Mount Sinai School of Medicine
Department of Pathology
Program Description

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Introduction to Pathology Residency Program at Mount Sinai

Educational goals and philosophy

The goal of the pathology residency is to train physicians in the broad field of pathology and laboratory medicine through a combination of practical and didactic experiences in the setting of an academic medical center. Exposure to pathology research and to new and developing technologies in pathology (i.e., immunopathology, molecular pathology, ultrastructure), as well as to subspecialty pathology (i.e., dermatopathology, hepatic, and renal pathology), is integral to the program. Two broad tracks are offered: a four-year AP-CP program—tailored to the needs of individuals interested in academic or community hospital pathology—and a three-year AP program—tailored to the needs of individuals interested in subspecialty or investigative anatomic pathology. A combined program in AP-Neuropathology is also offered. Fellowships are offered in Surgical Pathology, Breast Pathology, Liver and Transplantation Pathology, Gynecologic Pathology, Gastrointestinal Pathology, Cytopathology, Dermatopathology, Molecular Pathology, and Neuropathology.

Rotations at several hospitals with widely varied material are provided to ensure adequate exposure of the residents to various problems in pathology (Mount Sinai Medical Center, a tertiary referral hospital; the James J. Peters Veterans Affairs Medical Center, a general hospital; and Englewood Hospital, a busy community hospital. In addition, a mandatory rotation to the NYC Medical Examiner’s Office ensures exposure to forensic pathology.

Residents are encouraged, to the greatest extent possible, to function as clinical consultants through a program of graded responsibility over the four years of training. Anatomic and clinical rotations are integrated to provide 4 years of continuous training (18 months’ anatomic pathology, 18 months’ clinical pathology, and 12 months’ additional training in anatomic pathology or clinical pathology).

Residents are encouraged to participate in clinical and laboratory research during their training, and completion of a scholarly activity is a requirement for completion of the residency program. This may be in the form of a case report, clinicopathologic study, or laboratory research.

Each resident is assigned a faculty advisor at the beginning of the residency. Faculty advisors are retained throughout the four years, fostering a close relationship between faculty and residents. Faculty advisors are available to discuss evaluations, career planning, and research projects.
Required rotations

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Elective rotations

- Gastrointestinal Pathology (Mount Sinai)
- Electron Microscopy (Mount Sinai)
- Research (Mount Sinai)
- Renal Pathology (Mount Sinai)
Competence goals of the overall program

The overarching goal of the pathology residency program at MSSM is to provide specialty education to physicians, leading to effective and confident independent practice of general pathology. The educational approach is experiential within the context of a dynamic, integrated health-care delivery system at the cutting edge of medical practice and education.

Each pathology resident at MSSM pathology program acquires and develops the skills, knowledge, and attitudes leading to professional proficiency through close interactions with, and under the direct supervision of, faculty members who give value, context, and meaning to the different activities of pathologists as part of a multidisciplinary medical team that involves a broad spectrum of health-care professionals in the context of interdisciplinary health-care system. As residents gain experience and demonstrate growth in their ability to actively engage in patient-care activities, they are allowed to assume roles that permit them to exercise those skills with greater independence. In the process, the concept of graded and progressive responsibility—one of the core tenets of American graduate medical education—is the dominant strategy through which this tenet operationalized at MSSM.

The shared goals of the entire MSSM pathology faculty are the following: (1) Ensuring the provision of safe and effective care to the individual patient; (2) ensuring each resident’s development of the skills, knowledge, and attitudes required to enter the unsupervised practice of general pathology with confidence and full awareness of the enormous responsibility of pathologists in the different clinical and health-care settings; and (3) establishing a foundation for continued professional growth beyond a formal educational setting.

Specific competence goals and objectives are established for each assignment at each educational level for each rotation, according to the requirements of the Residency Review Committee for Pathology, as described below.

ACGME competence goals and objectives

Patient care

Residents must be able to provide patient care that is compassionate, appropriate, and effective for the treatment of health problems and the promotion of health. Residents:

(1) will have education in anatomic pathology that must include instruction in autopsy and surgical pathology, cytopathology, pediatric pathology, dermatopathology, forensic pathology, immunopathology, histochemistry, neuropathology, ultrastructural pathology, cytogenetics, molecular biology, aspiration techniques, and other advanced diagnostic techniques as they become available;
(2) will have education in clinical pathology that must include instruction in microbiology (including bacteriology, mycology, parasitology, and virology), immunopathology, blood banking/transfusion medicine, chemical pathology, cytogenetics, hematology, coagulation, toxicology, medical microscopy (including urinalysis), molecular biologic techniques, aspiration techniques, and other advanced diagnostic techniques as they become
available;

(3) will demonstrate a satisfactory level of diagnostic competence and the ability to provide appropriate and effective pathology services consultation;

(4) will perform at least 50 autopsies during the program. Autopsies may be shared, but no more than two residents may count a shared case toward this standard. Further, programs must ensure that residents participate fully in all aspects of an autopsy as appropriate to the case. In a complete autopsy, this includes: (a) review of history and circumstances of death; (b) external examination of the body; (c) gross dissection; (d) review of microscopic and laboratory findings; (e) preparation of written description of gross and microscopic findings; (f) development of opinion on cause of death; and, (g) review of autopsy report with teaching staff. (i) Resident education must include exposure to forensic, pediatric, perinatal, and stillborn autopsies.

(5) Will examine and assess at least 2,000 surgical pathology specimens during the program. This material must be from an adequate mix of cases to ensure exposure to both common and uncommon conditions. Residents should formulate a microscopic diagnosis for cases they have examined grossly. Residents should preview their cases prior to sign-out with an attending pathologist;

(6) will examine at least 1,500 cytologic specimens during the program. This material must include a variety of both exfoliative and aspiration specimens; and,

(7) will participate in the regular formal clinical and teaching rounds corresponding to the laboratory services to which they are assigned. For example, residents should attend infectious-disease service rounds while on assignment in microbiology.

(8) The educational experiences detailed above may be provided through separate, exclusive rotations, by rotations that combine more than one area, or by other means. However the experiences are provided, all rotations and other assignments must conform to the educational goals and objectives of the program.

Medical knowledge

Residents must demonstrate knowledge of established and evolving biomedical, clinical, epidemiological, and social-behavioral sciences, as well as the application of this knowledge to patient care. Residents:

(1) must have instruction and experience in the interpretation of laboratory data as part of patient-care decision-making and patient-care consultation; and

(2) must participate in pathology conferences, rounds, teaching and scholarly activity, as well as gain experience in the management and direction of a pathology laboratory. This laboratory experience should include education in quality assurance, safety, regulations, and the use of hospital and laboratory information systems.

Practice-based learning and improvement

Residents must demonstrate the ability to investigate and evaluate their care of patients, to appraise and assimilate scientific evidence, and to continuously improve patient care based on constant self-evaluation and lifelong learning. Residents are expected to develop skills and habits to be able to meet the following goals:

(1) identify strengths, deficiencies, and limits in one’s knowledge and expertise;

(2) set learning and improvement goals;

(3) identify and perform appropriate learning activities;

(4) systematically analyze practice using quality-improvement methods and implement changes with the goal of
practice improvement;

(5) incorporate formative evaluation feedback into daily practice;

(6) locate, appraise, and assimilate evidence from scientific studies related to their patients’ health problems;

(7) use information technology to optimize learning; and

(8) participate in the education of patients, families, students, residents, and other health professionals.

Interpersonal and communication skills
Residents must demonstrate interpersonal and communication skills that result in the effective exchange of information and collaboration with patients, their families, and health professionals. Residents are expected to:

(1) communicate effectively with patients, families, and the public, as appropriate, across a broad range of socioeconomic and cultural backgrounds;

(2) communicate effectively with physicians, other health professionals, and health-related agencies;

(3) work effectively as a member or leader of a health-care team or other professional group;

(4) act in a consultative role to other physicians and health professionals; and

(5) maintain comprehensive, timely, and legible medical records, if applicable.

(6) Along with faculty, be regularly involved in consultative activity;

(7) provide patient-care consultations which should be both intra- and inter-departmental;

(8) perform at least 200 intraoperative consultations during the program;

(9) be considered integral members of the staff of the Department of Pathology, and must have the opportunity to participate in discussions related to management of the department; and

(10) when operating under appropriate supervision, be given direct responsibility to make decisions in the laboratory.

Professionalism
Residents must demonstrate a commitment to carrying out professional responsibilities and an adherence to ethical principles. Residents are expected to demonstrate:

(1) compassion, integrity, and respect for others;

(2) responsiveness to patient needs that supersedes self-interest;

(3) respect for patient privacy and autonomy;

(4) accountability to patients, society, and the profession; and

(5) sensitivity and responsiveness to a diverse patient population, including but not limited to diversity in gender,
age, culture, race, religion, disabilities, and sexual orientation.

Systems-based practice
Residents must demonstrate an awareness of and responsiveness to the larger context and system of health care, as well as the ability to call effectively on other resources in the system to provide optimal health care. Residents are expected to:

1. work effectively in various health-care delivery settings and systems relevant to their clinical specialty;
2. coordinate patient care within the health-care system relevant to their clinical specialty;
3. incorporate considerations of cost awareness and risk-benefit analysis in patient and/or population-based care as appropriate;
4. advocate for quality patient care and optimal patient-care systems;
5. work in interprofessional teams to enhance patient safety and improve patient-care quality; and
6. participate in identifying system errors and implementing potential systems solutions.

Resident teaching and research
Residents participate in the instruction of medical students at the Mount Sinai School of Medicine through participation in the department’s major pathology courses and student electives. Residents are the primary faculty in the student laboratories and supervise students on pathology clerkships.

A variety of research opportunities is available for residents in the department, ranging from clinical research to basic science. Clinical research opportunities are available in the areas of flow cytometry (J. Straucheno), gynecologic pathology (L. Deligdisch), liver pathology (S. Thung), bone pathology (R. Garcia), lymphoid pathology (J. Straucheno), molecular pathology (D. Zhang), gastrointestinal pathology (N. Harpaz), genitourinary pathology (P. Unger), and breast pathology (I. Bleiweiss). Basic research opportunities are available in the areas of molecular biology (T. Fasy), developmental pathology (S. Kohtz), and neuropathology/HIV (S. Morgello).

Resident supervision
Residents are supervised by faculty and senior residents through a system of graded responsibility, as mandated by New York State. Residents initially perform procedures under direct supervision of faculty until judged competent (credentialed) to perform the procedure under general supervision. Residents are encouraged to take responsibility appropriate for their level of training. Faculty and senior residents are available for consultation at all times.

Evaluation
Residents are evaluated according to the ACGME core competencies: patient care, medical knowledge, practice-based learning and improvement, interpersonal and communication skills, professionalism, and systems-based practice. Resident evaluations are provided by faculty at the end of each rotation, using an electronic program called New Innovations available to all residency programs in the institution. Evaluations are reviewed by the residents with their faculty advisor and program director semiannually. In addition, residents are evaluated in a
360-degree fashion by autopsy technical/ancillary staff and surgical pathology technical staff (i.e., physician assistants) several times a year.

Using the same electronic system, residents are also able to evaluate their rotations and the attending faculty at the completion of each rotation. These evaluations are anonymous. Resident progress is monitored through a system of credentialing mandated by New York State. Resident evaluations are reviewed on an ongoing basis by the director of the residency training program and the chairman of the department. Resident evaluations are utilized to monitor the progress of individual residents and to ensure that the program’s educational goals are being met. Residents in need of counseling are referred to their faculty advisor and, if necessary, the program director and/or chairman. Remediation or disciplinary action may be required depending on the issue(s) at hand regarding particular residents. Disciplinary actions may be appealed to the House Staff Affairs Committee of the Medical School. Criteria for promotion are: PGY1 to PGY2: achievement of first-year goals in autopsy, surgical, and clinical pathology; PGY2 to PGY3: achievement of second-year goals in autopsy, surgical, and clinical pathology; PGY3 to PGY4: achievement of third-year goals in autopsy, surgical, and clinical pathology; PGY4 to completion: demonstrated ability to practice with minimal supervision and potential to practice independently; completion of an academic project (case report, clinical, or laboratory study); demonstrated clinical competence to perform fine-needle aspiration; completion of fifty autopsies. Opportunity for resident self-evaluation is also provided through the annual ASCP in-service examination taken by all residents.

**Autopsy Rotation**

**Overview**

Teach residents the approach to a comprehensive, problem-oriented post-mortem examination with emphasis on technical mastery of dissection, on the importance of communication and the interchange of information with clinicians, and on thorough clinicopathologic correlation. Each resident is expected to perform and report on a minimum of forty autopsies—typically single-prosecutor autopsies—during residency training. In addition, the resident is expected to participate in gross organ reviews and formal autopsy presentations performed by other members of the department, increasing his/her autopsy exposure to approximately 500 cases during the training period.

**Duration**

Combined Anatomic/Clinical Pathology program (AP/CP): residents are assigned to the autopsy service for eleven months of their forty-eight-month training period. Anatomic-only program (AP only): residents are assigned to the autopsy service for twelve months of their thirty-six-month training period.

**Competence goals and objectives**

**Patient care**

- Gain mastery of medical-chart review and summation.
- Develop technical skills related to autopsy prosecution (dissection) for both adult and pediatric autopsies, including evisceration and dissection techniques as well as brain removal.
- Demonstrate knowledge of appropriate diagnostic specimen collection and ancillary studies.
• Integrate and interpret information from pathologic materials (gross anatomic, histologic, and laboratory), patient history, and other sources as needed to formulate preliminary and final pathologic diagnoses (i.e., PAD, FAD).

• Apply basic principles of gross pathologic photography.

• Understand the principles of and practice standard safety precautions.

• Provide clear and comprehensive but concise and timely autopsy reports, including clinicopathologic correlation.

Medical knowledge

• Acquire knowledge of the basic concepts that apply to death certification and the completion of cause-of-death statements.

• Know the basic requirements of medical-examiner referrals.

• Understand the legal concept of next-of-kin and its application pertaining to consent for autopsy.

• Know various methods of autopsy technique for both adult and pediatric autopsies, including evisceration and dissection techniques as well as brain removal.

• Know basic and special ancillary tests and their application to the autopsy.

Practice-based learning and improvement

• Utilize performance evaluations and critiques by superiors, peers, and others (i.e., morgue personnel) to improve individual practices on the autopsy service.

• Participate in education of medical students, residents, and other health-care professionals.

• Read continuously about general autopsy and disease-specific topics to inform oneself and to formulate appropriate clinicopathologic correlates.

Interpersonal and communication skills

• Communicate effectively with peers, ancillary staff, pathologists, and clinicians.

• Provide organized and legible reports.

• Provide feedback of autopsy findings to clinical staff.

• Present at autopsy-related conferences in professional manner.

Professionalism

• Resident assumes responsibility for the autopsy cases that are assigned to him/her.

• Completes autopsy reports in a timely fashion.

• Resident is respectful of others, including deceased patients, ancillary staff, peers, authoritative figures, and other health-care individuals.

• Resident is honest, reliable, and accountable to peers, authoritative figures, patients’ families, etc.
• Attends didactic and other required educational experiences.
• Participates in scholarly activities as appropriate.

Systems-based practice
• Utilize clinical information of specific cases to develop an approach to an autopsy at hand and generate a PAD.
• Recognize the impact of autopsy practices on families, health-care professionals, health-care systems, and society at large.
• Participate in interdisciplinary performance-improvement initiatives (i.e., morbidity and mortality conferences).

Resident responsibilities

General responsibilities (all residents):
• Acts professionally at all times
• Is responsible
• Works as a team
• Pays attention to detail
• Is mindful of hierarchical authority (i.e., attendants, chiefs, senior residents, etc.)
• Is courteous to others
• Reads about one’s cases
• Works hard
• Has fun….

