chart and/or obtain additional information from the clinicians. For each audit, fill out a review form and turn it in to the Chief of Service for review.
12. The resident will review the results of the periodic review of transfusion practices for the Transfusion Advisory Committee of the hospital.
13. Prepare and present relevant cases and topics at the Wednesday CP teaching conference.
14. Participate in medical student teaching program, particularly for the MS-4 students doing elective rotations in Blood Banking and/or Clinical Pathology.
15. Satisfactorily complete technical methods training outlined in the Syllabus including a 2 to 3 day rotation at the American Red Cross Blood Center and a visit to one of the regional stem cell laboratories.

#### **Resident Supervision and Evaluation:**

Supervision of the resident on this part of the rotation is provided by the Chief of the Transfusion Medicine Service. The Chief of Transfusion Medicine provides a written evaluation of the resident's performance, using the E\*Value system, at the conclusion of the rotation and/or training period.

#### **COAGULATION SERVICE**

Facility: GWU Hospital

Duration: 2 weeks (during the GWU Hospital Transfusion Service Rotation)

Teaching Staff: Louis DePalma, M.D. (Chief, Hematopathology Service)

#### **Overall Goals and Objectives:**

The overall goal of this part of the rotation is for the resident to acquire a working knowledge of diseases of the hemostatic/coagulation system and a working knowledge of clinical coagulation testing and consultation.

### Detailed Goals and Objectives:

The resident on the Coagulation part of this rotation is to achieve a set of competencies based on the six ACGME core competency areas. The following are competencies to be mastered by each resident, with an indication of the level of trainee (Skill Level I or II) expected to master each competency and the ACGME core competency area(s) to which each competency applies. [Note: Although the formal rotation on the Coagulation Service lasts only two weeks, the resident continues to encounter hemostatic/coagulation disorders while on other rotations (e.g. Transfusion Medicine, Hematopathology) and on-call; the determination of the skill level of the resident that should master each competency is based on that continuing exposure and not simply on the two-week formal rotation.]

#### Skill Level I Residents:

1. The resident has a general knowledge of the normal biochemistry and physiology of coagulation and other mechanisms for maintenance of hemostasis.  
**(Competency I, Patient Care; Competency II, Medical Knowledge)**
2. The resident has a general knowledge of the major analytical technologies used in coagulation and hemostasis testing. The resident is familiar with the major types of reagents and instruments used in coagulation testing and the importance of the reagent-instrument combination in determining the sensitivity and specificity of testing.  
**(Competency I, Patient Care; Competency II, Medical Knowledge)**
3. The resident has a working knowledge of the proper collection, anticoagulation, handling, and storage of specimens for coagulation and hemostasis testing.  
**(Competency I, Patient Care; Competency II, Medical Knowledge)**
4. The resident is familiar with the common causes of abnormal results with the major routine tests used to evaluate for coagulation and hemostasis disorders, including the PT, APTT, TT, fibrinogen assay, D-dimer, and template bleeding time. The resident is able to recommend the appropriate special tests that should be done to confirm the diagnosis of major disorders of coagulation and hemostasis.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency IV, Interpersonal and Communication Skills)**

#### Skill Level II Residents:

5. The resident is familiar with the pathophysiology, clinical characteristics, epidemiology, laboratory features, and general therapeutic considerations of the major causes of inherited and acquired coagulation factor deficiencies, inhibitors, and dysfunction, including the hemophilias, von Willebrand's disease (inherited and acquired), DIC, liver dysfunction, the anti-phospholipid (Lupus-like) anticoagulant, and dysfibrinogenemia, and is able to direct and interpret the laboratory evaluation of these disorders.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**

6. The resident is familiar with the pathophysiology, clinical characteristics, epidemiology, laboratory features, and general therapeutic considerations of the major hypercoagulable disorders, including deficiencies of factor C, factor S, and ATIII, and factor V Leiden syndrome, and is able to direct and interpret the laboratory evaluation of these disorders.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**
7. The resident is familiar with the pathophysiology, clinical characteristics, epidemiology, laboratory features, and general therapeutic considerations of the major inherited and acquired disorders associated with platelet dysfunction and is able to direct and interpret the laboratory evaluation of these disorders (with special emphasis on the use and interpretation of platelet aggregometry studies).  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**
8. The resident has a working knowledge of how coagulation laboratory testing is properly used to monitor anticoagulant and antithrombotic therapy, including the concept of ISI for thromboplastin reagents and the use of the PT/INR, APTT, and anti-Xa assay.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**
9. The resident has a working knowledge of how coagulation and hematology laboratory testing are properly used in the management of blood component therapy.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement; Competency VI, Systems-Based Practice)**
10. The resident has a working knowledge of how the D-dimer test is properly used in the evaluation and diagnosis of deep venous thrombosis and pulmonary embolus.  
**(Competency I, Patient Care; Competency II, Medical Knowledge)**
11. The resident is able to effectively provide consultation to clinicians and other health care providers in the evaluation and management of disorders of coagulation and hemostasis.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement; Competency IV, Interpersonal and Communication Skills; Competency V, Professionalism; Competency VI, Systems-Based Practice)**

#### **Resident Duties and Responsibilities:**

At the beginning of the first month on the Transfusion Medicine rotation, the resident should meet with Dr. DePalma to set up the rotation on the Coagulation Service. Time at the bench can be arranged with the senior technologists. During the rotation, the resident is responsible for gaining an understanding of the following areas, through readings, discussion sessions, bench rotations, and management of ongoing cases encountered while on the rotation:

1. Methods:
  - a) Instrumentation
    - Principles
    - Operation
    - Quality Control
    - Administrative Issues
    - Background/Journal reading
  - b) Reagents
    - Biologics and the concept of standardization
    - Recombinant reagents
    - Evaluation of reagent-instrument combination
    - Quality Control
    - Administrative issues
    - Background/Journal reading
2. Tests:
  - a) Principles
    - Sensitivity, specificity and predictive value
    - Responding to clinicians' requests and needs
    - Point of care testing
    - Standardization and proficiency testing issues
  - b) Clinical Consultation Coagulation Test Interpretation:
    - congenital vs. acquired disorders
    - Work-up of elevated PTT
    - LAC and ACL
    - Factor Deficiencies
    - Factor Inhibitors
    - Work-up of DIC
    - Platelet Dysfunction
    - Congenital coagulopathies
    - Anti-coagulant and anti-thrombotics monitoring
  - c) The use of Coagulation Laboratory in blood component therapy and the role of the clinical consultant.
3. Management:
  - Operating budget
  - Capital equipment
  - Total quality management
  - Joint Commission, CAP, etc.
  - Personnel Issues

### **Resident Supervision and Evaluation:**

Supervision of the resident on this part of the rotation is provided by the Chief of the Hematopathology Service. The Chief of Hematopathology provides a written evaluation of the resident's performance, using the E\*Value system, at the conclusion of the rotation and/or training period.