Progressive responsibilities:

PGY1:
• Reviews the autopsy manual and becomes familiar with various autopsy dissection techniques. In addition, the resident is expected to read about the disease processes present in his/her own cases.
• Assures communication with the appropriate attending clinician prior to each autopsy.
• Performs the autopsy following written and/or oral guidelines presented by the department of pathology.
• Takes appropriate images of significant pathologic findings.
• Submits and follows up on microbiologic and other ancillary studies.
• Fixes small samples of pertinent pathology from each case in formalin at the time of the autopsy, which will be later trimmed for histologic processing.
• Reviews gross organ pathology with the attending pathologist.
• Appropriately labels all containers with the autopsy case number, date, and his/her last name.
• Prepares timely preliminary autopsy reports (PAD), within twenty-four hours (exception: weekends/holidays).
• Verbally communicates initial findings to the clinician after the PAD is formulated with the pathology attending.
• Submits appropriate tissue for histologic sections. Typically, this is done after the specimens have been appropriately fixed in formalin (24–48 hours after the autopsy).
• Reviews glass histologic slides prior to sign-out with the pathology attending. Slides are generally available within seven days of submission.
• Formulates his/her own histologic and pathologic impression of the case, including a unifying diagnosis (if possible).
• Reviews glass histologic slides with the attending pathologist.
• Prepares/writes the final anatomic diagnosis (FAD) after discussion with the attending pathologist.
• Formulates comprehensive clinico-pathologic correlates for each case, researching important issues and areas of interest.
• Completes autopsies within thirty working days.
• Presents autopsy findings at intradepartmental (weekly autopsy review with the chairman of pathology, weekly brain-cutting and didactic conferences) and interdepartmental (morbidity/mortality, CPC) conferences.
• Takes evening and weekend autopsy calls.
• Performs adult and pediatric autopsies.
• Grosses placental and fetal specimens.
• Assists fellow residents with the performance of autopsies.
• Assists in teaching of medical students on elective.

PGY2:
• Same as for PGY1, with added emphasis on honing dissection and diagnostic skills and on teaching first-year residents.

PGY3/4:
• Emphasis on teaching junior residents.
• Serves as a junior attending on the autopsy service at the discretion of the autopsy director (PGY4 and above only).

Fellows:
• Serve as junior attending on the autopsy service at the discretion of the autopsy director.
Resident supervision

- Dr. Lento, the autopsy director, is informed of all autopsies. Dr. Lento is available to assist and teach residents, as needed.
- Members of the entire pathology staff at the Mount Sinai Medical Center participate in the supervision and instruction of residents on the autopsy service. Each attending pathologist generally serves at least one–two weeks per year as the attending on the autopsy service. Attendings with a special interest in the autopsy may serve more frequently on the service.
- Drs. Margret Magid and Raffaella Morotti supervise residents who participate in pediatric autopsies.

During the first month of the academic year, Dr. Lento offers didactic instruction and demonstrations of the methods of evisceration, dissections, and other autopsy techniques to PGY1 and to new residents and fellows with the assistance of chief and/or senior residents.

After the performance of an autopsy, the attending pathologist reviews the case with the resident. This attending provides direct and indirect surpervision to the resident and is responsible for the resident’s prompt generation of the PAD. The attending reviews the resident’s gross description/clinical history, the histologic slides, and the resident’s preliminary histological diagnosis. He/she also reviews the written final autopsy report and signs it.

Locations

Autopsies are performed at MSMC and at various hospital affiliates during residency training, including: the Bronx Veteran’s Administration Center and Elmhurst Hospital Center (in Queens, NY). Medicolegal autopsies are performed at the Chief Medical Examiner’s Office of NYC during required, one-month rotation in forensic medicine.

Resident Evaluation

The manner of resident evaluation varies with the resident’s experience and demonstrated level of competence with autopsy techniques. The autopsy director and/or chief/senior resident(s) instructs junior residents in a step-by-step manner and directly assess the acquisition and development of skills. As residents gain experience and demonstrate increasing competence performing autopsy techniques, they are permitted to exercise their skills with greater independence and are allowed to perform autopsies with indirect supervision by attending or chief resident available to provide assistance when questions or unexpected or unfamiliar findings are encountered during dissections.

Residents are evaluated according to the core competencies identified by the Residency Review Committee for Pathology—patient care, medical knowledge, practice-based learning, communication, professionalism, and systems-based practice—as they demonstrate growth in their ability to perform complete autopsies independently.

In general, the autopsy director or the rotating staff pathologist will evaluate residents on the autopsy service. Residents may be evaluated for fund of knowledge, technical expertise, timeliness/thoroughness of autopsy reports, and the quality of intradepartmental and interdepartmental conference presentations. Written evaluations are available to all the residents for review and discussion with the autopsy director, residency advisor, and program director.
**Surgical Pathology Rotation**

**Overview**

The general goal and objectives of the surgical pathology rotation are to provide the resident with the skills necessary to function as a competent surgical pathologist and as an effective consultant. These are clinical skills (gross and microscopic differential diagnosis, ability to integrate clinical information, ability to utilize special diagnostic techniques, and ability to function as a consultant to clinicians), technical skills (ability to describe grossly a surgical specimen, to appropriately dissect and select sections, gross and microscopic photography), administrative skills (ability to direct a histology laboratory, informatics, laboratory management), and teaching skills (ability to teach more junior residents and to effectively communicate and interpret pathologic findings to clinicians).

**Duration**

- At least 12 months are required.

**Competence goals and objectives**

**Patient care**

- Gain mastery of chart review and summation.
- Contact clinicians and surgeons for details of patient history and clinical concerns in advance of surgical sign-out.
- Demonstrate a satisfactory level of diagnostic competence and the ability to provide appropriate and effective consultation in the context of surgical pathology.

**Medical knowledge**

- Demonstrate knowledge of appropriate diagnostic specimen collection in the operating rooms, clinics, offices, and appropriateness of ancillary studies.
- Integrate and interpret information from pathologic materials (gross anatomic, histologic, and laboratory), patient history, and other sources as needed, so as to formulate pathologic diagnoses.
- Demonstrate knowledge of current methods utilized for clinical diagnosis, including Southern blotting analysis, PCR, reverse transcriptase (RT)-PCR, karyotyping, and fluorescence, in-situ hybridization; indications and procedures for submitting specimens for electron microscopy, common ultrastructural features in diseases that routinely require electron microscopy, and preparation and sampling of tissue specimens for electron microscopy.

**Practice-based learning and improvement**

- As residents progress through different levels of training and experiences, they prepare and organize requested documentation, clinical information, formulation of diagnosis, and differential diagnoses of surgical cases before review with attending pathologist.
- Prepare written reports (required by some attendings).
• Perform relevant background reading.
• Correlate frozen-section findings with pathological findings on permanent histological sections.
• Demonstrate knowledge of AJCC/UICC TNM grading and staging systems applied to malignant neoplasms.
• Demonstrate competence in gross and microscopic photography, and preparation of poster presentations and journal publication photographs in conjunction with staff photographer.

Interpersonal and communication skills

• Provide clear, comprehensive, and concise timely reports. Verbally communicate results to clinicians, as indicated.
• Present selected cases at clinicopathological conferences with clarity, completeness, and high-quality illustrations.
• Participate in student-teaching laboratories and medical-school electives in the pathology department. Numerous students rotate through surgical pathology, and residents and fellows work directly with students.
• Participate in surgical-pathology biweekly gross-specimen-conference; daily surgical-pathology microscopic unknown conferences; Monday-morning surgical-pathology lecture series; and Thursday-morning surgical-pathology conference.

Professionalism

• Residents must demonstrate a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to a diverse patient population.
• Assume responsibility for the cases that are assigned them. Work up and follow up with additional studies, as indicated, for surgical cases in a complete and timely manner.
• Must be respectful, honest, and reliable when working with ancillary staff, peers, and other health-care individuals.
• Attend didactic and other required educational experiences.
• Participate in scholarly activities as appropriate.

Systems-based practice

• Residents must demonstrate an awareness of and responsiveness to the larger context of health care and the ability to call on a wide range of resources to provide the highest level of pathology practices.
• Utilize clinical information of specific cases to develop an approach to surgical cases.
• Participate in/attend interdisciplinary performance-improvement initiatives (i.e., morbidity and mortality conferences, specialized divisional conferences, and quality-control conferences).
Resident responsibilities

Progressive responsibilities

PGY 1:

- A mandatory comprehensive orientation program is given in July through September of each year by faculty, chief residents, senior residents, and fellows regarding laboratory procedures, utilization of equipment, gross descriptions, and use of online surgical pathology manual. The orientation program begins with a series of twice-weekly grossing lectures, which last six weeks.
- Senior residents hold these lectures in the grossing room and instruct the PGY1s on how to gross a variety of specimens, what the prosecutor should be looking for when evaluating a specimen, and what sections need to be submitted for histological evaluation. The grossing lecture series is then followed by eight weeks of introductory histology lectures taught by the faculty. These lectures cover the basic histology of every organ system.
- In addition to the orientation program outlined above, each PGY1 completes a two-week pre-surgical rotation prior to his/her first month of surgical pathology. This rotation consists of working with a senior resident to learn more about how to gross a specimen, how to perform a frozen section, and how to sign out biopsies. Residents must also demonstrate knowledge and understanding of the basic elements of the surgical-pathology report, including: identifiers, referral institution, clinical information, dates and times, documentation of submitted specimen, and identification of tissue source.

PGY 2:

- Be thoroughly familiar with the surgical pathology manual.
- Demonstrate knowledge of the basic principles of informatics in anatomic pathology and ability to effectively utilize the PowerPath system.
- Demonstrate progressive competence in the application and demonstration of techniques and methods of the gross examination, description, and processing of surgical specimens building on the experiences during PGY 1.
- Assume responsibility for requesting ancillary studies required or expected for the proper pathological examination and diagnoses of certain specimens (e.g., tissue bank, culture, electron microscopy, cytogenetics, molecular pathology).
- At this level, residents must also demonstrate knowledge about tissue fixation and processing, including embedding, orientation, section preparation, levels, use of special stains, immunohistology, electron microscopy, cytogenetics, and other special techniques.
- Awareness and familiarity is also expected with requirements for storage and disposal of specimens and hazardous chemicals.
PGY 3:

- Teach junior residents, help with dissection of complex specimens, and demonstrate proper dissection techniques for different types of specimens from different organ systems.
- Demonstrate proficiency in anatomic pathology skills, including:
  - Knowledge of JCAHO and CAP standards and requirements for specimen submission.
  - Knowledge of JCAHO and CAP standards regarding occupational hazards and infection control.

PGY 4:

- The emphasis is on teaching and supervision of junior residents and the pursuit of in-depth knowledge and understanding of the pathology of organ systems.
- Residents are provided opportunities to engage in scholarly activities with support of faculty members in any area of their particular interest.
- Residents become involved in management and supervision of surgical-pathology laboratory personnel and operations and must demonstrate knowledge and understanding of and: (1) procedures for the reporting of untoward incidents in the laboratory, (2) basic recommendations and requirements of accreditation and licensing of pathology laboratories (JCAHO, CAP, regional legal requirements) pertaining to retention of pathology specimens and records; and (3) demonstrate knowledge of Web-based or organization-related (e.g., CAP, ASCP, United States and Canadian Academy of Pathology) learning and continuing medical-education tools in anatomic pathology.

Resident supervision

Mount Sinai Medical Center:

James J. Peters Veteran Affairs Medical Center:
H. Choi, M.D. and A. Lemp, M.D.

Englewood Hospital and Medical Center:
M. Sanchez, M.D.; R. Stahl, M.D.; A. Burga, M.D.; J. Tzeng, M.D.; and M. Tismanetsky, M.D.

Residents are supervised by senior residents, surgical-pathology fellows, and attending pathologists. All cases are signed out with an attending pathologist on a daily basis.
Locations

- Mount Sinai Medical Center
- James J. Peters Veteran Affairs Medical Center
- Englewood Hospital and Medical Center

Note: All gross-surgical-pathology responsibilities take place at the Mount Sinai Hospital, Department of Pathology, Annenberg 15/33.

Evaluation

- Documentation of activities: residents and fellows in surgical pathology are encouraged to keep a logbook of complex or interesting cases that they have handled and to keep a record of presentations or projects in which they have participated.

- New Innovations Graduate & Undergraduate Medical Education Software Web-based program with comprehensive evaluation forms are used by the faculty at the end of each training rotation. Evaluations include faculty evaluation of program, faculty evaluation of residents/fellow, resident/fellow evaluation of rotation, resident/fellow evaluation of program, and resident/fellow evaluation of faculty member. The chief of surgical pathology reviews the resident’s evaluation in conference with that resident.

- Gross-pathology skills are evaluated at periodic gross-surgical reviews.

Supplemental materials

- Medical Library: Annenberg, 10 and 11th floor.
- Web-based Mt. Sinai School of Medicine material is available.
- Materials for independent study of microscopic teaching slides and some gross specimens, as well as patient histories are available from most surgical specialties.

Cytopathology

Overview

This section describes the educational plan, policy for the delineation of privileges and the supervision of residents during their required rotation through the cytopathology service. The goals, objectives, and policies in are not necessarily listed in order of importance. This section is comprised of nine pages, with an acknowledgment signature on the last page. The resident’s signature is obtained after the initial orientation at the beginning of their rotation through the cytopathology service.

In many pathology training programs, the autopsy service provides the foundation on which residents develop the skills needed to properly function on the surgical pathology service, those being gross examination, description and dissection of tissues, selection of tissue sections for histological processing, and microscopic examination of histological sections for disease processes. Cytopathology skills differ from those used in surgical pathology and include locator skills and diagnostic skills. Unfortunately, in most pathology residency programs, there is no equivalent foundation-forming process for cytopathology. Residents often begin their cytology rotations with none of the skills needed to make their time spent both educational and productive.
Locator skills enable the cytopathologist to find abnormal cells while being able to ignore the often thousands of unimportant cells on each slide. Without locator skills, the process of slide examination grinds to a halt and previously unrecognized abnormal cells are missed. Although cytotechnologists are employed to screen cytology slides, any slide referred to a pathologist (abnormal gyn and all non-gyn cases) becomes the medical-legal responsibility of that pathologist who signs out the case.

Diagnostic skills enable the cytopathologist to recognize and diagnose a disease process. While this is similar to surgical pathology, the diagnostic clues and features are often different from those utilized during histopathological examination of tissue sections. They include careful consideration of intercellular relationships, nuclear membrane irregularities, air-drying artifacts, and differences in fixative employed, among others.

The autopsy service can be employed to begin providing new residents with some familiarity with cytological preparations and their examination and interpretation. To this end, the conference “Performing FNAs—Practical Demonstration and Hands-On Experience” is the first cytology conference of each academic year. There, residents learn to prepare, fix, stain, and examine cytological smears. Residents, then, can make/touch preps or due FNAs of lesions or nodules from their autopsies, stain, and review them with a cytopathologist prior to issuance of a PDA. Cytological diagnoses can be incorporated into the PDA, at the discretion of the case-attending pathologist, and the resident can accumulate a reference collection of slides of his/her own.

Duration
Two months minimum required at any time during the entire training period.

Competence goals and objectives

PGY1

Patient care

• FNA technique: observe and participate in FNA adequacy procedures
• Locator skills: primary screen gyn and non-gyn smears, complete screening log
• Mark significant/abnormal findings on slides

Medical knowledge

• Attend weekly cytopathology conference
• Observe cytoprepatory techniques
• Pre-test: complete fifteen-case, computer-based, pre-rotation slide test
• Cytomorphology: learn to recognize normal cytology of all body systems

Practice-based learning and improvement

• Able to determine specimen adequacy

Interpersonal and communication skills
• Make quality presentations at cytology conference and Journal Club

Professionalism

• Cooperativeness: follow advice and appropriate requests from faculty

PGY2

Patient care

• FNA technique: learn to perform FNAs of palpable masses
• Diagnostic skills: make accurate diagnoses

Medical knowledge

• Attend cytology conferences
• Cytomorphology: learn to recognize benign reactive, premalignant, and malignant conditions; learn to recognize cytologic patterns associated with infectious, chemical, and physical agents and radiation; learn the Bethesda System for reporting pap-smear results.

Practice-based learning and improvement

• Instruct others in proper technique in making smears

Interpersonal and communication skills

• Provide clear and accurate written documentation of patient information on requisition forms for FNA procedures
• Continued quality presentations

Professionalism

• Trustworthiness: demonstrate responsibility in completing tasks

PGY3:

Patient care

• FNA Technique: perform FNA Adequacy Procedures and FNAs of palpable masses
• Diagnostic Skills: know when it is appropriate to get a second opinion from another cytopathologist

Medical knowledge

• Conferences: attend cytology conferences
• CAP Proficiency: participate in CAP proficiency tests, if available
- Cytomorphology: learn to triage cytology specimens for ancillary testing
Practice-based learning and improvement

- Instruct others in proper FNA technique
- Participate in quality-assurance activities—cytology-histology correlations

Interpersonal and communication skills

- Provide clear, accurate, and timely information about patients to the faculty
- Understand information and supervision from the attending staff
- Ask appropriate questions for clarification purposes
- Continued quality presentations

Professionalism

- Relationship with others: relate well to other health professionals, technical and clerical staff
- Conduct their patient-care activities with high ethical standards
- Accept additional responsibilities without complaint or protest
- Systems-Based Practice
- Understand how cytology diagnoses affect health-care decisions for patients

PGY4:

Patient care

- Diagnostic reporting: able to formulate accurate diagnostic reports with appropriate recommendations, if clinically indicated

Medical knowledge

- Conferences: attend cytology conferences
- CAP Proficiency: obtain a score of 9 percent of the divisional score in CAP proficiency tests, and federal proficiency tests, if available
- Ancillary testing: able to correlate ancillary test results with morphologic findings
- Obtain a score of 80 percent on the fifteen-case pre-screened glass-slide Post-Rotation Slide Test

Practice-based learning and improvement

- Participate in quality-assurance activities: complete 200 cytology-histology correlations

Interpersonal and communication skills

- Do not require repeated directives
• Continued quality presentations

Professionalism

• Accept criticism positively
• Interact with patients with compassion
• Follow HIPPA regulations when dealing with patients and their information

Systems-based practice

• Understand how cytology diagnoses affect the health-care system
• Understand how the practice of cytology differs in various health-care delivery systems and how it affects health-care costs

Resident responsibilities

1. Residents attend the orientation program of the division of cytopathology which is intended to achieve the following objectives:

• To acquaint residents with the goals and objectives of the rotation.
• To acquaint residents with responsibilities, policies, and privileges of the rotation.
• To acquaint residents with the policies and procedures of the division of cytopathology.
• Attendance at the orientation program presented by the director of cytopathology.
• Residence training at 9 AM on the first day of the rotation is required of the resident by the pathology department, the division of cytopathology, and the director of Cytopathology Residence Training, as well as the ACGME.
• Scheduled FNA procedures can be viewed on the G drive in the folder “Cytopathology FNA Schedule.”
• A schedule of attendings responsible for PC (outpatient) cases, MC (inpatient) cases, and FNAs each day is posted on a monthly calendar in individual cytopathology-attending offices, as well as at the cytopathology fellow’s desk.
• *Daily educational schedule:
  8–9 AM: protected educational time, including weekly Wednesday-morning cytology conferences.
  9–9:15 AM:
  o Week 1 & 2: designate Q&A cases for review in the Cytology-Histology Correlation computer module.
  o Week 3 & 4: review selected case slides for Q&A review with attending cytopathologist.
  9:15–10 AM: screen selected cases for screening log.
  10 AM–12 PM: attend case sign-out with attending cytopathologist.
12–1 PM: attend daily unknown conferences. Lunchtime.
1–2 PM: review selected cases for case-sign-out session. If none available, review study set slides.
2–5 PM: attend case sign-out with attending cytopathologist.
5–6 PM: work on cytology conference and Journal Club presentations or manuscript preparation.

– This schedule indicates a ten-hour workday/five-day workweek. As there is no on-call for this rotation, the total of fifty hours is well below ACGME duty-hour limits of eighty hours.

– *As FNA adequacy procedures and patient FNAs are scheduled throughout the day, these activities may be interrupted, as needed, and appropriate for participation in said procedures (see sections 2 & 3 below).

• Upon completion of this orientation session, the resident will immediately take a short computer-image-based cytology-slide pre-rotation test to establish his/her baseline cytology knowledge. The test is comprised of five gyn cases, five non-gyn cases, and five FNA cases with both low- and high-power images. One hour is the maximum time allowed to complete this exercise. Cytology texts are allowed as references.

• G&O: resident will become aware of his/her role during this rotation.

2. Residents will assess the adequacy of fine-needle aspirations (FNA) performed primarily by members of the department of radiology.

• Residents shall accompany the cytology fellow and/or an experienced cytotechnologist on the first week for the purpose of orientation, FNA cart preparation, slide preparation, fluid-specimen handling, adequacy interpretation, and specimen requisition forms.

• Residents will check the FNA adequacy schedule each morning before procedures begin and search the anatomic pathology computer file for previous cytology/surgical pathology specimens which may be of importance during the evaluation of each case scheduled that day. Where appropriate and feasible, the resident will pull such slides from the file to review with the attending of the day, prior to beginning procedures that day.

• During the second week, the resident will perform the adequacy procedure under the observation of the cytology fellow and/or an experienced cytotechnologist.

• During the third and fourth weeks, the resident will perform the FNA adequacy procedures under general supervision, if the director of training (or chief of the service in his absence) considers him/her competent to perform this procedure based on that resident’s procedure evaluations and direct observation. Residents will be expected to get the clinician/radiologist to complete each requisition form, including designation of the specimen target, obtain pertinent clinical history, and appropriately triage cellular material for ancillary studies, in addition to smear preparation and evaluation.

• Residents will call the attending pathologist of the day to review prepared smears at the site of the procedure.
Feedback regarding the handling of each case will be provided to the resident at this time and will include completion of an FNA Adequacy Procedure Evaluation form (i.e., the resident will be evaluated in writing for competence in performing this procedure).

At the discretion of the director of training, at such time that the resident has been deemed proficient, attendings may decline to complete an evaluation form for every procedure and may, instead, do the evaluations as spot checks.

Due to the high volume of cases, the resident will be limited to participating in one case per day, but may choose to participate in five lumped cases, not to exceed a total of five per week.

G&O: residents will become proficient in performing adequacy evaluations. An opportunity for increased responsibility is provided, per ACGME educational expectations.

ACGME Core Competency: PATIENT CARE, PRACTICE-BASED LEARNING AND IMPROVEMENT, PROFESSIONALISM, SYSTEMS-BASED PRACTICE.

3. Residents will be available during the rotation to perform FNAs of palpable lesions on patients, primarily in the Head & Neck Clinic and occasionally at the bedside.

Residents will accompany the pathology FNA attending and will subsequently perform their own FNAs at the discretion of the director, FNA service, and/or FNA attending. Accompanying and assisting the FNA attending in the performance of an FNA procedure is not optional; it is required.

While performing FNAs in the clinics, the resident will be under the supervision of the cytopathology fellow, if an FNA attending is not present at that time.

FNAs performed by the resident will be reviewed with the fellow and by the attending pathologist assigned to that case.

The cytopathology fellow/FNA attending will complete an FNA Performed Evaluation Form for each and every procedure performed by the resident throughout the rotation and will provide feedback to the fellow.

Since many of the pathologist-performed FNAs now use ultrasound guidance, the residents will learn the basics of ultrasound examination of both palpable and non-palpable lesions.

Due to the high volume of cases, the resident will be limited to participating in one case per day, but may choose to participate in five lumped cases, not to exceed a total of five per week.

G&O: residents will learn to perform FNAs on patients and become aware of the advantages of cytopathologist-performed FNAs, especially with regard to the employment of ultrasound.

ACGME Core Competency: PATIENT CARE, PRACTICE-BASED LEARNING AND IMPROVEMENT, PROFESSIONALISM, SYSTEMS-BASED PRACTICE.

4. Residents will prepare and present conferences in the department of pathology.

Residents will give a surgical-pathology, conference-style, in-depth case presentation of one interesting case selected by any of the attendings during the rotation.

Assigned case presentations are required, with the same obligation as would be considered for surgical pathology conference.
• The presentation will be limited to thirty minutes (time for questions and answers to be accounted for within this time limit).

• Conference presentation dates will be selected by the director of training, occurring either within the current rotation or as close as possible after completion of the rotation and limited to the second Wednesday of each month (as dictated by surgical-pathology business meetings).

• Conference presentations must begin promptly at 8 AM and finish promptly at 8:30 AM to allow the surgical-pathology business meeting to begin on time.

• Conference attendees will be asked to complete a Cytopathology Conference Evaluation Form for each presentation.

• Residents may be requested to present pertinent cytologic findings at clinical conferences throughout the Medical Center.

• Residents will attend the weekly Wednesday 8 AM cytology conference when not presenting it themselves.

• G&O: residents will discover the differences in presentation of histological and cytological material.

• ACGME Core Competency: MEDICAL KNOWLEDGE, INTERPERSONAL AND COMMUNICATION SKILLS

5. Residents will present one article at Cytology Journal Club.

• Cytology Journal Club is held at 2 PM every third Wednesday of each month.

• The presentation will occur during the rotation, if possible, or at the next-closest-possible date after the rotation is completed.

• While Cytology Journal Club is relatively informal, a professional presentation such as a PowerPoint® presentation is suggested.

• The resident should keep the target audience in mind, which will include cytotechnologists, when preparing the presentation.

• Journal articles should be selected with the input of the director of training and any other attending participating on the cytology service.

• Articles that discuss criteria for difficult differential diagnoses are encouraged.

• Conference attendees will be asked to complete a Cytopathology Conference Evaluation Form for each presentation.

• G&O: residents will explore the cutting-edge issues as they relate to the cytopathology.

• ACGME Core Competency: MEDICAL KNOWLEDGE, INTERPERSONAL AND COMMUNICATION SKILLS, SYSTEMS-BASED PRACTICE.

6. Residents will develop Locator Skills by screening unscreened cytology slides.

• Residents will screen five to ten gyn cases each day, beginning on the first week with five and increasing to ten on the second week.
Residents will keep a screening log and will review discrepancies with the cytotecnologist responsible for the case, if not referred to a pathologist or the cytopathology fellow or sign-out attending for pathologist-referred cases. The reviewer will initial the space in the far-right column to document review of the discrepant case with the resident. It is the resident’s responsibility to seek out the appropriate reviewer and provide the slide for review.

Residents will be instructed in how to complete the screening log by the cytopathology fellow.

Residents will turn in the screening log to the director of training at the end of the rotation.

G&O: residents will develop locator skills, required to complement diagnostic skills for adequate cytological evaluation of cases they may see during their own practices. Decreasing discrepancy rates demonstrated on each successive week’s screening log is an indication of development of locator skills.

ACGME Core Competency: PATIENT CARE.

7. Residents will develop diagnostic skills by attending sign-out sessions with attendings.

The resident should review pre-screened cases not currently in possession of an attending and indicate and initial their diagnosis on the requisition sheet in the area marked “for office use only.”

Residents will not be able to attend every sign-out each day. However, as there is almost always someone signing out gyns and two others signing out non-gyns each day, there will be ample opportunity to participate in this activity.

Residents will assist attending’s complete cases (and not limited to) by obtaining clinical information from the clinician and arranging for ancillary studies, if needed.

Workflow in cytology laboratories is different from that experienced in surgical pathology. Federal and state regulations require twenty-four-hour turn-around times for non-gyn specimens. The clinicians expect no less. As cytology cases are being screened throughout the entire day and case workloads usually require an entire day to complete, it is impossible to set aside the day’s work for scheduled-case sign-out times, as is currently being done by many of the surgical pathology subspecialties. No one in the division of cytopathology can routinely complete an entire day’s worth of cases in only a portion of any given workday. It is the resident’s responsibility to be present in the Cytopathology Suite when not participating in procedures or during protected educational time, so as to maximize the opportunity to attend sign-out sessions. A desk with a cytology microscope is provided in the Suite so the resident may look at study-set slides when sign-out sessions are not occurring.

G&O: residents will develop diagnostic skills, special-study selection, and report-generating skills and become aware of those diagnostic points and details different from and similar to those used in arriving at a histological diagnosis.

ACGME Core Competency: PATIENT CARE.

8. The resident is required to participate in the ongoing Quality Control Activity in a timely manner.

Required of the division by regulatory authorities.

Participation in Quality Control Activities are required of the fellow by the ACGME.
• Cytology-Histology Correlations (as designated by Eileen Hauptman).
• A minimum of 200 correlation cases/month, with at least 10 percent being discrepancy cases, are to be completed by the fellow. This can be easily accomplished by spending a few minutes each day on the computer, and thus completing ten cases.
• G&O: develop an appreciation of where discrepancies are most common.
• ACGME Core Competency: PATIENT CARE.

9. Residents on the rotation involved in research projects, completion of autopsies, or conference preparations for other rotations will not be allowed time during regular laboratory operating hours for such activities, unless all of the above activities are completed or not ongoing (sign-out/FNA procedures) and only with permission and notification of the director of training.

10. Required reading:
   • Small DeMay

Recommended references:
   • Big DeMay
   • Koss

11. Residents are encouraged to improve their diagnostic skills by:
   • Reviewing divisional glass-slide study sets.
   • Cytology-slide study sets are selected as our best cases and are under the management of Dr. Hua Chen.
   • Since cytology slides are not replaceable (other than cell-block slides), anyone wishing to review the slides must record them in the accompanying slide log. It becomes his/her personal responsibility to return them to the study set.
   • Since patients occasionally request that slides be sent for outside review, loss of slides from the study sets will not be tolerated.
   • Reviewing International Academy of Cytology Kodachrome® study sets.

12. On-call policy:
   • There is no resident on call for the cytology service.
   • Residents are, however, expected to assist the cytopathology fellow with late stat cases, if requested.

13. Residents will follow the rules and regulations of the cytopathology laboratory.
   • Slides, smears in particular, are not replaceable.
   • Residents will not leave the physical confines of the cytology lab with cases not signed out in the computer, except for the purpose of an intradepartmental consult requested by an attending.
Similar rules have been instituted for cytology attendings for the same reasons: potential misplacement and/or loss of case slides.

- Residents will remove cytology slides of signed-out cases from the lab for presentation purposes only after logging the case with the designated cytotecnologist responsible for tracking slides.
- Residents will not be allowed to have unsigned case slides in the residents’ room.
- See Eileen Hauptman for additional appropriate rules and regulations.

14. Successful completion of the rotation requires

- Good performance evaluations
- Cooperation
- Professionalism
- Consistent attendance/participation
- Attendance of the weekly cytopathology conference
- Presentation of a case study at cytology conference and at Cytology Journal Club.
- Passing grade on any CAP proficiency slide tests and or federal proficiency tests taken by the laboratory staff during the rotation.
- Passing grade on a fifteen-slide test involving cases selected by the staff, including five gyn, five non-gyn, and five non-gyn FNA cases. Grading based on standard Federal Proficiency Test Scoring Grid.
- The resident will present him/herself to the director of training at 9 AM on the last day of the last month on the service for the purpose of taking the fifteen-slide exam with a two-hour time limit. Cytology texts are allowed as references.
- Once the fifteen-slide test is completed, comparison with the beginning-day computer-based-image test can be made and an assessment of improvement (or lack thereof) will be made.
- G&O: all cytopathologists and cytotecnologists take proficiency exams, ranging from federally mandated tests to CAP proficiency tests. Taking tests is part of the practice of cytopathology. The residents become familiar with the test format. ACGME expectations of documentation of improvement are fulfilled.
- ACGME Core Competency: MEDICAL KNOWLEDGE.

15. Vacation policy:

- No vacation time will be allowed during cytology rotations.
- Exceptions to this rule will be made only for emergency situations approved by the director of training.