## ROTATION: MOLECULAR DIAGNOSTICS AND FLOW CYTOMETRY – GWU HOSPITAL

Facilities: GWU Hospital

Duration: 1-month, concurrent on both the Molecular Pathology and Flow Cytometry Services

### MOLECULAR DIAGNOSTICS SERVICE

Teaching Staff: Louis DePalma, M.D. (Service Chief and Rotation Director); Alejandro Luiña Contreras, M.D. (Assistant Service Chief)

#### Overall Goals and Objectives:

The overall goal of this rotation is to provide the resident with experience in the performance and interpretation of basic techniques used in a diagnostic molecular pathology laboratory. These include DNA and RNA isolation, Southern blot analysis, and polymerase chain reaction. General topics covering the basic principles of DNA isolation, detection of gene rearrangements, polymerase chain reaction amplification and their clinical utility will be discussed with the resident.

#### Detailed Goals and Objectives:

While on this part of the rotation, the resident is to achieve a set of competencies based on the six ACGME core competency areas. The following are competencies to be mastered by each resident, with the ACGME core competency area(s) to which each competency applies. This rotation is typically done by more senior residents (during the second, third, or fourth year of training) and the competencies are, thus, all considered appropriate for Skill Level II residents.

1. The resident has a general knowledge of the basic molecular biology of DNA, RNA, and genes, including DNA and RNA structure, physical chemistry of nucleic acids, DNA and RNA hybridization, DNA replication and repair, gene structure, transcription, RNA processing, translation, post-translational modification, and regulation of gene expression.  
(Competency I, Patient Care; Competency II, Medical Knowledge)
2. The resident understands the basic laboratory methodologies of DNA and RNA analysis, including collection and storage of specimens, isolation and quantitation of DNA, the composition and function of probes and primers, solid-phase and solution hybridization methods, endonuclease digestion, amplification methods (PCR, RT-PCR, and non-PCR), transfer (blotting) techniques, gel electrophoresis, nucleic acid detection/visualization methods, and microchip array technology.  
(Competency I, Patient Care; Competency II, Medical Knowledge)

3. The resident can interpret the findings of standard DNA and RNA analyses used in clinical diagnosis, including Southern blot, PCR, RT-PCR, and "liquid" hybridization and amplification studies (e.g. amplification-based assay for Chlamydia/Gonococcus infection).  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**
4. The resident has a working knowledge of the common clinical indications for performing molecular analysis in evaluation of neoplastic, infectious, and inherited disorders and in histocompatibility testing.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement; Competency VI, Systems-Based Practice)**
5. The resident knows the expected molecular analytical findings associated with common neoplastic, infectious, and inherited disorders and how these findings can contribute to diagnosis, treatment, and/or prediction of prognosis of these disorders.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**
6. The resident has a working knowledge of the basic laboratory techniques of cytogenetic and fluorescence in-situ hybridization (FISH) analysis and can provide basic interpretation of these studies.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**
7. The resident is familiar with the management issues unique to a molecular diagnostics laboratory, including quality control, instrument and reagent acquisition, maintenance, and regulatory requirements.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency VI, Systems-Based Practice)**

#### **Resident Duties and Responsibilities:**

The resident is expected to participate in the following activities:

1. Bench rotation for learning the basic principles of molecular techniques.
2. Participation in decision-making for selection of diagnostic assays requested by physicians (collection of clinical, morphologic, and immunophenotypic data).
3. Observation of performance of DNA isolation, quantification, gel electrophoresis and PCR amplification.
4. Review with the service chief and sign-out of molecular diagnostic studies.
5. Presentation of at least one case at the Wednesday morning Clinical Pathology Case Presentation conference during the rotation
6. Rotate for a short period at the Quest Diagnostics/Nichols Institute laboratory in Chantilly, VA, to be exposed to cytogenetic and FISH laboratory techniques and to learn basic interpretation of cytogenetic and FISH studies.

## Resident Supervision and Evaluation:

Supervision of the resident on this part of the rotation is provided by the Chief of the Molecular Diagnostics Service. The technical aspects and basic principles of the methods used in the Molecular Diagnostics laboratory are reviewed with the resident by a senior medical technologist in the laboratory. The Chief of Molecular Diagnostics provides a written evaluation of the resident's performance, using the E\*Value system, at the conclusion of the rotation.

## FLOW CYTOMETRY SERVICE

Teaching Staff: Donald Karcher, M.D.

### Overall Goals and Objectives:

The overall goal of the flow cytometry part of the rotation is for the resident to develop a working knowledge of flow cytometric analysis as used in the evaluation of immunodeficiency states and neoplastic diseases and in support of bone marrow and stem cell transplantation.

### Detailed Goals and Objectives:

While on this part of the rotation, the resident is to achieve a set of competencies based on the six ACGME core competency areas. The following are competencies to be mastered by each resident, with the ACGME core competency area(s) to which each competency applies. This rotation is typically done by more senior residents (during the second, third, or fourth year of training) and the competencies are, thus, all considered appropriate for Skill Level II residents.