Resident supervision

- M. Wu, Director, Cytopathology Service


• A. Szporn, Director, Supervisor, Residents’ Cytopathology Education
• D. Burstein, Attending Cytopathologist
• H. Chen, Attending Cytopathologist
• D. Zhang, Attending Cytopathologist

Evaluation

Residents are strongly advised to keep a performance-evaluation checklist while on rotation through the cytology laboratory and are evaluated by faculty supervisors based on achievement of the ACGME Core Competencies described above. On the last day of the rotation, the resident meets with the director of training to review and obtain a copy of his/her performance evaluation during the cytopathology rotation.

Failure to successfully complete the rotation will result in

• Poor ACGME-required rotational evaluation.
• Notification of the director, Pathology Residency Program.
• Notification of the department chairman.
• Recommendation from the director of the Pathology Residency Program to the American Board of Pathology that it consider not allowing the pertinent resident to sit for the anatomic-pathology board exam is one possible additional consequence of not successfully completing this rotation.

Pediatric Pathology

Overview

The overall goal of the pediatric pathology rotation is to expose the resident to the field of pediatric pathology as it relates to autopsy and surgical pathology, including the full range of inherited, developmental, and acquired disorders. The resident will have responsibilities in the evaluation of placentas, fetuses, and “products of conception,” pediatric autopsies, and surgical specimens and biopsies from pediatric patients. (Note: Other divisions in the department of pathology [e.g., hematopathology, neuropathology, GYN pathology, dermatopathology] may also review specimens from pediatric patients. Many cases are reviewed as interdivisional collaboration. The resident will also rotate through these divisions in the course of the residency program and review pediatric specimens at that time.)

Duration:

• Four weeks in the second half of the first year

Competence goals and objectives

1. Patient care
   • Gain mastery of pediatric chart review and summation.
• As indicated, contact pediatricians and surgeons for details of patient history and clinical concerns in advance of performance of the autopsy or of surgical sign-out.
• Demonstrate knowledge of appropriate diagnostic specimen collection and ancillary studies, particularly as they relate to fetal and pediatric specimens.
• Integrate and interpret information from pathologic materials (gross anatomic, histologic, and laboratory), patient history, and other sources as needed, so as to formulate preliminary and final pathologic diagnoses (i.e., PAD, FAD) for pediatric autopsies.
• Provide clear and comprehensive but concise and timely autopsy reports, including clinicopathologic correlation.
• Complete surgical and biopsy pathology reports in a timely manner.
• Verbally communicate results to clinicians, as indicated.
• Present selected pediatric pathology cases to clinicopathological conferences.

2. Medical knowledge

• Acquire knowledge of placental pathology and its correlation with gestational disorders.
• Know special autopsy techniques for fetal and pediatric autopsies, including evisceration and dissection techniques.
• Describe normal anatomy and histology in the fetus and neonate, which are essential prerequisites to understanding many congenital and acquired disorders in this age group.
• Become familiar with the pathology, pathogenesis, and clinical correlation of common congenital and acquired pediatric disorders that require surgical intervention.
• Become familiar with the pathology, pathogenesis, and clinical correlation of common congenital and acquired gastrointestinal and hepatic pediatric disorders that can be diagnosed on biopsy specimens.
• Acquire knowledge of the differential diagnosis and pathological workup—including ancillary studies—of pediatric solid tumors.

3. Practice-based learning and improvement

• Utilize performance evaluations and critiques by superiors, peers, and others (i.e., pathology assistants, morgue personnel), so as to improve individual practices on the autopsy and surgical services.
• Participate in education of medical students, residents, and other health-care professionals.
• Read continually about pediatric and obstetrical disease-specific topics to inform oneself and to formulate appropriate clinicopathologic correlates.

4. Interpersonal and communication skills

• Communicates effectively with peers, ancillary staff, pathologists, and clinicians
• Provides organized and legible reports
• Presents at pediatric clinicopathological conferences in professional manner
5. Professionalism

- Resident assumes responsibility for the autopsy cases/surgical that are assigned to him/her.
- Works up and follows up with additional studies, as indicated, for surgical cases in a complete and timely manner.
- Completes pediatric autopsy reports in a timely fashion.
- Resident is respectful of others, including deceased patients, ancillary staff, peers, authoritative figures, and other health-care individuals.
- Resident is honest, reliable, and accountable to peers, authoritative figures, patients’ families, etc.
- Attends didactic and other required educational experiences.
- Participates in scholarly activities as appropriate.

6. Systems-based practice

- Utilize clinical information of specific cases and thus develop an approach to:
  - Pediatric autopsy at hand and generate a PAD
  - Pediatric surgical cases
- Participate in/attend interdisciplinary performance improvement initiatives (i.e., morbidity and mortality conferences, and specialized divisional pediatric clinicopathological conferences).

Resident responsibilities

Note: The pediatric pathology rotation, falling in the second half of the first year, combines elements of Skill Levels I and II (see below):

1. Postmortem evaluation

Gross dissection and microscopic sign-out with a pediatric pathologist of all pediatric, fetal autopsies, and products of conception (POCs) greater than eleven weeks’ gestation. Requisite performance of postmortem examination includes:

Skill level I–II

Note: Pediatric autopsy activities build on the background residents have acquired following their general-autopsy rotation, as they learn specific approaches to pediatric disorders.

- Familiarization with the pediatric pathology manual for pediatric autopsy procedures
- Review of the autopsy permission
- Review of the pediatric (and obstetrical) clinical chart
- Consultation with clinicians prior to the autopsy
- Performance of the pediatric/fetal autopsy with supervision, as required, by the pediatric pathologist
• Construction of the PAD
• Appropriate sampling of tissues
• Recognition of the necessity for ancillary studies and their submission, as indicated
• Independent review of slides and written description of microscopic interpretations
• Relevant background reading (textbooks, journals, databases)
• Sign-out with the pediatric pathologist
• Construction of the FAD
• Composing the clinicopathological correlation
• Presenting at pediatric or perinatal-mortality conference, if indicated

Skill level II

• As above, with increasing degree of independence in dissection, more sophisticated interpretation of gross and microscopic findings, and further independent study of the relevant pediatric/obstetrical topics. It is expected that, by the end of the rotation, residents will be competent at performing routine pediatric/fetal autopsies independently (with assistance provided for complicated and specialized abnormalities).

2. Surgical pathology

Skill level I–II

(Note: Residents become familiar with surgical pathology procedures by gross dissection and sign-out of placental specimens, which they are initially instructed on and supervised by the attending pediatric pathology during their general-autopsy rotation. In the pediatric-pathology rotation, they are also exposed to other pediatric surgical specimens and biopsies.)

• Familiarization with the pediatric-pathology manual for pediatric surgical-dissection procedures.
• Gross dissection and microscopic sign-out with a pediatric pathologist of a representative number of placentas received in surgical pathology.
• Gross dissection and microscopic sign-out with a pediatric pathologist of all larger pediatric specimens.
• Sign-out of pediatric biopsies (gastrointestinal mucosal biopsies and liver) with a pediatric pathologist.
• Prepare a written microscopic description and suggest a diagnosis based on independent review of the slides prior to sign-out.
• Relevant background reading (textbooks, journals, databases) is to be done prior to and/or after sign-out.
• Presenting the cases at a clinicopathologic conference, as indicated.
Skill level II

- As above, with increasing degree of independence in dissection, more sophisticated interpretation of gross and microscopic findings, and further independent study of the relevant pediatric/obstetrical topics.

3. Conferences

The resident is expected to attend conferences in which the pediatric pathology division participates, and to present at selected pediatric clinicopathological conferences. A list of these conferences (both didactic and patient-management) follows: (Note: those marked with an asterisk are optional.)

- Pediatric Gastrointestinal Pathology Conference (weekly)
- Perinatal Pathology Conference (monthly)
- Pediatric Morbidity and Mortality Conference (monthly)
- Pediatric Tumor Board (monthly)
- Pediatric Liver Pathology Conference (monthly)
- Pediatric Surgical Pathology Conference (bimonthly, offered by the chief of the Pediatric Pathology Division to all the pathology residents)
- Pediatric Surgery Conference (biweekly)*
- Pediatric Cardiac Pathology Conference (monthly)*
- Intestinal Failure/Small Intestinal Transplantation Conference (monthly)*

Supervision

The two board-certified pediatric pathologists, Drs. Margret Magid and Raffaella Morotti, closely supervise residents on the pediatric-pathology rotation in their performance and sign-out of pediatric and fetal autopsies, placental and POC examination, and evaluation of pediatric surgical gross and biopsy specimens.

Location

All pediatric pathology responsibilities take place at the Mount Sinai Hospital. Occasionally, materials from other hospitals, including gross specimens for dissection, will be received in consultation by the pediatric-pathology division. If the gross evaluation is considered to be an educational value, the resident will participate in the dissection (and subsequent sign-out) under the direct supervision of the attending pediatric pathologist.

Evaluation

- The teaching staff closely supervises the resident’s daily activities.
- At the conclusion of the rotation, each resident is evaluated in writing by the teaching staff for the core competencies of medical knowledge, patient care, practice-based learning, systems-based practice, and professionalism/interpersonal/communication skills. The chief of pediatric pathology reviews the resident’s evaluation in conference with that resident.
Supplemental materials

Materials for independent study of pediatric gross and microscopic specimens are provided:

- Unknown glass slides with case histories
- Gross organs categorized by organ system
- An extensive archive of hearts with congenital defects

Suggested references are provided by the Division of Pediatric Pathology, and the most important textbooks are maintained in the Resident Library.

Selected topics of interest in pediatric pathology

Perinatal (placental and fetal/neonatal) features:

- Acute chorioamnionitis
- Chronic villitis
- Fetal hydrops
- Intrauterine fetal death
- Intrauterine growth restriction
- Prematurity
- Twinning—chorionicity and disorders of twinning

Pediatric:

- Biliary atresia
- Celiac disease
- Eosinophilic esophagitis
- Rectal bleeding—pathological differential diagnosis
- Hirschsprung disease
- Pediatric solid tumors—neuroblastoma, rhabdomyosarcoma, PNET, Wilms tumor (nephroblastoma), hepatoblastoma

References

Placentas

• Kaplan CG. *Color Atlas of Gross Placental Pathology*. New York: Igaku-Shoin, 1994, and 2nd ed., 2007. (Note: A pdf version of this textbook is available on the G drive in the “Pediatric Pathology” folder under the “Manuals” icon.)


**General pediatric pathology**


Neuropathology

Overview

The general goal and objectives of the neuropathology rotation is to expose anatomic-pathology residents to the full spectrum of surgical and autopsy diagnostic accessions in an active, modern neuropathology service, including many important diseases—neurodegenerative, neurodevelopmental, neuromuscular, infectious, immune, and neoplastic. Focus is on disorders unique to neuropathology, not seen in other AP rotations, and on the diagnostic workups overseen and performed by attending neuropathologists. Also included is exposure to relevant knowledge of current basic and clinical neuroscience.

Duration

The neuropathology rotation for anatomic-pathology residents is usually taken after the first year of training and requires four weeks.

Competence goals and objectives (PGY2 and above)

Patient care

- For surgical biopsy specimens.
- Be able to evaluate the gross characteristics of a specimen, accurately describe it, and appropriately sample it for microscopic evaluation.
- Be aware of special techniques to assist in the interpretation of histology and know when to use them.
- Be able to render accurate histologic diagnoses and properly identify commonly occurring lesions.
- For autopsy specimens.
- Be able to synthesize autopsy results from nervous system with the general autopsy findings to render a coherent diagnostic assessment and summary of cases.

Medical knowledge

- Know the nature of basic neurologic and neurosurgical diseases, their presentation, course, prognosis, common complications, and general approaches to treatment.
- Know the gross and microscopic aspects of neuroanatomy, especially as it relates to clinicopathologic correlation and determination of system damage/dysfunction in the context of disease states.
- Know approaches to modern workup of major nervous-system diseases through the use of histologic and immunohistochemical stains.

Practice-based learning

- When given results of their concordance with attending staff diagnoses, residents are expected to use these results, so as to direct their studying and improve their diagnostic acumen.
Interpersonal and communication skills

• Demonstrate the ability to consistently and clearly communicate to the attending staff information regarding clinical cases and their workup.

Professionalism

• Accept criticism positively.
• Demonstrate initiative and independence and carry out duties with diligence.
• Relate respectfully and appropriately to other health professionals, technical and clerical staff.

Systems-based practice

• Demonstrate an understanding of how neuropathology diagnoses affect health-care decisions for patients and the health-care system.

Resident responsibilities

The resident’s deepest responsibility in this rotation is educational: it is simply to learn as much neuropathology as possible. The “service” responsibilities are comparatively minor and merge seamlessly with the pedagogic: learning to describe, learning to reason diagnostically, and learning to teach. Specific minimal requirements are to attend and/or participate in and/or perform the daily combined surgical-and-autopsy-neuropathology sign-out/pedagogic sessions (Mon–Fri, from 1 PM); daily description and submission of surgical specimens and biopsies (after 4 PM); weekly neuropathology brain-cutting conference (Thurs, from 10 AM or 1 PM, dependent on the attending on service); weekly neuroradiology conference (Tues, 7–9 AM); unscheduled frozen sections and “neuro” autopsies (as appropriate); weekly neuro-oncology conference (Thurs, 9–10 AM); and monthly neuropathology/neurosurgery grand rounds (last Wed, 8 AM).

Supervision

• S. Morgello, M.D.
• Purohit, M.D.
• T. Naidich, M.D.

Location

Mount Sinai Medical Center and School of Medicine

Evaluation

The monthly “on-service” responsibility for diagnostic neuropathology is rotated among Drs. Fowkes and Morgello and supplemented didactically by Drs. Purohit and Naidich. The on-service attending writes an evaluation of the rotating resident, after consulting other relevant interacting personnel, and discusses the evaluation with the resident.
Dermatopathology

Overview

The general goal and objectives of the dermatopathology rotation are to expose the resident to the field of dermatopathology as it relates to both surgical pathology and dermatology. The resident will have responsibilities in the evaluation of inflammatory and neoplastic dermatologic diseases, with specimens and biopsies coming from patients in private practices affiliated with Mount Sinai, the Mount Sinai faculty practice, the Mount Sinai surgical service, and the Mount Sinai Dermatology in-patient service. Residents will also have the opportunity to see patients in any of the three clinical settings: The Mount Sinai in-patient dermatology service, the Mount Sinai Faculty practice, and the Mount Sinai Clinic.

Duration: Four weeks

Competence goals and objectives

1. Medical knowledge
   - Acquire histologic as well as clinical findings in dermatologic disease.
   - Know special biopsy techniques for a variety of conditions of the skin, including inflammatory and bullous disorders.
   - Describe normal histology of the skin, including anatomic/regional variation.
   - Become familiar with the pathology, pathogenesis, and clinical correlation of common congenital and acquired dermatologic disorders.
   - Acquire knowledge of the use of ancillary studies, immunofluorescence, and immunohistochemical techniques used in the diagnosis of skin disease.

2. Patient care
   - Pathology residents are encouraged to visit the Mount Sinai resident clinic which is in session four days a week.
   - When applicable, residents may communicate with dermatologists, dermatologic surgeons, and plastic surgeons to obtain clinical information.
   - Demonstrate knowledge of appropriate diagnostic specimen collection and the performance and interpretation of frozen sections.
   - Complete surgical and biopsy pathology reports in a timely manner.
   - Verbally communicate results to clinicians, as indicated.
   - Gain mastery in the interpretation of Mohs micrographic surgery specimens.
   - Present dermatopathology cases to clinicopathological conferences.
3. Practice-based learning and improvement
   • Utilize performance evaluations and critiques by superiors, peers, and others (i.e., pathology assistants, dermatopathology fellow) to improve individual practices on the surgical service.
   • Participate in education of medical students, residents, and other health-care professionals.
   • Read continually about dermatologic disease-specific topics for the purpose of education and to formulate appropriate clinicopathologic correlates.

4. Systems-based practice
   • Utilize clinical information of specific cases to develop an approach to the diagnosis of dermatologic disease.
   • Participate in/attend inter-disciplinary performance improvement initiatives (i.e., Dermatology Grand Rounds with patient presentations, dermatology resident book review, dermatopathology journal club).