1. The resident has a general knowledge of the structure, various components, and function of a flow cytometer.  
(Competency I, Patient Care; Competency II, Medical Knowledge)
2. The resident has a working knowledge of the methods for proper collection, anticoagulation, and preservation of viability of specimens for flow cytometry.  
(Competency I, Patient Care; Competency II, Medical Knowledge)
3. The resident has a working knowledge of the basic laboratory techniques used in flow cytometry, including analysis for cell viability, adjusting of cell count, reaction and incubation of cells with fluorescent-tagged monoclonal antibodies and polyclonal antisera (direct and indirect immunofluorescence techniques), use of isotypic controls, and cell analysis using the flow cytometer.  
(Competency I, Patient Care; Competency II, Medical Knowledge)

4. The resident has a working knowledge of analysis and manipulation of data generated by the flow cytometer. This includes understanding the concepts of electronic gating, back-gating, and cursor placement, and being able to interpret histograms and scattergrams.  
**(Competency I, Patient Care; Competency II, Medical Knowledge)**
5. The resident has a working knowledge of the use of flow cytometry in enumeration of lymphocyte subsets, hematopoietic stem cells, and other cell types.  
**(Competency I, Patient Care; Competency II, Medical Knowledge)**
6. The resident has a working knowledge of the use of flow cytometry in immunophenotyping of hematologic and other neoplasms. This includes a knowledge of the common indications for performing flow cytometry in these conditions, the expected immunophenotypic findings in these neoplasms, and the role of these findings in diagnosis, treatment, and/or prediction of prognosis of these neoplasms.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**
7. The resident has a working knowledge of the use of flow cytometry in DNA ploidy and cell cycle analysis, including the common indications for performing this analysis, basic interpretation of histograms used in this analysis, and an appreciation of the role of this analysis in diagnosis, treatment, and/or prediction of prognosis in these conditions.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement)**

#### **Resident Duties and Responsibilities:**

Daily activities are determined in conjunction with the service chief. During the rotation, the resident should:

1. Review provided written materials and outside reading assignments outlining the basics of flow cytometric analysis.
2. Review with a senior medical technologist in the Flow Cytometry laboratory basic methods for operation of the flow cytometer, collection and preparation of cells for flow cytometric analysis, and generation of flow cytometric data.
3. Review the results of CD3/CD4/CD8 analysis used to evaluate immunodeficiency states.
4. Review the results of CD34+ stem cell assays used to assess the adequacy of bone marrow and stem cell harvests.
5. Review with the service chief the results of flow cytometric immunophenotypic analyses used to diagnose and characterize leukemias and lymphomas. This review will include new cases analyzed during the rotation and archived case studies illustrating analysis in common leukemias and lymphomas.
6. Prepare and present at least one flow cytometry case at the Wednesday Clinical Pathology Resident Case Presentation conference during the rotation.

**Resident Supervision and Evaluation:**

Supervision of the resident on this part of the rotation is provided by the Chief of the Flow Cytometry Service. The technical aspects and basic principles of the methods and instrumentation used in the Flow Cytometry laboratory are reviewed with the resident by the service chief and a senior medical technologist in the laboratory. The Chief of Flow Cytometry provides a written evaluation of the resident's performance, using the E\*Value system, at the conclusion of the rotation.

## ROTATION: SENIOR CLINICAL PATHOLOGY ROTATION – VAMC

**Facility:** VAMC

**Duration:** 4 months

**Teaching Staff:** Min-Ling Liu, M.D. PhD. (Rotation Director), Suman Chauhan, M.D., Jack Lichy, M.D. PhD., Wen Chen, M.D., Edina Paal, M. D., Robert Dufour, M.D.

### **Overall Goals and Objectives:**

The overall goal of this rotation is for the resident to refine his/her knowledge and skills in the major sections of the CP laboratory and to develop the ability to cover multiple CP laboratory sections simultaneously, similar to what is often done in a community hospital-based setting.

### **Detailed Goals and Objectives:**

This rotation is designed to be done by more senior (second-, third-, and fourth-year) residents, who have completed at least two months of each core CP rotation (Microbiology/Serology/Immunology, Hematopathology, Clinical Chemistry, and Transfusion Medicine/Coagulation rotations) at the GWU Hospital. As such, the detailed goals and objectives for each section of this rotation are the same as those for each corresponding core CP rotation at the GWU Hospital.

### **General Resident Duties and Responsibilities:**

1. Residents on this rotation are expected to cover all aspects of the Clinical Pathology services, including Hematopathology, Blood Bank/Transfusion Medicine, Clinical Chemistry, and Microbiology.
2. Residents are expected to be accessible at all times during regular working hours, from 8:00 a.m. to 4:30 p.m., Monday through Friday. If the resident is away from the service for any reason, he/she should arrange coverage and inform the appropriate laboratories who to reach and for how long. This pertains to vacation and sick leave, as well as administrative absences.
3. Residents should meet regularly with and perform tasks assigned by the Directors of the services.
4. Residents are on CP call for the VAMC and are usually simultaneously on CP call for GWU Hospital (see detail on call schedule for GWU Hospital). Call is typically taken 7 days at a time, beginning each Friday at 5:00 p.m. Call coverage is on weekdays from 5:00 p.m. to 8:00 a.m., and all day on Saturdays, Sundays, and holidays. The on-call resident is responsible for all the laboratory services. Any difficult problems should be referred to the attending pathologist on-call.

5. Residents are expected to provide support for the critical value reporting system. The resident should report critical results to the appropriate clinician according to the guidelines (see attached).
6. Residents will provide continuing education presentations for medical technologists.
7. The resident in Clinical Pathology is also expected to occasionally cover the autopsy service and train junior residents on their first autopsy rotation on an emergency basis.
8. Supervision is provided by the Directors and Supervisors in each section. The residents are evaluated as to their progress by each Section Director orally during the rotation, with summary in writing by Clinical Pathology Rotation Director (Dr. Min-Ling Liu) at the conclusion of the rotation and/or training period.

## SECTIONS

Clinical Pathology is headed by the Chief of Pathology and Laboratory Medicine Service, and divided into the following sections, each headed by a director:

- |                             |   |
|-----------------------------|---|
| ▪ Blood Bank:               | Edina Paal, M.D.  |
| ▪ Chemistry:                | Jack Lichy, M.D. PhD., D.<br>Suman Chauhan, M.D.<br>Robert Dufour, M.D. |
| ▪ Hematology & Coagulation: | Min-Ling Liu, M.D., Ph.D.   |
| ▪ Microbiology:             | Wen Chen, M.D.  |
| ▪ Molecular Diagnostics     | Jack Lichy, M.D., Ph.D.   |
| ▪ Clinical Flow Cytometry:  | Min-Ling Liu, M.D., Ph.D.   |
| ▪ Outpatient Service        | Min-Ling Liu, M.D., Ph.D.   |

### Administrative Laboratory Sections:

The laboratory is divided into the following sections:

1. Core Lab: Comprising Chemistry and Hematology & Coagulation.

- |                                  |                 |
|----------------------------------|-----------------|
| ▪ Supervisor:                    | Patty Shiu      |
| ▪ Lead Technologist, Chemistry:  | Cristina Santos |
| ▪ Lead Technologist, Coagulation | Wandalyn Belt   |
| ▪ Lead Technologist, Hematology: | Maripe Floriza  |

2. Microbiology and Serology.

- |                                |                 |
|--------------------------------|-----------------|
| ▪ Supervisor:                  | Sabiha Zubairi  |
| ▪ Lead Technologist, Serology: | Maria Fernandez |

### 3. Blood Bank

- Supervisor: Vilma Yapana

### 4. Outpatient Lab and Phlebotomy

- Supervisor: Tony Inocentes

### 5. Clinical Flow Cytometry

- Lead Technologist Lyvouch Filkowski

### 6. Molecular Diagnostics

- Lead Technologist Jean Przybocki
- Research Biologist Pin-Yu Perera

## **BLOOD BANK/TRANSFUSION MEDICINE SERVICE**

Teaching Staff: Edina Paal, M.D.

The Blood Bank at the VAMC is a small facility whose scope of operations includes:

- Confirmatory testing of donor units
- Recipient pre-transfusion testing
- Compatibility testing
- Storage and dispensing of Blood components
- Blood administration
- Investigation of adverse effects
- Information management
- Tissue storage and dispensing

The resident rotating through Blood Bank (BB) as part of his/her Senior CP rotation at the VAMC is expected to already be familiar with the basic principles of transfusion medicine, including pre-transfusion compatibility testing, clinically significant antibodies commonly encountered in clinical practice, work up of transfusion reactions, storage and administration of blood products etc. During this rotation, therefore, the resident's role is to serve as a consultant to the technologists as well as the clinical staff, and assist the BB Director in all clinical and administrative duties pertaining to the BB. These will include:

1. Daily review of all requests for blood products that do not meet the "Indications for Transfusion" guidelines for the VAMC, and consultation with the requesting physicians as needed to plan optimal transfusion therapy.
2. Review the daily OR list and Blood Product requests to evaluate compliance with the Maximum Surgical Blood Order Schedule (MSBOS) guidelines for the VAMC.

3. Consult with requesting physicians when blood shortages may require delay in surgery or transfusion, or when an order cannot be completely provided due to unavailability of a product (single-donor platelets, CMV-negative, etc.).
4. Review all questionable requests for HLA-matched components, CMV-negative components, granulocyte concentrates, irradiated components, and washed cells.
5. Review antibody panels and compatibility problems.
6. Investigate all transfusion reactions, participate in laboratory and clinical management of cases as necessary, and document pertinent findings in the Transfusion Reaction Report forms.
7. Review cases of transfusion-transmitted diseases (HIV, Hepatitis, etc.), recalls, and look backs in consultation with the Chief of the Transfusion Service.
8. Attend the quarterly Transfusion Committee meeting (if this falls during the rotation month/s).

## HEMATOPATHOLOGY SERVICE

Teaching Staff: Min-Ling Liu, M.D.

Service Scope:

- Bone marrow biopsy and aspirate examination
- Clinical flow cytometry analysis
- Lymph node pathology
- Peripheral blood smear review
- Body fluid examination

Duties and Responsibilities:

Evaluation of bone marrow aspirates and biopsies, lymph node for lymphoma workup, peripheral blood smears, and body fluids are performed on a daily basis. STAT cases including acute leukemia should be handled at once.

1. Bone Marrow Aspirates and Biopsies:
  - a. The aspirates will be sent from hematology. If not, please contact Hem technologist at ext. 8124.
  - b. Obtain a peripheral blood smear from hematology lab, if it is not included in the aspirate slide.
  - c. The resident should examine all cases before sign-out and write down impressions. Always perform a differential count of the aspirate, if the morphology/preservation permits.
  - d. Order pertinent special stains (AFB and GMS for granulomas, especial HIV positive patient), immunohistochemistry studies and flow cytometry analysis.
  - e. If the patient has previous material, obtain pertinent material before sign out.

2. Lymph node pathology:
  - a. Obtain H&E slides from Surgpath residents.
  - b. Examine all material and form differential diagnosis.
  - c. Order pertinent immunohistochemistry studies and flow cytometry analysis.
  - f. If the patient has previous material, obtain pertinent material before sign out.
  - d. Sign out with attending pathologist.
  
3. Clinical flow cytometry analysis:
  - a. All specimens for potential flow cytometry analysis are sent directly to the lab.
  - b. The resident will review a cytospin preparation from the specimen or a peripheral blood smear or a bone marrow aspirate to determine whether abnormal cell population is present.
  - c. If an abnormal cell population is present, determine what is the differential diagnosis and order pertinent panel, with the supervision of attending pathologist.
  - d. Review the result, write down impressions and sign out with the attending pathologist.
  
4. Peripheral blood smears:
  - a. Smears with questionable cells or unusual findings will be left at the microscopic table in the core lab for review, with a copy of the automated result printout.
  - b. The resident should review the smear, formulate an opinion, and bring the case to the daily sign-out for review by the attending.
  - c. Bring attention to attending staff ASAP in case of new acute leukemia.
  - d. An interpretive footnote will be written by the attending.
  - e. After sign-out, the signed sheet should be return to the lab for the technologist to enter the comment into the computer.
  