5. Professionalism
   • Resident works up and follows up with additional studies, as indicated, for surgical cases in a complete and timely manner.
   • Resident is respectful of others, ancillary staff, peers, authoritative figures, and other health-care individuals.
   • Resident is honest, reliable, and accountable to peers, authoritative figures, patients’ families, etc.
   • Attends didactic and other required educational experiences.
   • Participates in scholarly activities as appropriate.

6. Interpersonal and communication skills
   • Communicates effectively with peers, ancillary staff, pathologists, and clinicians.
   • Presents at dermatology clinicopathological conferences in professional manner.

Resident responsibilities

1. Surgical Pathology
   • Familiarization with the dermatopathology manual for dermatologic surgical dissection procedures.
   • Gross dissection and microscopic sign-out with a dermatopathologist of a representative number of melanoma specimens.
   • Sign-out of skin biopsies with a dermatopathologist.
   • Prepare a written microscopic description and suggest a diagnosis based on independent review of the slides during sign-out.
• Relevant background reading (textbooks, journals, databases) is to be done prior to and/or after sign-out.
• Presenting the cases at a clinicopathologic conference, as indicated.

2. Conferences: The resident is expected to attend conferences in which the Dermatopathology Division participates and to present at selected dermatopathology clinicopathological conferences. A list of these conferences (both didactic and patient-management) follows.
• Dermatology Grand Rounds (weekly)
• Dermatology book review (weekly)
• Dermatology Tumor Board (twice yearly)
• Dermatopathology book review/journal club (weekly)

Supervision
The four Board-Certified Dermatopathologists, Drs. Robert Phelps, Miriam Birge, Helen Shim-Chang, and Gary Goldenberg, closely supervise residents on the dermatopathology rotation in their performance and sign-out of skin biopsies and surgical specimens.

Location
All dermatopathology responsibilities take place at the Mount Sinai Hospital. Occasionally, materials from other hospitals will be received for consultation by the dermatopathology division. If the gross evaluation is considered to be of educational value, the resident will participate in the dissection (and subsequent sign-out) under the direct supervision of the attending dermatopathologist or dermatopathology fellow.

Evaluation
• The teaching staff closely supervises the resident’s daily activities.
• At the conclusion of the rotation, each resident is evaluated in writing by the teaching staff for the core competencies of medical knowledge, patient care; practice-based learning; systems-based practice; professionalism; and interpersonal and communication skills. The Chief of Dermatopathology reviews the resident’s evaluation in conference with the resident.

Supplemental materials
• Materials for independent study of dermatologic gross and microscopic specimens are provided:
  o An extensive archive of glass slides with case histories
  o Online study sets
• Suggested references are provided by the Division of Dermatopathology, and the most important textbooks are maintained in the Resident Library.
Gynecologic Pathology

Overview
The general objective of the resident is to become familiar with gynecological and, to a certain degree, obstetrical pathology, since this represents an important volume in the work of most practicing pathologists. The residents review the patient’s clinical history; submit the gross specimens (occasionally photographed) received from the O.R., from the private offices, and from the hospital clinics; and go over the microscopic slides first by themselves, trying to make a histopathologic diagnosis. The material is quite abundant (approximately 20,000 specimens per year), including gynecologic oncology and infertility and IVF material. Our institution is a referral center for the latter, and a great variety of interesting and unusual cases—some sent for consultation from other institutions—is received, being first seen by the rotating pathology resident. (ACGME competencies: medical knowledge, patient care, practice-based learning, systems-based practice, professionalism, and communication and interpersonal skills.)

Duration
Pathology residents from our program rotate for one month during the academic year, some taking another month during the following years of their training.

Competence goals and objectives

Patient care

- Review the patient’s clinical history.
- Examine, describe, and submit gross specimens for pathological accurate diagnosis of different gynecological diseases.
- Preview microscopic slides and make preliminary histopathologic diagnosis.

Medical knowledge

- Apply anatomic knowledge to the description of gross specimens, the collection of appropriate samples for histopathological study, and diagnosis in the context of the available medical history.

Practice-based learning and improvement

- Investigate and evaluate the impact of pathological diagnoses on the clinical care of patients and review the current literature.
- Appraise and assimilate scientific evidence and its relevance to the improvement of patient care.

Interpersonal and communication skills

- Provide clear, accurate, and timely information about patients to the faculty.
- Understand information and follows instructions and guidance from the attending staff.
- Ask appropriate questions for clarification purposes.
• Obtain proper photograph of specimens to clearly illustrate and communicate specific features of appropriate cases.

Professionalism
• Relate to other health professionals and to the technical and clerical staff with respect and consideration.
• Follow high ethical standards in the conduct of all patient-care activities.
• Accept additional responsibilities without complaint or protest.

Systems-based practice
• Understand how pathological diagnoses affect health-care decisions for patients across all health and medical-care disciplines.

Resident responsibilities
• Residents study and sign out gynecologic material with the attending staff.
• They are continuously questioned on diagnostic issues, encouraged to consult bibliography, and participate in the conferences held in our department and in the department of ob/gyn.
• Clinical-pathological correlations are emphasized: residents interact with the ob/gyn residents and attendings both personally and by telephone, getting information of patient's history, clinical manifestations, and management, and in turn, offering insights into the gross and microscopic descriptions of the specimens.
• Gynecologic pathology is an extremely busy rotation. For this reason, no research project is feasible during the rotation, but the residents are exposed to challenging projects and ideas. During elective time following this rotation, many residents have worked on such projects, sending abstracts to meetings and publishing papers on subjects that “inspired” them during the gynecologic-pathology rotation.

Supervision
• L. Deligdisch, M.D.
• T. Kalir, M.D.
• C. Eliasen, M.D.

Evaluation
Assessment of professional development and demonstration of competencies corresponding to the PGY level of each resident, similar to that described for surgical pathology, with a focus on assessment of knowledge related to gynecologic pathology.
Community Pathology

Overview

The focus of rotation of the Mount Sinai residents to Englewood Hospital is twofold:

- To participate in the pathology practice of a community hospital with specific instructions in matters in which interactions between surgical pathology, clinical pathology, and the role of the pathologist as a consultant for resolving clinical problems applies.

- To offer the unique and large experience in fine needle aspiration that is available at the Cytodiagnosis and Breast Care Center. (ACGME competencies: Medical knowledge, Patient care, Practice based learning, Professionalism, Communication and interpersonal skills)

Duration

- Two Months

Competence goals and objectives

Patient Care

Residents must be able to provide patient care that is compassionate, appropriate, and effective for the treatment of health problems and the promotion of health. Residents:

- will have instruction in community hospital pathology practice, cytopathology, aspiration techniques, and other diagnostic techniques as they become available;
- will demonstrate a satisfactory level of diagnostic competence and the ability to provide appropriate and effective pathology services consultation.

Medical Knowledge

- Residents must demonstrate knowledge of established and evolving biomedical, clinical, epidemiological and social-behavioral sciences, as well as the application of this knowledge to patient care in a community hospital setting.

Practice-based Learning and Improvement

- Residents must demonstrate the ability to investigate and evaluate their care of patients, to appraise and assimilate scientific evidence, and to continuously improve patient care based on constant self-evaluation and life-long learning.

Interpersonal and Communication Skills

- Residents must demonstrate interpersonal and communication skills that result in the effective exchange of information and collaboration with patients, their families, and health professionals.
Professionalism

- Residents must demonstrate a commitment to carrying out professional responsibilities and an adherence to ethical principles. Residents are expected to demonstrate:

  1. compassion, integrity, and respect for others;
  2. responsiveness to patient needs that supersedes self-interest;
  3. respect for patient privacy and autonomy;
  4. accountability to patients, society and the profession; and,
  5. sensitivity and responsiveness to a diverse patient population, including but not limited to diversity in gender, age, culture, race, religion, disabilities, and sexual orientation.

Systems-based Practice

- Residents must demonstrate an awareness of and responsiveness to the larger context and system of health care, as well as the ability to call effectively on other resources in the system to provide optimal health care. Residents are expected to:

  1. work effectively in various health care delivery settings and systems relevant to their clinical specialty;
  2. coordinate patient care within the health care system relevant to their clinical specialty;
  3. incorporate considerations of cost awareness and risk-benefit analysis in patient and/or population-based care as appropriate;
  4. advocate for quality patient care and optimal patient care systems;
  5. work in interprofessional teams to enhance patient safety and improve patient care quality; and,
  6. participate in identifying system errors and implementing potential systems solutions.

Resident responsibilities

Rotation to surgical pathology with processing of specimens and sign out with attending pathologist. 2) Rotation through the Cytodiagnostic Center to acquire experience of the performance and interpretation of fine needle aspiration biopsies. 3) Rotation through the clinical laboratory with involvement in management decisions, including review of personnel performance.

Resident supervision:

- Miguel A. Sanchez, M.D.,
- Rosalyn Stahl, M.D.,
- J. Tzeng, M.D.,
- Ana Burga, M.D.,
- Mikhail Tismenetsky, M.D.
Evaluation:

- Each resident is assigned to an attending pathologist during the surgical pathology rotation.
- Dr. Sanchez, Dr. Stahl and Dr. Kashani provide individual direct supervision to residents during the rotation through the Cytodiagnosis Center.

**Hematopathology Rotation**

**Overview**

Residents are introduced to the fundamentals of hematopathology as an integrative discipline. Emphasis is placed upon correlation of morphological findings in hematopathology specimens (primarily bone marrow and lymph-node biopsies), with aspirate smears, flow cytometry, tumor cytogenetics, FISH, molecular diagnostics, and other ancillary studies. Residents are responsible for researching the clinical history pertinent to each case, including review of previous biopsy findings, information regarding prior diagnoses and course of treatment, and results of relevant laboratory tests. Residents must be able to correlate morphological findings with clinical history and laboratory findings, in order to establish an appropriate differential diagnosis. Assigned readings are provided over the course of each rotation. Learning is assessed by discussions with the hematopathology faculty during case sign-out. Residents are responsible for presenting pathology and flow cytometry findings for hematological malignancy cases at adult hematology/oncology tumor board, as well as pediatric tumor board.

**Duration**

The equivalent of at least three four-week rotations on the hematopathology service. Residents may spend additional time on the hematopathology service if scheduling permits.

**Competence goals and objectives**

1. **Patient care**
   
   The resident is expected to optimize patient care by
   
   - Thorough compilation of clinical history and laboratory results prior to sign-out sessions.
   - Keeping track of cases and following up on ancillary studies in a timely fashion.
   - Maintaining close channels of communication with clinicians, especially in difficult or urgent cases.

2. **Medical knowledge**
   
   - Residents are expected to do background reading pertinent to each new disease entity as they encounter them in the case material.
   - Residents must adequately prepare for tumor boards. Having reviewed recent literature relevant to each case.
   - Residents must be prepared to anticipate and field questions from the audience.
   - Assigned readings will be provided over the course of each rotation.
• Learning is assessed by verbal discussions with residents during case sign-out.

3. Practice-based learning and improvement

Residents are expected to utilize performance evaluations and critiques by
• superiors to improve their practices.
• Residents are expected to participate in the education of medical students and other residents.
• Residents are expected to do background research on specific disease entities as they are encountered in cases seen over the course of the rotation.

4. Interpersonal and communication skills

• Effective communication with peers, ancillary staff, pathologists, and clinicians is expected.
• Resident is required to provide thorough and concise clinical information at time of sign-out; if adequate clinical information is unavailable, the resident is expected to communicate with the clinician.
• Residents are expected to present pathology and flow cytometry findings at adult hematology/oncology and pediatric tumor boards.

5. Professionalism

• Resident is responsible for thorough and timely preparation of cases.
• Resident is responsible for following up ancillary studies.
• Resident is responsible for self-study and completion of learning objectives for each rotation.
• Resident is responsible for adequately preparing cases for tumor boards.
• Resident is responsible for maintaining civil and courteous behavior toward colleagues and other employees of the institution.

6. Systems-based practice

• Residents are expected to bring to bear multidisciplinary clinical information to provide a framework for the interpretation of biopsy specimens.
• Residents are expected to synthesize data from multiple laboratory modalities (morphological interpretation, FISH/cytogenetic, molecular studies, etc.) to arrive at an appropriate diagnosis, or differential diagnosis, for each case.
• Residents are expected to participate in interdisciplinary conferences.
Resident responsibilities

Each resident must complete the equivalent of at least three four-week rotations on the hematopathology service. Residents may spend additional time on the hematopathology service if scheduling permits. The workday is structured as follows:

9 AM: Resident checks bone-marrow box in histology laboratory for requisition sheets.

9 AM–12 PM: Resident reviews each case history and writes a summary. Resident does background research on the disease entity(ies) relevant to each case and retrieves slides on prior cases, as appropriate.

1–2 PM: Slides are usually available at approximately 1:00 PM. From this time onward, resident independently reviews slides and writes down findings.

2–4 PM: Cases are signed out with Drs. Strauchen and Petersen.

Additional activities

- Hematology/Oncology Tumor Board, Thursday (7:30–8:30 AM).
- Pediatric Tumor Board, Tuesday (4–5 PM) (participation is only required on days when hematological malignancies are presented).

Assignment schedule

Rotation I (4-week duration)

- Emphasis is on basic principles
  - Normal bone-marrow and lymph-node morphology
  - Normal maturation sequence of myeloid and lymphoid lineages
  - General approaches to interpretation of bone-marrow biopsies, aspirate smears, lymph node biopsies, and other specimen types.
  - Current WHO classification scheme for hematologic neoplasms
  - Introduction to flow cytometry interpretation
  - General understanding of myeloid and lymphoid neoplasms. Introductory reading material is provided.
  - General understanding of benign conditions affecting bone-marrow and lymphoid tissues

- Flow cytometry laboratory experience
  - Resident is expected to schedule five mornings in the clinical flow-cytometry laboratory over the course of the first rotation, in order to obtain an understanding of laboratory techniques and instrumentation employed in the preparation and analysis of various specimen types for flow cytometry. General principles of laboratory practice, including QA/QC procedures are also covered (see supplement, below).
Rotation II (4-week duration)

- Emphasis is on a more nuanced understanding of specific hematological disorders.
  - Residents are expected to write diagnoses in entirety prior to sign-out.
  - More advanced reading materials are provided.
  - Residents are expected to have at least a cursory knowledge of all hematological neoplasms as defined by current WHO criteria.
  - Residents are expected to achieve a detailed understanding of common hematological neoplasms, with emphasis on molecular mechanisms.

Rotation III (4-week duration)

- Emphasis is on solidification of knowledge acquired during previous rotations.
  - Additional reading materials are provided.
  - Resident is required to do in-depth study of a specific disease entity; this may take the form of submission of a case-report article for publication or presentation at a national meeting, or a case-based overview of a specific disease entity presented to faculty and residents of the department.

References

- Greer, JP et al., eds., *Wintrobe’s Clinical Hematology*, 12th ed.
  Wintrobe, Maxwell M. and John P. Greer, 2009.
• Swerdlow, SH et al., eds., WHO Classification of tumours of Haematopoietic and Lymphoid Tissues, IARC: Lyon, 2008.

Online resources

• ASH image bank (http://imagebank.hematology.org/)
• Pathology Outlines online (http://www.pathologyoutlines.com/)

Forensic Medicine Rotation

Overview

The general goals and objectives of the forensic pathology rotation are to enable residents to gain competence in the performance of the medico-legal autopsy, become familiar with the differences between hospital-based and forensic autopsies, know the rationale and techniques of preserving evidence, gain further competence in the process of certifying causes of death, and be familiar with the techniques of forensic serology, forensic toxicology, and scene investigation. (ACGME competencies: medical knowledge, patient care, practice-based learning, systems-based practice, professionalism, and communication and interpersonal skills.)

Duration: One month

Competence goals and objectives

Patient care

• Participate in the investigation of criminal scenes.
• Perform medico-legal autopsy dissections.

Medical knowledge

• Apply principles of forensic medicine to the analysis of pathological findings in the context of other forms of evidence obtained from criminal investigation sites to determine causes of death.