5. Body Fluids:
  - a. Smears and fluid cytopsins with questionable cells or unusual findings (including crystals) will be left at the microscopic table in the core lab for review, with a copy of the cell count and differential.
  - b. The resident should review and formulate an opinion, and bring the slide and sheet to sign-out.
  - c. After sign out, the slide and signed sheet should be brought to the lab for the comment to be entered in the computer.
  
6. Involvement in CAP survey and review.

## **COAGULATION SERVICE**

Teaching Staff: Min-Ling Liu, M.D., Ph.D.

Service Scope:

The Coagulation laboratory at the VAMC is a small facility with limited services including routine PT, INR, PTT, TT, fibrinogen, d-dimer, factor assays, mixing studies and lupus anticoagulants.

### Resident Duties and Responsibilities:

The resident rotating through Coagulation as part of the Senior CP rotation at the VAMC is expected to already be familiar with the basic principles of coagulation including methods, indication, interpretation, quality control and management. During this rotation, therefore, the resident's role is to serve as a consultant to the technologists as well as clinicians, and assist the Director in all clinical and administrative duties. These will include, but not limited to:

1. Clinical consultation and coagulation test interpretation
  - Work-up of elevated PTT and PT
  - mixing studies
  - Factor Deficiencies
  - Factor Inhibitors
  - Lupus anticoagulant
  - Anti-thrombotics monitoring
2. Review send out requests.
3. Involvement in CAP survey and result review

### CHEMISTRY SERVICE

Teaching Staff: D. Robert Dufour, M.D., Suman Chauhan, M.D., Jack H. Lichy, M.D., PhD.

### Overall Goals and Objectives:

The emphasis in this rotation is on building skills as a clinical consultant in the area of clinical chemistry, including therapeutic drug monitoring, urinalysis and body fluid chemistry, protein electrophoresis, and hepatitis serologies. The resident is expected to function as a liaison between the laboratory staff and the clinical care providers in the hospital, offering assistance in test selection, reviewing requests for uncommonly ordered tests for appropriateness and discussing diagnostic strategies with the providers, and reviewing unusual laboratory results for specimen labeling problems and clinically important changes in the patient's condition and conveying this information to the providers. The resident will also become proficient in interpretation of chemical laboratory tests by reviewing unknown cases on a daily basis

### Resident Duties and Responsibilities:

During the rotation, residents will be expected to perform a number of functions. Residents will review request for referral of tests to a reference laboratory, reviewing them for appropriateness and discussing questionable cases with the clinicians. Residents will review all specimens with delta check failures, all high digoxin levels, and sub-therapeutic drug results from inpatients to detect specimens with preanalytic errors and mislabeled specimens, and alert physicians to significant problems with their patients. Residents will review high risk laboratory results (high globulins, high iron saturation) to determine need for further testing. There is a daily "clinical chemistry rounds", with 1-3 cases per day selected by the attending. Residents will review the results without information on the clinical history of the patient, then present the case to the attending in a socratic

dialogue to develop the resident's skills in interpretation of results of commonly ordered laboratory tests. After review of the results, residents will review the clinical history of the patient to assess the validity of their conclusions. These reviews may, on occasion, result in visits to the floor to discuss the laboratory results with the clinical staff when laboratory review indicates the likelihood of a clinical diagnosis not considered by the physicians. Residents will perform clinical consultations on selected abnormal laboratory results (by lab initiative) or when requested by the clinical house staff. Residents will perform TDM consultation when drug results are outside therapeutic range and review of records indicates likely inappropriate dose modification. Residents will perform initial interpretation on all protein electrophoresis and immunofixation electrophoresis. Residents prepare a presentation/ or participate for each weekly clinical pathology conference at the VA.

### **CLINICAL MICROBIOLOGY/IMMUNOLOGY/SEROLOGY SERVICE**

Teaching Staff: Wen Chen, M.D.

The resident rotating through Microbiology as part of his/her Senior CP rotation at the VAMC is expected to already be familiar with the basic principles of microbiology/serology/immunology. During this rotation, therefore, the resident's role is to serve as a consultant to the technologists as well as the clinical staff, and assist the Microbiology Director in all clinical and administrative duties pertaining to the Microbiology/Serology/Immunology, such as providing guidance to the clinical staff regarding appropriate usage of laboratory testing (especially send-out tests), appropriate specimen collection, interpretation of unexpected results, and problem solving.

Weekly microbiology rounds discussing interesting cases and/or interesting topics are given by the Microbiology Supervisor on Fridays, involving the Infectious Disease clinical staff, Microbiology attending, and Pathology residents.

### **MOLECULAR DIAGNOSTICS SERVICE**

Teaching Staff: Jack Lichy, M.D., Ph.D.

The Molecular Diagnostics Laboratory at the VAMC offers a variety of testing services involving the detection of nucleic acids in tissue specimens. The test menu includes immunoglobulin and T Cell Receptor gene rearrangement assays, *K-ras* mutation detection by DNA sequencing, microsatellite instability, Factor V Leiden, Prothrombin G20210A, and the UroVysion FISH assay for detection of bladder cancer. In addition to providing these tests as a clinical service, this section provides laboratory testing in support of research projects requiring molecular testing. Residents will have the opportunity to learn the medical indications for molecular diagnostic testing, the technical aspects of performing these tests, and the thought processes involved in interpreting test data and reporting results.

**Overall Senior CP Rotation Resident Supervision and Evaluation:**

Supervision of the residents day-to-day work is provided by the attending pathologist(s) in each section. The resident is evaluated as to his/her progress by each attending pathologist verbally during the rotation and a summary written evaluation, using the E\*Value system, is provided by the VAMC Clinical Pathology Resident Director (Dr. Min-Ling Liu).

## ROTATION: LABORATORY MANAGEMENT AND INFORMATICS – GWU HOSPITAL AND VAMC

Facility: GWU Hospital and VAMC

Duration: 1 month

Teaching Staff: Donald S. Karcher, M.D. (Rotation Director); D. Robert Dufour, M.D.; John F. Keiser, M.D., PhD.

### Overall Goals and Objectives:

The overall goal of this rotation is for the resident to acquire a basic knowledge base and skill set in laboratory administration and laboratory informatics appropriate for a general practicing pathologist.

### Detailed Goals and Objectives:

While on this rotation, the resident is to achieve a set of competencies based on the six ACGME core competency areas. The following are competencies to be mastered by each resident, with the ACGME core competency area(s) to which each competency applies. This rotation is typically done by more senior (third- or fourth-year) residents and the competencies are, thus, all considered appropriate for Skill Level II residents.

#### Laboratory Management

1. The resident has a good working knowledge of the overall organization of the clinical laboratory and the role of the pathologist as the service chief and/or medical director.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency V, Professionalism; Competency VI, Systems-Based Practice)**
2. The resident understands and can apply the principles of quality control, quality assurance (including proficiency testing), and continuous quality improvement.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency V, Professionalism; Competency VI, Systems-Based Practice)**
3. The resident has a working knowledge of statistical analysis relevant to clinical laboratory management.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement; Competency V, Professionalism; Competency VI, Systems-Based Practice)**

4. The resident understands the principles of and can interpret the results of new method and instrument validation studies.  
**(Competency I, Patient Care; Competency II, Medical Knowledge)**
5. The resident has a general knowledge of the principles of laboratory staffing and human resource management.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency IV, Interpersonal and Communication Skills; Competency V, Professionalism; Competency VI, Systems-Based Practice)**
6. The resident has a general knowledge of the principles of budgeting for the clinical laboratory, including the elements of operating budget, capital budget, direct costs, indirect costs, test fee analysis, and "profit" margin.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency VI, Systems-Based Practice)**
7. The resident understands the significance of and process of billing for clinical laboratory and pathology services, including the general approach to providing CPT and ICD-9 codes to maximize reimbursement.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency VI, Systems-Based Practice)**
8. The resident has a working knowledge of the concept of client service, including test result turnaround time management, client relations, management of client complaints, etc.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency V, Professionalism; Competency VI, Systems-Based Practice)**
9. The resident understands the importance of and the process of laboratory and general health care institutional accreditation. This includes knowledge of the unique roles of professional organizations, regulatory bodies, and governmental agencies (e.g. CAP, AABB, Joint Commission, FDA, CMS, DCRA, etc.) in the accreditation process.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency V, Professionalism; Competency VI, Systems-Based Practice)**
10. The resident understands the elements of laboratory safety.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency V, Professionalism; Competency VI, Systems-Based Practice)**

#### Laboratory and Health Care Informatics

1. The resident has an understanding of the role of informatics in pathology practice and health care delivery.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency V, Professionalism; Competency VI, Systems-Based Practice)**

2. The resident has a working knowledge of the different types of clinical information systems, including their major components and how the components are organized.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency VI, Systems-Based Practice)**
3. The resident understands the concept of interfacing of different information systems.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency VI, Systems-Based Practice)**
4. The resident has a general knowledge of the process of evaluating and purchasing a laboratory information system.  
**(Competency I, Patient Care; Competency II, Medical Knowledge)**
5. The resident understands the regulatory requirements for management of laboratory information systems.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency V, Professionalism; Competency VI, Systems-Based Practice)**
6. The resident understands the different means of providing laboratory data, test results, and pathology reports using electronic media, including Web-based reporting systems.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency IV, Interpersonal and Communication Skills; Competency V, Professionalism; Competency VI, Systems-Based Practice)**
7. The resident has a working knowledge of digital image production and how digital images can be imbedded into laboratory or pathology reports.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency IV, Interpersonal and Communication Skills; Competency VI, Systems-Based Practice)**
8. The resident has a working knowledge of the use of information systems for case searching, data mining, and clinical database management.  
**(Competency I, Patient Care; Competency II, Medical Knowledge; Competency III, Practice-Based Learning & Improvement; Competency VI, Systems-Based Practice)**

#### **Resident Duties and Responsibilities:**

The resident is assigned topics on which to read and participates in extensive discussion sessions with the attending pathologists. The resident participates in exercises and projects as assigned by the attending pathologists (e.g. laboratory safety inspection, mock CAP inspection, etc.) and is expected to attend relevant departmental administrative meetings (as identified by the attending pathologists) at both the GWU Hospital and VAMC.

**Resident Supervision and Evaluation:**

Supervision of the resident's day-to-day activities is provided by the Rotation Director and the other attending pathologists. The Rotation Director provides a written evaluation, using the E\*Value system, reflecting the resident's performance at both the GWU Hospital and VAMC.

## ROTATION: PEDIATRIC CLINICAL PATHOLOGY/ LABORATORY MEDICINE – CNMC

Facility: CNMC

Duration: 1 month

Teaching Staff: Edward Wong, M.D. (Rotation Director); Joseph Campos, Ph.D.; David Leitenberg, M.D.; Naomi Luban, M.D.; Wendy Paul, M.D.; Steven Schonberg, Ph.D. (Quest), Mendel Tuchman, M.D.

### Overall Goals and Objectives:

The overall goal is for the resident to become familiar with the unique aspects of the clinical laboratory/clinical pathology in the pediatric population.

### Detailed Goals and Objectives:

This rotation is designed for the resident who has already completed at least two months in each of the core CP rotations at the GWU Hospital. The specific goals and objectives of the rotation are similar to those for the adult clinical pathology rotations, but modified to apply to diseases commonly encountered in children, and are based on the six ACGME core competencies. Because this rotation is done by more senior (third- or fourth-year) residents, all competencies to be mastered are considered appropriate for Skill Level II residents.

### Resident Duties and Responsibilities:

This rotation consists of the resident spending defined periods of time working in specific areas of the clinical laboratory at the CNMC (and for the Cytogenetics section, at the Nichols Institute/Quest Diagnostics Laboratory in Chantilly, VA). In general, the resident will be on-call for clinical consultation for the entire laboratory rotation, except while he/she is at Quest Diagnostics. Every morning a review of the previous day's clinical issues will be presented and discussed with the attending staff.

The specific areas of the laboratory in which the resident works and the period of time of that assignment are as follows:

### Cytogenetics (Dr. Schonberg at Quest Diagnostics): 3-5 days

#### Scope of Service:

The cytogenetics laboratory is a full-service, pre- and post-natal, facility that presently processes approximately 30,000 tests per year. It is equipped for computer imaging for karyotype and FISH analyses.