Practice-based learning and improvement

Residents must demonstrate the ability to investigate and evaluate their experience with forensic cases, to appraise and assimilate scientific evidence, and to continuously improve assessments of criminal evidence and pathological diagnoses in cases of unnatural causes of death. Residents should be able to meet the following goals: (1) identify strengths, deficiencies, and limits in one’s knowledge and expertise; (2) set learning and improvement goals; (3) identify and perform appropriate learning activities; (4) systematically analyze practice using quality improvement methods, and implement changes with the goal of practice improvement; (5) incorporate formative evaluation feedback into daily practice; (6) locate, appraise, and assimilate evidence from scientific studies related to their patients’ health problems; (7) use information technology to optimize learning; and (8) participate in the education of families, students, residents, and other professionals.
Interpersonal and communication skills

Residents must demonstrate interpersonal and communication skills that result in the effective exchange of information and collaboration with families, health professionals, and legal, judiciary, and law-enforcement professionals. Residents are expected to: (1) communicate effectively with the public, as appropriate, across a broad range of socioeconomic and cultural backgrounds; (2) communicate effectively with physicians, other health professionals, and health-related, law-enforcement, and legal agencies; (3) work effectively as a member or leader of a health-care team or other professional group; (4) act in a consultative role to other physicians and health professionals; and (5) maintain comprehensive, timely, and legible medical records, if applicable.

Professionalism

Residents must demonstrate a commitment to carrying out professional responsibilities and an adherence to ethical principles and the law. Residents are expected to demonstrate: (1) compassion, integrity, and respect for others; (2) respect for privacy, confidentiality, and autonomy; (3) accountability to society, the law, and the profession; and (4) sensitivity and responsiveness to a diverse patient population, including but not limited to diversity in gender, age, culture, race, religion, disabilities, and sexual orientation.

Systems-based practice

Residents must demonstrate an awareness of and responsiveness to the larger context and system of health care, and recognize conditions and circumstances that may raise the possibility of criminal activity as well as the ability to call effectively on other resources in the health, law-enforcement, and legal system to provide optimal assessments of health-care factors and differentiation between natural and unnatural deaths. Residents are expected to:

- work effectively in various health-care delivery settings and systems relevant to their clinical specialty.
- coordinate patient care within the health-care system relevant to their clinical specialty.
- incorporate considerations of cost awareness and risk-benefit analysis in patient and/or population-based care as appropriate.
- advocate for quality patient care and optimal patient-care systems.
- work in interprofessional teams to enhance patient safety and improve patient care quality; and
- participate in identifying system errors and implementing potential systems solutions.

Resident responsibilities

In general, residents will spend one month of their residency training at the OCME, where they participate in all phases of the forensic autopsy. Under the supervision of the deputy chief medical examiner, residents are involved in:

- Scene investigations with medico-legal investigators
- Performance of autopsy dissections as first or second prosecutors, in tandem with assigned medical examiners
- Determination of the cause and manner of death
- Daily presentations and discussions of cases to the chief medical examiner
- Review of microscopic, microbiologic, and toxicological studies
- Accompanying the medical examiner to court to observe expert forensic testimony
Although residents are not allowed to prepare final medico-legal autopsy reports, they are included in the formulation of the details of individual cases. Residents are required to maintain a log of all cases in which they have participated at the OCME. Formal lectures in forensic medicine are given to the residents on rotation at the OCME. These lectures are supplemented by additional lectures given at MSH by staff members of the OCME, who are invited on an annual basis.

**Resident supervision**

- Dr. Charles S. Hirsch, Chief Medical Examiner of the City of New York
- Dr. Barbara Sampson, First Deputy Chief Medical Examiner, and
- Staff of the Medical Examiner’s Office.

**Location**

Office of the Chief Medical Examiner for the City of New York

**Evaluation**

Residents are evaluated by the deputy medical examiner and staff of the Office of Chief Medical Examiner for the City of New York.

**Gastrointestinal Pathology Elective**

**Overview**

The division includes four attending pathologists who collectively evaluate over 12,000 surgical, biopsy, and consult cases annually. These cover the gamut of diseases that affect the gastrointestinal tract, including a wide variety of neoplastic and chronic inflammatory bowel diseases. The surgical specimens are divided between residents on the elective and those on the general surgical pathology and pediatric services. During the rotation, residents are incorporated into the daily activities of the division; attend, prepare, and make presentations at divisional and multidisciplinary conferences; and undertake independent study.

The overall goals and objectives of the rotation are to familiarize residents with the field of gastrointestinal pathology, including acquisition of skills and mastery of techniques for the systematic study of gross and microscopic tissue morphology; correlation of pathological findings with clinical characteristics; and endoscopic aspects of the various inflammatory and neoplastic disorders that affect the gastrointestinal tract. Prepare residents to provide pathology consultation to surgeons, internists, and oncologists dealing with gastrointestinal orders. (ACGME competencies: medical knowledge, patient care, practice-based learning, professionalism, interpersonal and communication skills.)

**Duration**

- One month

**Competence goals and objectives**

Patient care
• Acquisition of skills and mastery of techniques for the systematic study of gross and microscopic tissue morphology.
• Correlation of pathological findings with clinical characteristics.
• Endoscopic aspects of the various inflammatory and neoplastic disorders that affect the gastrointestinal tract.

Medical knowledge
• Apply principles of anatomy and histology to understanding of abnormalities of the gastrointestinal system.
• Make correlations of pathological findings with clinical disease as evidence in radiological studies and other clinical diagnostic procedures.

Practice-based learning and improvement
• Identify strengths, deficiencies, and limits in knowledge and expertise at different stages of professional development.
• Set learning and improvement goals.
• Identify and perform appropriate learning activities.
• Locate, appraise, and assimilate evidence from scientific studies related to their patients’ health problems.
• Use information technology to optimize learning.

Interpersonal and communication skills
• Provide pathology consultation to surgeons, internists, and oncologists dealing with gastrointestinal orders.

Professionalism
• Residents must demonstrate a commitment to carrying out professional responsibilities and an adherence to ethical principles.
• Residents are expected to demonstrate
  (1) compassion, integrity, and respect for others;
  (2) responsiveness to patient needs that supersedes self-interest;
  (3) respect for patient privacy and autonomy;
  (4) accountability to patients, society, and the profession; and
  (5) sensitivity and responsiveness to a diverse patient population, including but not limited to diversity in gender, age, culture, race, religion, disabilities, and sexual orientation.

Systems-based practice
Residents must demonstrate an awareness of and responsiveness to the larger context and system of health care, as well as the ability to call effectively on other resources in the system to provide optimal health care. Residents are expected to:

1. Work effectively in various health-care delivery settings and systems relevant to their clinical specialty;
2. Coordinate patient care within the health-care system relevant to their clinical specialty;
3. Incorporate considerations of cost awareness and risk-benefit analysis in patient and/or population-based care as appropriate;
4. Advocate for quality patient care and optimal patient-care systems;
5. Work in interprofessional teams to enhance patient safety and improve patient-care quality; and
6. Participate in identifying system errors and implementing potential systems solutions.

**Resident responsibilities**

- Residents participate in all stages of GI specimen evaluations, including gross descriptions, appropriate sampling for histology, and microscopy studies and diagnosis; criteria for the selection and interpretation of special stains and other special studies; review of clinical, radiological, and endoscopic data and their correlation with pathological findings.
- Residents actively participate in direct consultations between GI pathology, fellows, attendings, and clinicians.
- Mandatory attendance at GI-pathology conferences, in addition to participation in other departmental didactic activities.

The patient-management and GI didactic conferences include:

- GI Case Review Conference (daily)
- Intestinal Failure/Transplantation Conference (biweekly)
- GI Pathology Case Conference (weekly)
- GI Endoscopy Conference (weekly)
- GI Clinical Grand Rounds (weekly)
- GI Pathology Journal Club (weekly)

Residents are assigned progressive levels of responsibility and graded as they demonstrate growing competence and technical skills on the following duties:

- Gross evaluation, description, and histologic sampling of surgical specimens under supervision of attending staff.
- Review of all surgical and biopsy cases prior to sign-out, including clinical correlations and special studies.
- Participation in microscopic sign-out.
- Participation in preparation of cases for conferences and presentation of cases.
- Independent study using texts, CDs, and collections of journals and reprints available in division offices and institutional libraries.

Resident supervision
- Noam Harpaz, M.D., Ph.D. (Director)
- Stephen Ward, M.D., Ph.D.
- Alexandros D. Polydorides, M.D., Ph.D.
- Hongfa Zhu, M.D.

Evaluation
- The teaching staff closely supervises the resident’s daily activities, assesses, and monitors his/her progressive competence when performing assigned tasks during the rotation.
- A summative performance evaluation is performed at the conclusion of the rotation and the results are discussed with the resident, highlighting areas both of strength and in which further development is desirable.
- Approaches to strengthen areas of perceived weakness or difficulty are also discussed, if encountered, during the rotation.

Research Elective

Overview
The general goals and objectives of the research elective in pathology are to familiarize residents with the role of research in pathology, help residents develop an appreciation of the research process, learn “bench” techniques, and learn to write and publish a scientific paper.

Duration: One to three months

Competence goals and objectives

1. Patient care
   - Demonstrate knowledge of appropriate specimen collection and handling for research and the performance and interpretation of the results of research studies on patient samples.
   - Present pertinent findings at research and clinicopathological conferences.

2. Medical knowledge
   - Acquire knowledge of the use of ancillary studies and state-of-the-art techniques used in the scientific investigation of various diseases.
3. Practice-based learning and improvement

- Utilize performance evaluations and critiques by superiors, peers, and others to improve individual practices and methods in pathology research.
- Read selectively and in depth about the underlying mechanisms of disease to formulate appropriate working hypotheses and plans for research in a particular topic.
4. Interpersonal and communication skills

- Communicates effectively with peers, ancillary staff, pathologists, and clinicians.
- Presents at dermatology clinicopathological conferences in professional manner.
- Makes clear and effective presentations of research findings at research-in-progress conferences.
- Participates in literature reviews on specific aspects of the research area chosen.
- Collaborates and communicates effectively with all members of the research team and all collaborators.

5. Professionalism

- Works up and follows up with assigned duties as instructed in a complete and timely manner.
- Resident is respectful of others, ancillary staff, peers, authoritative figures, scientists, and other personnel individuals.
- Resident is honest, reliable, and accountable to peers, authoritative figures, patients’ families, etc.
- Attends didactic and other required educational experiences.
- Participates in scholarly activities as appropriate.

6. Systems-based practice

- Utilizes clinical information of specific cases to develop an approach to the investigation of some specific aspect of disease.
- Participate in/attend inter-disciplinary performance-improvement initiatives (i.e., Grand Rounds with patient presentations, journal club, and other similar activities).

**Resident responsibilities**

The specific duties and responsibilities assigned to residents during the research elective vary by type of research areas of interest and the length of the rotation. Opportunities are available for residents to undertake research projects in the following areas:

- Immunopathology: Dr. Swan Thung
- Molecular biology of hormone receptors: Dr. Tamara Kalir
- Polymerase chain reaction for detection of Epstein-Barr and other viruses: Dr. Susan Morgello
- A variety of clinical projects is also available through the program’s CP components and clinical-research collaborators
Resident supervision

Varies by the area of chosen research and interest indicated above.

- Dr. Swan Thung
- Dr. Susan Morgello
- Dr. Tamara Kalir

Location

- Mount Sinai Medical Center and School of Medicine

Evaluation

- Direct and indirect supervision of residents is provided by the corresponding research preceptors and by specialized technical staff in each area.
- Competence assessments are based on performance of the various techniques and procedures relevant to the research in each particular area of research; presentation of their research work in research-in-progress conferences; literature reviews on specific aspects of the research area chosen by the resident; exit personal interview at the end of the rotation; and review of written reports of the results and analysis of the data gathered during the research-elective rotation.

Renal Pathology Elective

Overview

The general goal and objectives of the renal pathology rotation are to expose the resident to non-urologic diseases of the kidney, including glomerular, tubular, interstitial, and vascular renal processes. Be able to evaluate renal biopsies utilizing light, electron, microscopic, and immunopathologic techniques. Familiarize the resident in the area of renal transplantation, including evaluation of donor biopsies and post-transplant processes such as acute and chronic rejection, acute tubular necrosis, recurrence of the original renal disease, viral infection, and PTLD. (ACGME competencies: medical knowledge, patient care, practice-based learning, professionalism, interpersonal and communication skills.)

Duration

One-month rotation, often combined with other non-surgical rotations, e.g., clinical pathology and/or specialty areas in anatomic pathology.

Competence goals and objectives

1. Patient care

   - Expose the resident to non-urologic diseases of the kidney, including glomerular, tubular, interstitial, and vascular renal processes.
• Familiarize the resident in the area of renal transplantation, including evaluation of donor biopsies and post-transplant processes such as acute and chronic rejection, acute tubular necrosis, recurrence of the original renal disease, viral infection, and PTLD.

2. Medical knowledge
• Be able to evaluate renal biopsies utilizing light, electron, microscopic, and immunopathologic techniques.

3. Practice-based learning and improvement
• Utilize performance evaluations and critiques by superiors, peers, and others to improve individual practices and methods in urogenital-pathology-subspecialty practice.

4. Interpersonal and communication skills
• Communicates effectively with peers, ancillary staff, pathologists, and clinicians.
• Presents at clinicopathological conferences in professional manner.
• Makes clear and effective presentations at various conferences.
• Participates in literature reviews on specific urogenital diseases.

5. Professionalism
• Works up and follows up with assigned duties as instructed in a complete and timely manner.
• Resident is respectful of others, ancillary staff, peers, authoritative figures, scientists, and other personnel individuals.
• Resident is honest, reliable, and accountable to peers, authoritative figures, patients’ families, etc.
• Attends didactic and other required educational experiences.
• Participates in scholarly activities, as appropriate.

6. Systems-based practice
• Utilizes clinical information of specific cases and conditions to discuss specific aspects of disease in the context of multidisciplinary medical care.
• Participates in/attend inter-disciplinary performance-improvement initiatives (i.e., Grand Rounds with patient presentations, journal club, and other similar activities.)

Resident responsibilities
The resident will review renal biopsy slides, electron microscopy, and immunopathology with Dr. Dikman. In the beginning of the second week, written descriptions of the biopsy findings will be required to evaluate interpretation of the specimens. Attend daily biopsy review sessions; weekly Wednesday combined nephrology-renal-pathology conference at 4 PM; monthly Monday 4 PM nephrology-renal-pathology grand rounds in the department of medicine; weekly Friday renal-transplant-pathology conference at 1:30 PM.
Resident supervision:

- S. Dikman, M.D.

Evaluation:

- Performance-assessment form by Dr. Dikman, fellows, technical staff, and clinicians.
- Self-assessment of professional growth, acquisition of skills, and growth in the confidence level of the resident in the evaluation and diagnosis of renal diseases after the completion of the rotation.

**Electron Microscopy Elective**

**Overview**

The electron microscopy rotation is designed to teach pathology residents the technologies associated with such diagnostic procedures and specific mechanisms by which diagnoses are made and correlated with histologic and immunologic diagnoses. There are one- and two-month rotations, which are elective rotations, potentially available. The resident also participates with diagnoses in cases he/she is involved at the histologic level, which requires electron microscopy.

**Duration:** One or two months

**Competence goals and objectives**

1. **Patient care**
   - Expose the resident to diseases requiring ultrastructural examination of tissue samples for definitive diagnosis.

2. **Medical knowledge**
   - Be able to evaluate biopsies from various tissues utilizing light, electron, microscopic, and immunopathologic techniques.

3. **Practice-based learning and improvement**
   - Utilizes performance evaluations and critiques by superiors, peers, and others to improve individual practices and methods in ultrastructural pathology in general and subspecialty pathology practice.