**Resident Training:**

The Resident receives exposure to all technical areas (culture, chromosome preparation, karyotype preparation and analysis) working with NACLS-certified laboratory technologists and associates as well as didactic/discussion with the Laboratory Technical Director, inclusive of interpretation, procedural rationales, risk calculation, and theoretical considerations. Extensive discussion of routine and specialty areas ('chromosome breakage disorders', interphase and metaphase FISH, analyses for acquired cytogenetic change, etc) is provided. As required, basic background in genetics pertinent to cytogenetics is provided through didactic/discussion and recommended readings. Reading material in the form of texts and significant journal publications are provided. Opportunity for clinical-cytogenetic case work-up and/or methods development is provided for the interested resident.

**Expectations:**

It is generally assumed that this rotation is the first major exposure to medical cytogenetics for the pathology resident. Prior preparation is not required, though the experience can be enhanced by prior review of the ISCN [International System for Human Cytogenetic Nomenclature] and any good human cytogenetics text. The Cytogenetics section in McClatchey's Clinical Laboratory Medicine [Williams and Wilkins] is particularly good in this respect. The Cytogenetics Laboratory operates from approximately 7:00 AM to 7:00 PM. Exposure to the full array of technical methods may occasionally require time other than "routine business hours". The resident will have the opportunity to culture, "harvest" and prepare/study metaphase preparations [from peripheral blood]. At the end of the rotation, the resident will:

1. be familiar with cytogenetic nomenclature
2. be better prepared to interpret and correlate nomenclature with clinical indication and clinical management/follow-up for both constitutional and acquired chromosome change
3. have reviewed basic genetic mechanisms with respect to chromosome behavior
4. have become familiar with all standard technologies including computer assisted imaging/karyotyping
5. be familiar with cytogenetics QC and PT protocols

**Hematology/Flow Cytometry/Transfusion Medicine (Drs. Wong, Luban, Leitenberg, and Paul): 1½ weeks****Scope of Service:**

The transfusion medicine and hematology services are uniquely designed to support the extensive array of surgical and clinical services at Children's National Medical Center including bone marrow and stem cell transplantation, trauma and burn units, cardiovascular surgery, orthopedic surgery, neurosurgery, renal and cardiac transplantation, neonatal and pediatric intensive care units, extracorporeal membrane oxygenation support and hemophilia and thrombosis centers. Extensive therapeutic apheresis support includes red cell exchange for sickle cell patients with acute chest syndrome and stroke, plasma exchange for disease conditions such as TTP/HUS and focal segmental glomerulosclerosis, and peripheral blood stem cell collection for autologous and allogeneic stem cell transplantation. There is a comprehensive donor center for directed and non-directed donations including platelet apheresis donations with comprehensive component preparation by the transfusion service. In addition, T and B cell subset and leukemia/lymphoma flow cytometric analysis and oxidative burst analysis for evaluation of chronic granulomatous disease is

provided to support hematology and oncology, special immunology and infectious disease department programs at Children's National Medical Center.

**Resident Training/Expectations:**

During the rotation, the resident is expected to be available for clinical consultation. The resident is expected to attend and perform daily sign-out rounds which include peripheral smear, coagulation and hemoglobin electrophoresis interpretation, initiate appropriate reflexive testing with results communicated back to the clinician, evaluate and interpret transfusion reactions, approve bleeding times/platelet function screening, send-out tests in hematology and transfusion medicine and perform consultations for peripheral blood stem cell collections, red cell and plasma exchange. The resident will learn appropriate pediatric transfusion practice and be trained in appropriate blood bank restrictions for different pediatric populations.

The resident is also expected to be able to correlate clinical findings (based on chart review and/or attendance at the weekly multidisciplinary hematology/oncology rounds and stem cell transplant management meetings and bi-weekly tumor board meetings) with laboratory findings and bone marrow aspirate and peripheral blood review in the diagnosis of pediatric hematologic and oncologic diseases. Many of these meetings should be used by the resident to observe and participate in diagnostic workups and transfusion practice in real life situations. Opportunities will be provided to review bone marrow aspirates on hematology/oncology pediatric patients.

**Clinical Chemistry/Microbiology/Immunology/Metabolic Testing (Drs. Campos, Luban, Paul, Tuchman, and Wong): 1½ weeks**

**Metabolic/Genetic Testing – Dr. Tuchman**

**Scope of Service:**

The biochemical and molecular genetics laboratory is a national reference laboratory for the diagnosis of a variety of metabolic genetic diseases and is closely associated with the clinical genetics service at Children's National Medical Center.

**Resident Training/Expectations:**

During their rotation in the biochemical and molecular genetics laboratory, the trainees will become familiar with methods and tests used in the diagnosis of inborn errors of metabolism and other genetic diseases. The tests that the trainees will become familiar with will include: plasma and urine amino acid analysis, urine organic acids, acyl-carnitines, urine catecholamine metabolites (HVA, VMA), urine methylmalonate, urine orotate, urine mucopolysaccharides, urine succinylacetone, DNA analysis of fragile X syndrome, hemochromatosis, factor V Leiden, prothrombin, MTHFR gene mutation, ornithine transcarbamylase mutation analysis; other tests include enzyme analysis for Tay-Sachs disease and urea cycle disorders and blood spot assays for PKU and Maple Syrup Urine Disease. The laboratory methods that the trainee may become familiar with include gas chromatography, mass spectrometry (stable isotope dilution), liquid chromatography mass spectrometry, HPLC, Southern blot, SSCP, PCR and gel electrophoresis. The resident is expected to attend daily sign-out rounds at 2 pm in the laboratory.

## Clinical Chemistry – Drs. Luban, Paul, Tuchman, and Wong

### **Scope of Service:**

The laboratory includes comprehensive clinical chemistry testing for inpatients and outpatients at Children's National Medical Center including its satellite clinics. In addition, the laboratory provides state of the art pediatric therapeutic drug monitoring using tandem mass spectrometry for immunosuppressive and AIDS drug monitoring. The point-of-care testing program is widely utilized in the satellite clinics, intensive care units and emergency room and is a national model for decentralized testing.