4. **Interpersonal and communication skills**
   - Communicates effectively with peers, ancillary staff, pathologists, and clinicians.
   - Presents at clinicopathological conferences in professional manner.
   - Makes clear and effective presentations at various conferences.
   - Participates in literature reviews on specific application of ultrastructural pathology to the understanding of diseases.
5. Professionalism

- Works up and follows up with assigned duties as instructed in a complete and timely manner.
- Resident is respectful of ancillary staff, peers, authoritative figures, scientists, and other personnel individuals.
- Resident is honest, reliable, and accountable to peers, authoritative figures, patients’ families, etc.
- Attends didactic and other required educational experiences.
- Participates in scholarly activities, as appropriate.

6. Systems-based practice

- Utilizes clinical information of specific cases and conditions to discuss specific aspects of disease in the context of multidisciplinary medical care.
- Participates in/attend inter-disciplinary performance-improvement initiatives (i.e., Grand Rounds with patient presentations, journal club, and other similar activities).

Resident responsibilities

- The rotations are preferable during year one or two so that their follow-up cases in the later years can be more productive. Further, when electron microscopy is performed on surgical pathology and autopsy cases presented, the residents go over the diagnostic features with Dr. Ronald E. Gordon, Director of Electron Microscopy.

Resident supervision

- R. Gordon, Ph.D., Director of Electron Microscopy

Locations

- Mount Sinai Medical Center and School of Medicine

Evaluation

- Direct and indirect supervision of each resident in the performance and mastery of skills and concepts in ultrastructural pathology.
- Residents are evaluated on their presentations and what they have learned from the electron microscopy that contributes to the case diagnosis.
**Clinical Pathology Program**

**Overview**

The overall aim of the rotations is to train the resident in the multiple disciplines of clinical pathology and to prepare him/her for the role of laboratory director in the modern health-care era. Emphasis is placed on clinical interpretation, quality assurance, laboratory management, and informatics, as well as the technical and methodological aspects of laboratory practice.

**Duration**

- Eighteen months, commencing in the second year of residency, typically divided as follows:

  | Clinical biochemistry, including toxicology and endocrinology: | four months |
  | Hematology, including tumor cytogenetics:                     | four months |
  | Microbiology, including immunology and molecular methods:     | four months |
  | Transfusion medicine, including HLA testing:                  | three months |
  | Laboratory management and medical informatics:               | one month   |
  | Electives:                                                   | one to two months |

Note: Electives may consist of additional time in the laboratories listed above, or in any special laboratory area.

**Resident responsibilities**

In addition to the activities in each laboratory, the resident in clinical pathology is expected to attend the weekly morning lectures/conferences held at Mount Sinai. This consists of the following:

- Tuesday, 8–9 AM: Laboratory medicine seminar*
- Tuesday, 9:15–10:30 AM: Laboratory tutorial
- Tuesday, 10:30–11:30 AM: Problem-case presentation
- Tuesday, 11:30 AM–12 PM: ASCP in-service examination review

*The entire Tuesday morning is focused on the topic chosen for the 8 AM laboratory medicine seminar.

**Resident supervision**

- Melissa Pessin-Minsley, M.D., Ph.D.
- Others as listed in each of the rotation descriptions.

**Evaluation**

Residents are evaluated and supervised by the faculty laboratory directors in each rotation. Rotations in each of the laboratories in a particular discipline are structured in a way that the resident receives
appropriate, graduate, and progressive instruction, whether he/she completes the rotation at one time in one laboratory or in shorter periods in different laboratories at the different teaching institutions.

**Blood Bank/Transfusion Medicine Rotation**

**Overview**

Training in blood bank/transfusion medicine (BB/TM) at the Mount Sinai School of Medicine Pathology Residency Program consists of three months of rotations at the Medical Center. Training consists of rotations through the transfusion-medicine and cellular-therapy department, which includes: blood-bank laboratory, blood donor/apheresis center, clinical HLA laboratory, and stem-cell processing laboratory. The Mount Sinai BB/TM is a full-service operation that provides training opportunities to residents in all aspects of transfusion medicine and cellular therapy. The objective of this rotation is to prepare pathology residents for their role as practicing pathologists in providing medical supervision for the transfusion service in a community hospital. Higher-level training with more clinical emphasis is available as an elective course for those highly interested in BB/TM. Residents are also prepared for successful completion of the BB/TM section of the American Board of Pathology board examination in clinical pathology.

**Duration:**

- Three months, with option for additional months as elective time.

**Competence goals and objectives**

**Patient Care**

- Learn collaboration with other professionals, including those in other disciplines, in providing patient-focused care.
- Learn the principles of compassionate and cost-effective patient care.
- Gain diagnostic competence and the ability to provide appropriate and effective pathology services and clinical consultation.
- Gather accurate patient data, and perform consultations regarding therapeutic apheresis, transfusion reactions, serologic workups, hemostasis, or other transfusion-related issues.
- Make informed decisions regarding the diagnostic workup of blood-bank serologic specimens based on patient’s clinical history, literature searches, textbooks, and clinical judgment.
- Use available information technology (hospital and laboratory information systems, electronic bibliographic searches, and journals) to support workup and diagnosis, and to help educate clinicians by providing relevant literature references.
- Demonstrate competence in the performance of tasks considered essential for transfusion medicine practice, including:
Understanding laboratory testing and blood-product usage, including coagulation factors.
Consultation and medical supervision of therapeutic apheresis procedures.
Completing transfusion-reaction investigations with appropriate follow-up to the clinical services.
Understanding basics of donor evaluation, both allogeneic whole-blood and peripheral-blood stem-cell donors.

Interpersonal and Communication Skills

• Communicate effectively with peers, ancillary staff, pathologists, and clinicians.
• Provide effective teaching in presentation(s) to technical staff and resident colleagues.
• Actively participate in the teaching of medical students and other health-care professionals, including:
  – Teaching students on elective rotations in pathology and in medical-school courses as laboratory instructors.
  – Teaching students and fellows from other disciplines during in-hospital clinical conferences.
  – Teaching laboratory and donor-center staff by providing in-service education.
• Generate concise, accurate, and organized written reports.
• Present at conferences and participate in committee meetings in a professional manner.

Medical Knowledge

• Acquire knowledge of basic immunohematology and clinicopathologic correlation. Become familiar with immunohematologic testing and blood-bank automation. Be able to complete concise and accurate serologic and transfusion-reaction evaluations.
• Become familiar with blood-donor evaluation, blood-component manufacturing, testing, and storage.
• Become familiar with transfusion-medicine practices as applied to specific patient populations, including surgery, hematology/oncology, hematopoietic stem-cell transplantation, pediatrics, and obstetrics.
• Acquire knowledge of the principles of therapeutic apheresis and hematopoietic stem-cell collection, and the rationale for using apheresis in a variety of disease states. Be able to formulate appropriate differential diagnoses, and develop treatment plans for therapeutic apheresis consults.
• Acquire knowledge of stem-cell processing laboratory practices, including quality control and monitoring of stored products.
• Acquire knowledge of molecular techniques used in HLA typing and donor matching, including use of national registries for donor searches.
Practice-Based Learning and Improvement

- Facilitate the learning of students, residents, colleagues, and other health-care professionals.
- Demonstrate the ability to analyze, practice, experience, and perform practice-based improvement activities using a systematic methodology, including participation in quality-monitoring efforts (e.g., assisting with transfusion utilization/appropriateness audits).
- Demonstrate competency in the use of information technology to manage information, access online medical information, and support their own education, including accessing of patient’s clinical information and previous laboratory results via the hospital’s Laboratory Information System, and performing computer bibliographic searches.
- Demonstrate ability to locate, appraise, and assimilate evidence from scientific studies related to patient’s health-care problems, including using literature searches to find relevant scientific references to aid in performing laboratory and clinical consultations.

Professionalism

- Assume responsibility for timely completion of assigned cases, including apheresis consultations and transfusion-reaction workups.
- Attend case rounds, staff meetings, didactic conferences, and other educational activities.
- Maintain commitment to confidentiality of patient information, informed consent, and ethical business practices.
- Become familiar with principles relating to conflicts of interest and appropriate and accurate billing for professional services.

Systems-Based Practice

- Demonstrate familiarity with clinical disciplines related to the specialty of transfusion medicine, including: clinical hematology, immunology, and infectious disease as they apply to transfusion medicine. Participate in interdisciplinary patient conferences, including adult-and-pediatric hematopoietic stem-cell-transplant rounds.
- Develop an awareness of and responsiveness to the larger context and system of health care and the ability to access and effectively use resources to provide value-added pathology services.
- Understand how pathology services affect other health-care professionals, organizations, and systems. Understand how to partner with health-care managers and health-care providers to assess, coordinate, and improve health care, and knowledge of how these activities can affect system performance.
- Demonstrate knowledge of methods for controlling health-care costs and allocation of resources.
Resident responsibilities

All Levels:

• Report to Blood Bank by 9:15 AM, after attending 8 AM teaching conferences
• Review blood-bank log for issues requiring physician attention
• Check in with supervisory staff, review inventory issues
• Check in with BB/TM attending physicians
• Attend daily blood bank/transfusion medicine morning rounds
• Attend weekly stem-cell rounds

Donor Room/Blood Bank/Immunohematology and HLA Laboratories

Skill Level I–II:

• Familiarization with blood typing, antibody screening, and antibody identification; practicing techniques at bench with supervision.
• Drafting of transfusion-reaction evaluations for review with attending.
• Review of the clinical chart as needed for special product requests, platelet reviews, requests for irradiated or washed products.
• Consultation with clinicians for special product requests.
• Recognition of the necessity for ancillary studies and their submission, as indicated.
• Review of antibody panels prior to sign-out rounds.
• Preparing for sign-out rounds with attending physicians.
• Relevant background reading (textbooks, journals, databases).
• Presenting at CP-Case Conference.
• Attending morning rounds; afternoon sign-out rounds; monthly BB/TM meeting with lab administration; attending transfusion-committee meeting.
• Attending weekly pediatric-and-adult hematopoietic stem-cell rounds

Skill Level II:

• As above, with increasing degree of independence in obtaining clinical histories/patient information, responding to donor-eligibility questions, more sophisticated interpretation of transfusion reactions, and further independent study of the relevant transfusion-medicine topics.
• It is expected that, by the end of the rotation, residents will be competent at performing routine transfusion-reaction evaluations independently (with assistance provided for complicated cases or unusual serologic findings).
• Begin assisting with blood-utilization reviews and document reviews appropriately.
• Begin assisting blood-bank staff with inventory issues and platelet triage.
• Begin assisting with look-back and recall investigations.
• Assist with accreditation interim reviews and participate in CAP inspections.
• Complete rotations through HLA laboratory.

Apheresis /Stem-Cell Collections

Skill Level I–II:

• Familiarization with the principles of apheresis (therapeutic and donor) and stem-cell collections.
• Review of patient history and chart in preparation of consultation notes for therapeutic-apheresis cases.
• Review of patient history and chart in preparation of history and physical for stem-cell-collection patients and donors.
• Relevant background reading (textbooks, journals, databases) is to be done prior to and/or after sign-out.
• Presenting the cases at clinicopathologic conference, as indicated.
• Presenting at CP case conference.

Skill Level II:

• As above, with increasing degree of independence in obtaining clinical histories/patient information, responding to adverse reactions during apheresis procedures, and more sophisticated assessment and recommendation/treatment plans for apheresis consultations.
• Further independent study of the relevant transfusion medicine topics.
• It is expected that, by the end of the rotation, residents will be competent at performing routine apheresis consultations (category-I indications, unambiguous benefit/apheresis as first-line therapy) independently (with assistance provided for complicated cases or unusual laboratory findings).
• Complete rotations through stem-cell processing laboratory.
• Present or lead discussion on a topic during the last month of blood-bank rotation.

Resident supervision
• Kathleen A. Leonard, M.D., Medical Director (AP/CP and BB/TM)
• S. Yoon Choo, M.D., Associate Medical Director (CP and BB/TM, Clinical HLA Lab)
• Ding Wen Wu, M.D., Ph.D., Associate Medical Director (CP and BB/TM)

Location:
Mount Sinai Medical Center, Klingenstein Clinical Center, B level.

Facilities
• Blood Bank Laboratory
• Blood Donor Center
• Therapeutic Apheresis /Apheresis Stem-Cell Collection Facility
• Clinical HLA Laboratory
• Stem-Cell Processing Laboratory

Evaluation
All attending physicians on the blood bank/transfusion medicine service participate in the supervision and instruction of residents during their BB/TM rotations. Initially, all of the resident’s daily activities are closely supervised by the teaching faculty. As the resident progresses through the rotation, gains experience, and demonstrates competence, he/she progresses to indirect supervision. The manner of resident supervision varies, depending on that resident’s experience, level of expertise, and comfort level with providing consultative services. When more than one resident is rotating through BB/TM, as appropriate, the more senior resident may assist in the instruction of the junior resident.

Residents are evaluated according to the core competencies identified by the Residency Review Committee for Pathology, including: patient care, medical knowledge, practice-based learning and improvement, interpersonal and communications skills, professionalism, and systems-based practice.

Attending physicians on the blood bank/transfusion medicine service will evaluate residents on the BB/TM rotations. Residents may be evaluated for fund of knowledge, technical expertise, timeliness/thoroughness of written reports, and the quality of intradepartmental and interdepartmental conference presentations. Written evaluations are available to all the residents for review and discussion with the director of transfusion medicine, their residency advisor, and/or the program director. Competence assessment form
Resident Rotation Objectives/Skills:
Blood Bank/Transfusion Medicine/Cellular Therapy

Resident Name:  
Rotation Month(s): □ 1 of 3 (required) □ 2 of 3 (required) □ 3 of 3 (required) □ 4 (elective) □ 5 (elective)
PGY Level: Rotation Dates: 

ACGME competencies (BB/TM key)
1= Patient Care  4= Practice-Based Learning and Improvement
2= Interpersonal and Communication Skills  5= Professionalism
3= Medical Knowledge  6= Systems-Based Practice