### **Resident Training/Expectations:**

The resident will be expected to understand the unique challenges in pediatric collection practice and testing, gain familiarity with age-dependent pediatric reference ranges for different analytes, understand methodology unique to pediatric therapeutic drug monitoring and toxicology testing, cystic fibrosis testing (sweat test), vitamin A and E testing, lead testing, and understand the unique challenges in point-of-care testing. In addition the resident will be introduced to evaluation criteria used to make laboratory equipment acquisitions. The resident will also be expected to approve send-out testing for specific analytes, be available for clinical laboratory consultation.

## Microbiology/Virology – Dr. Campos

### **Scope of Service:**

The microbiology/virology laboratory performs diagnostic testing for Children's National Medical Center and its regional outpatient centers, and referral testing for the Hospital for Sick Children. The test menu includes aerobic and anaerobic bacteriology, parasitology (intestinal parasites), mycology, virology (shell vial cultures, antigen detection assays, molecular diagnostic assays), serology (HIV-1 antibody, RPR, and heterophile antibody testing), and antimicrobial susceptibility testing (for bacteria and fungi).

### **Resident Training/Expectations**

Primary emphasis will be placed on viral and molecular diagnostic testing as this will be the resident's only exposure to these assays during his/her residency. Discussion with the resident will emphasize the sensitivity and specificity of microbiology/virology tests, with a focus on infectious diseases important to the pediatric population. The resident is required to attend daily laboratory rounds in the microbiology section and be on-call for clinical laboratory consultation.

## Laboratory Management/Administration (Drs. Luban, Campos, and Wong): 2-3 days

### **Resident Training/Expectations:**

Several "one-to-one" management sessions to cover topics such as equipment selection, laboratory accreditation, proficiency testing, employee evaluation, negotiating a position, etc. will provided during the rotation. The resident is encouraged to attend weekly blood bank rounds where a variety of laboratory management topics are discussed. For further exposure to laboratory management, the resident is expected to attend the monthly quality assurance meeting chaired by Dr. Campos or designee.

**Other Areas of Interest:**

Additional time may be requested for experience in such areas as informatics (LIS and web-based laboratory reporting, Dr. Campos) and stem cell processing (Dr. Wong).

**Continuing Education and Research:**

It is expected that all residents will provide one continuing education lecture to the technical staff after approval by the appropriate laboratory director. Overall, there are numerous opportunities to perform research projects in the time allotted. Residents are welcome to attend appropriate clinical conferences with the attending staff.

**Conferences:**

Clinical Conferences

Morning/Afternoon Rounds (Dr. Wong/designee)  
Coagulation Multi-institutional Conference  
Hematology Clinic  
Heme-Onc Multidisciplinary Rounds  
Metabolic/Genetics Signout  
Microbiology/Virology Lab Rounds  
Stem Cell Transplant Management Rounds  
Stem Cell Transplant QA meeting

Frequency/Time

Daily, 9 am & 4 pm  
Monthly (4<sup>th</sup> Monday, 1 pm)  
Wed morning (Dr. Luban)  
Thurs 1 pm  
Daily, 2 pm (Tuchman)  
Daily, 12 noon (Dr. Campos)  
Wed 12 noon  
Wed 1 pm (2<sup>nd</sup> Wed)

Administrative/Managerial Conferences

QA Directors meeting  
Transfusion Medicine

Frequency/Time

Monthly (Usually 2<sup>nd</sup> Tues 12 noon)  
Thurs 4:30 pm

Other Conferences

GW Pathology Tuesday Rounds  
Bone marrow aspirate morphology Rounds  
Professor's Rounds (Interesting Pediatric Cases)  
Pediatric Grand Rounds

Frequency/Time

Required (for GW path residents)  
Mondays 4 pm (Perez)  
Thurs 12 noon  
Wed 8 am

**Resident Supervision and Evaluation:**

Supervision of the resident's day-to-day activities is provided by the Rotation Director and the other attendings. The Rotation Director provides a written evaluation, using the E\*Value system, reflecting the resident's performance at both CNMC and Quest.

## IV. ELECTIVE ROTATIONS

## ELECTIVE ROTATIONS

### Duration:

For residents who have demonstrated adequate progress on core rotations during the first year and first half of the second year of training, four months of elective time are provided for AP/CP-4 residents and three months for straight AP-3 residents. Elective rotations occur during the second, third and fourth years of training (typically one month in year 2, two months in year 3, and one month in year 4).

### Rotations:

Elective rotation opportunities include a wide variety of opportunities at GWU Hospital, CNMC, VAMC, and other facilities, including the NIH, AFIP, and other academic medical centers. Elective rotations involving additional time on any of the required rotations at the GWU Hospital, VAMC, CNMC, or Office of the Chief Medical Examiner may also be arranged.

In preparation for each elective rotation, the resident **must** contact the Program Director **at least six months prior to the proposed starting date of each elective** and submit to the Program Director a completed GWU Office of GME Elective/Research Rotation Form. All proposed elective rotations away from the GWU Hospital, Washington VAMC, and CNMC must also be approved by the Associate Dean for Graduate Medical Education **at least three months prior to the proposed starting date of the elective**, using the above-mentioned form. For each proposed elective rotation, a clear description of the rotation and the expected contribution of the rotation to the resident's education must be included on the form (with an extra page attached, if necessary.) The Program Director and members of the Residency Training Committee will review each application for proposed elective rotation and a decision regarding the elective will be made as soon as possible. The goals and objectives, duties and responsibilities, and supervision and evaluation will vary depending on the particular elective chosen.

Examples of popular outside electives in recent years:

- Hematopathology at the NIH (Laboratory of Pathology)
- Surgical Pathology at the NIH (Laboratory of Pathology)
- Cytopathology at the NIH (Laboratory of Pathology)
- Subspecialty Surgical Pathology at Johns Hopkins University

New outside elective possibility in the Washington, DC area:

- Various experiences at the new Department of Defense Joint Pathology Center (successor to the old AFIP)

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