<table>
<thead>
<tr>
<th>Objective Skill</th>
<th>ACGME Competencies</th>
<th>Level</th>
<th>Completion Date</th>
<th>Attending Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Donor Room/Blood Bank/Immunohematology and HLA Laboratories</td>
<td>1,2,3,4,5,6</td>
<td>I-II</td>
<td></td>
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</tr>
<tr>
<td>Demonstrates knowledge of hospital-clinical-information systems (Epic, EDR) and laboratory-information systems (SoftLab, SoftBank, and SoftDonor) and ability to extract data as needed</td>
<td>1,2,3,4,5,6</td>
<td>I-II</td>
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<tr>
<td>Demonstrates knowledge of blood typing, antibody screening, and antibody identification, selection of compatible products</td>
<td>3,4,6</td>
<td>I-II</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Performs immunohematology techniques at bench with supervision</td>
<td>3,4,6</td>
<td>I-II</td>
<td></td>
<td></td>
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<tr>
<td>Evaluates donor eligibility; demonstrates knowledge of donor-adverse reactions; autologous and directed donations</td>
<td>1,2,3,4,5,6</td>
<td>I-II</td>
<td></td>
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<tr>
<td>Demonstrates knowledge of component preparation; blood-component storage and component modifications in preventing transfusion-adverse events</td>
<td>2,3,4</td>
<td>I-II</td>
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<tr>
<td>Demonstrates knowledge of pediatric and obstetric transfusion issues; familiar with use of Rh Immune Globulin and dosing</td>
<td>1,2,3,4,5,6</td>
<td>I-II</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drafts transfusion-reaction reports for review with attending</td>
<td>1,2,3,4,5,6</td>
<td>I-II</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reviews clinical chart to evaluate for special product requests: platelet reviews, requests for irradiated or washed products</td>
<td>1,2,3,4,5,6</td>
<td>I-II</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consultation with clinicians for special product requests</td>
<td>1,2,3,4,5,6</td>
<td>I-II</td>
<td></td>
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<tr>
<td>Reviews antibody panels prior to sign-out rounds</td>
<td>1,3,4,5</td>
<td>I-II</td>
<td></td>
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<tr>
<td>Prepares for sign-out rounds with attending physicians</td>
<td>1,3,4,6</td>
<td>I-II</td>
<td></td>
<td></td>
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<tr>
<td>Performs relevant background reading (textbooks, journals, databases)</td>
<td>1,3,5</td>
<td>I-II</td>
<td></td>
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<tr>
<td>Prepares case for presentation at CP Case Conference</td>
<td>1,2,3,4,5,6</td>
<td>I-II</td>
<td></td>
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</tr>
<tr>
<td>Attends morning rounds; afternoon sign-out rounds; monthly BB/TM meeting with Lab Administration; attends Transfusion Committee meeting</td>
<td>1,2,3,4,5,6</td>
<td>I-II</td>
<td></td>
<td></td>
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<tr>
<td>Attends weekly Pediatric and Adult Hematopoietic Stem Cell rounds</td>
<td>1,2,3,4,5,6</td>
<td>I-II</td>
<td></td>
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</tr>
<tr>
<td>Recognizes necessity for ancillary studies and arranges for their submission, as indicated; interprets immunohematology reference lab reports; assists lab staff in compatibility decisions</td>
<td>3,4,6</td>
<td>II</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capable of independently obtaining histories/patient information, responds to donor-eligibility questions, responds to inquiries on dosing of blood derivatives</td>
<td>1,2,3,4,5,6</td>
<td>II</td>
<td></td>
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<tr>
<td>Capable of performing routine transfusion-reaction evaluations independently</td>
<td>1,2,3,4,5,6</td>
<td>II</td>
<td></td>
<td></td>
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<tr>
<td>Demonstrates familiarity with donor infectious-disease screening; donor notification and deferral protocols</td>
<td>1,2,3,4,5,6</td>
<td>II</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assists with blood utilization reviews; documents reviews appropriately</td>
<td>1,3,4,6</td>
<td>II</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assists blood-bank staff with inventory issues, platelet triage</td>
<td>1,3,4,6</td>
<td>II</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assists with look-back and recall investigations</td>
<td>1,3,4,6</td>
<td>II</td>
<td></td>
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</tr>
<tr>
<td>Assists with accreditation interim reviews; participates in CAP inspections. Demonstrates knowledge of inspection/accreditation programs; transfusion consent requirements; Code of Federal Regulations; functions of the hospital transfusion committee;</td>
<td>3,4,5,6</td>
<td>II</td>
<td></td>
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</tr>
<tr>
<td>Evaluates CAP and New York State Department of Health Proficiency Testing program results; determines cause(s) of errors; drafts corrective-action response</td>
<td>3,4,6</td>
<td>II</td>
<td></td>
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<tr>
<td>Demonstrates knowledge of basics of Standards and regulations: AABB, FDA, CAP, Joint Commission, FACT, CLIA, OSHA, New York State, ASHI, CMS</td>
<td>3,4,6</td>
<td>II</td>
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<tr>
<td>Objective Skill</td>
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<tr>
<td>Completes rotations through HLA Laboratory; Describe the genetics and nomenclature of HLA system; Describe HLA testing techniques; Compare HLA types of individuals and describe level of HLA matching for transplantation</td>
<td>1,2,3,4,6</td>
<td>II</td>
<td></td>
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<tr>
<td>Apheresis/Stem Cell Collections and Stem Cell Processing Laboratory</td>
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<tr>
<td>Demonstrates knowledge of principles of apheresis (therapeutic and donor) and stem-cell collections; indications for emergency apheresis</td>
<td>3,4,6</td>
<td>I-II</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reviews patient history and chart in preparation of consultation notes for therapeutic apheresis cases</td>
<td>1,2,3,4,5,6</td>
<td>I-II</td>
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</tr>
<tr>
<td>Review of patient history and chart in preparation of history and physical for stem-cell collection patients and donors; describes mobilization regimens</td>
<td>1,2,3,4,5,6</td>
<td>I-II</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relevant background reading (textbooks, journals, databases) is to be done prior to and/or after sign-out.</td>
<td>3,4,5,6</td>
<td>I-II</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Presents cases at CP Case conference and clinicopathologic conferences, as indicated</td>
<td>1,2,3,4,5,6</td>
<td>I-II</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Responds to adverse reactions during apheresis procedures and adverse-donor reactions</td>
<td>1,2,3,4,5</td>
<td>II</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Completes more sophisticated assessment and recommendation/treatment plans for apheresis consultations</td>
<td>1,2,3,4,5,6</td>
<td>II</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Further independent study of relevant transfusion medicine topics</td>
<td>3,4,5,6</td>
<td>II</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capable of performing routine apheresis consultations (category-I indications, unambiguous benefit/apheresis as first-line therapy) independently (with assistance provided for complicated cases or unusual laboratory findings)</td>
<td>1,2,3,4,5,6</td>
<td>II</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Completes rotations through Stem Cell Processing Laboratory</td>
<td>1,2,3,4,5,6</td>
<td>II</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demonstrates knowledge of bone-marrow and apheresis-stem-cell processing techniques; routine processing with red-blood-cell and plasma reduction; specialized processing with cell-depletion techniques and indications for each</td>
<td>1,2,3,4,5,6</td>
<td>II</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demonstrates knowledge of cryopreservation, thawing, and infusion techniques</td>
<td>1,2,3</td>
<td>II</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Presents at least one continuing education session for technical and/or nursing staff</td>
<td>2,3,4,5,6</td>
<td>II</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Supplemental materials**

**References/Resources**

Clinical Chemistry Rotation

Overview
To teach residents a thorough understanding of the principles of standard methods and instrumentation used in all sections of the clinical chemistry/endocrinology laboratory sufficient to direct the laboratory’s performance of assays with these methods and instruments and to interpret test results. Each resident is expected to have a thorough understanding of pathophysiology of disease and its manifestations in laboratory tests. He/she must also be knowledgeable about the influence of pre-analytical factors, analytical variables, specimen variables, effects of age, sex, race, method, timing, or patient diagnosis, etc. on interpretation of test results as well as have a thorough understanding of the causes of laboratory errors.

Duration
Combined anatomic/clinical pathology program (AP/CP): residents are assigned to the chemistry labs for three months of their forty-eight-month training period.

Competence goals and objectives

Medical Knowledge

- Acquire knowledge of the basic concepts of laboratory medicine for interpretation of laboratory results.
- Be proficient in using electronic data systems to evaluate clinical histories as they relate to specific tests.
- Participate and present clinical cases of interest in chemistry, endocrinology, and point-of-care testing at the Tuesday CP case conference.

Patient Care

- Apart from electronic chart reviews, if required, residents are encouraged to interact with the house staff to discuss interesting laboratory results to improve the patient’s overall care. This may include tests that are sent to reference labs from the send-out department.

Practice-Based Learning and Improvement

- Daily evaluation of the delta check report enables residents to understand reasons for laboratory errors.
- A thorough understanding of variables that affect laboratory tests including pre-analytical, analytical, and post-analytical issues.
- Assist in the interpretation of immunofixation electrophoresis in relation to the clinical history and diagnosis.
Systems-Based Practice

- Utilize clinical information of specific cases to develop an understanding of different laboratory tests.
- Discuss different problems with specific instruments impacting the performance of laboratory tests at the CP case conference with the aim of improving the quality.
- Interact with different clinical specialties to address specific problems unique to the particular groups.

Professionalism

- Resident assumes responsibility for the delta check report and reviews findings with the director and assistant director.
- Completes daily delta check reports in a timely fashion.
- Resident is respectful of others, including laboratory supervisors and technologists.
- Resident is honest, reliable, and accountable to peers, authoritative figures, and laboratory staff.
- Attends didactic and other required educational experiences.
- Participates in scholarly activities as appropriate.

Interpersonal and Communication Skills

- Communicates effectively with peers, laboratory staff, and clinicians.
- Provides organized and legible reports.
- Provides feedback of delta-check findings as well as discussions with physicians relating to specific laboratory tests to the director and laboratory staff.
- Presents at CP case conferences as well as lab meetings in a professional manner.

Resident Responsibilities

General Responsibilities (all residents)

- Acts professionally
- Is responsible
- Works as a team
- Pays attention to detail
- Is mindful of hierarchical authority (i.e., senior residents, chiefs, attendings, etc.)
- Is courteous to others
• Reads about your cases
• Works hard
• Has fun…. 

Specific Responsibilities (according to level of training)

1. Analytical/Technical
   Essential elements of this understanding include:
   a. Effect of patient physiological status on test results
   b. Patient preparation
   c. Patient medication affecting test results
   d. Appropriate phlebotomy techniques including special techniques as needed
   e. Influence of specimen type on collection, handling, and analysis
   f. Specimen identification and tracking
   g. Safety in handling specimens
   h. Specimen stability (e.g., storage, transport requirements)
   i. Expected precision and accuracy of results
   j. Quality-control evaluation
   k. Pitfalls, interferences, and test limitations
   l. Cost effectiveness of methods and trade-off vs. quality

2. Statistical Techniques and Test Validation
   a. Be able to apply basic probability and statistics to establish reference ranges, determine sensitivity, specificity, predictive values, and supervise quality-control programs.
   b. Be able to evaluate a potential new instrument/method, assessing the technical merits of the analyzer, including analysis of cost, impact on workflow, and its capability to meet laboratory needs and implement the new instrument.
   c. Be familiar with the guidelines to write procedures in NCCLS format.

3. CP Case Conferences
   The resident should be able to read/analyze medical/scientific publications as part of preparation for presenting interesting cases at the Tuesday CP case conference.

4. Lab Inspection
   The resident should be familiar with the regulatory aspects of the chemistry laboratory and able to conduct mock CAP inspections using the CAP checklist.

Consultation:
1. Be able to advise clinical physicians on proper test strategy and interpretation of laboratory tests, to render a consultation on a clinical problem, and to write a clinically useful consultation report including:
   a. Obtaining and integrating relevant clinical information on each patient study.
   b. Gathering and integrating the interpretation of all relevant specimens and tests.
   c. Formulating a diagnosis or differential diagnosis and communicating the results to the clinicians verbally and by written report.
   d. Selecting or recommending further special studies or testing when indicated.

2. Be able to establish laboratory guidelines to identify possible assay or clinical problems and proactively seek opportunities to assist clinicians in evaluation and management of patients.

3. Be able to serve as a liaison between clinical staff (medical and nursing) and the clinical laboratory for lab-related and test-related problems.

4. Be able to make educational presentations to varied audiences.

5. Be able to participate in hospital and health system-wide educational activities on laboratory utilization.

6. Be able to set critical value limits for laboratory tests where appropriate.

7. Be able to establish priorities for tests, i.e., what-tests-are-always-done stat, what-tests-are-never-done stat.

8. Be able to advise clinicians on point-of-care testing.

9. Be adept at evaluating scientific publications related to laboratory medicine.

10. Be able to develop algorithms for testing when and where appropriate (e.g., acute myocardial infarction, thyroid testing, and hepatitis testing, among others).

11. Be able to participate in an open-door policy for in-laboratory teaching rounds, review and examination of patient-related results on a one-to-one basis.

(ACGME competencies: medical knowledge, patient care, practice-based learning, systems-based practice, professionalism, communication and interpersonal skills.)

Duties and Responsibilities

The following checklist will be used for the chemistry rotation. This will be spread over a period of three months. During this period, theoretical concepts involving different automated, as well as manual, methodologies will be discussed extensively. The tests will be discussed in relation to the different organ systems so that residents can relate the tests to different disease states.

- Week 1: Introduction to the service, tour of the facilities. Use of the laboratory information system (LIS). Reading of the laboratory manual, quality-control and quality-assurance issues. Reviewing delta-check results to identify problems in the laboratory.
  - Week 2: Patient preparation, interferences, and preanalytical variables in specimen collection.
• Laboratory organization, policies, and procedures. Specimen handling, processing, and distribution, laboratory safety. Introduction to the automated Core Laboratory and the concept of total laboratory automation.

• Week 3: Multichannel, high-volume, automated analyzers connected to the laboratory automation system. Review of clinical enzymology, liver-function tests, cardiac markers, and lipids.

• Week 4: Stat testing: this focuses on blood gases, electrolytes, and pediatric testing. Challenges in critical-care testing are discussed and, if possible, the resident accompanies the director to participate in the critical-care monthly committee meetings.

• Week 5: Point-of-care testing: visit different sites to understand issues and challenges. Attend the point-of-care testing-committee meetings, if possible, and try to address specific needs of the nursing units. Do a cost comparison between point-of-care testing methodologies and the core lab.

• Week 6: Special chemistry procedures: Sweat chloride testing including the collection in the clinic will be reviewed.

• Week 7: Principles of immunoassays and therapeutic drug monitoring. Different types of drugs and the determination of immunosuppressant drugs. Introduction to toxicology, emergency toxicology, and medico-legal issues.

• Weeks 8–9: Overview of the endocrine laboratory: basic principles of radioimmunoassay (RIA).
  - Enzyme-linked immunoassays (EIA and ELISA) definition
  - The competitive EIA
  - The sandwich assay: overview of automated immunoassay systems used in the endocrinology laboratory including the DXi, Centaur, Architect, and Immulite
  - Observe the intraoperative PTH procedure done in the OR

• Week 10: Overview of HIV procedures, issues, and challenges.

**CHEMISTRY ROTATION**
**FOR CLINICAL PATHOLOGY RESIDENTS**

Mount Sinai Hospital Checklist

<table>
<thead>
<tr>
<th>SKILL</th>
<th>ACGME Competency</th>
<th>Level</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applies knowledge of quality control and laboratory error for the evaluation of the delta-check report.</td>
<td>1,2,4,6</td>
<td>II</td>
<td></td>
</tr>
<tr>
<td>Understands the principles of clinical-chemistry methodologies used in the determination of laboratory tests.</td>
<td>3,4,6</td>
<td>I</td>
<td></td>
</tr>
<tr>
<td>Demonstrates knowledge of critical-care testing for adults and pediatric patients.</td>
<td>1,2,3,4,5,6</td>
<td>I</td>
<td></td>
</tr>
<tr>
<td>Understands challenges in point-of-care testing.</td>
<td>1,2,3,4,5,6</td>
<td>I</td>
<td></td>
</tr>
<tr>
<td>Understands concepts of sweat-chloride testing: collection, analysis, and interpretation.</td>
<td>1,3,4,5,6</td>
<td>I</td>
<td></td>
</tr>
<tr>
<td>SKILL</td>
<td>ACGME Competency</td>
<td>Level</td>
<td>Comments</td>
</tr>
<tr>
<td>-------</td>
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</tr>
<tr>
<td>Applies concepts of immunoassays to special chemistry and toxicology.</td>
<td>3,4,6</td>
<td>I</td>
<td></td>
</tr>
<tr>
<td>Understands the organization of the endocrinology laboratory.</td>
<td>1,2,4,6</td>
<td>I</td>
<td></td>
</tr>
<tr>
<td>Understands HIV testing and challenges.</td>
<td>1,2,4,5,6</td>
<td>I</td>
<td></td>
</tr>
<tr>
<td>Interprets clinical histories for immunofixation reports.</td>
<td>1,2,3</td>
<td>II</td>
<td></td>
</tr>
<tr>
<td>Applies understanding of chemistry laboratory to resolve physician complaints and interpretation of laboratory data.</td>
<td>1,2,3,4,5,6</td>
<td>II</td>
<td></td>
</tr>
</tbody>
</table>

**ACGME Competencies**

1 = Patient Care  
2 = Interpersonal Skills and Communication  
3 = Medical Knowledge  
4 = Practice-Based Learning and Improvement  
5 = Professionalism  
6 = Systems-Based Practice

**Resident supervision**

- Lakshmi Ramanathan, Ph.D.  
- Marie Grace, Ph.D.

**Evaluation**

- Residents are evaluated and supervised by the teaching faculty.
Supplemental materials


Hematology Rotation

Competence goals and objectives

Hematology competencies will be taught by laboratory bench rotations (observation, reading of procedures, and performance of limited procedures as practical), discussion with laboratory director during daily sign-out sessions, and through private study.

ACGME competencies:

1= Patient Care
2= Interpersonal Skills and Communication
3= Medical Knowledge
4= Practice-Based Learning and Improvement
5= Professionalism
6= Systems-Based Practice

RESIDENT EVALUATION: HEMATOLOGY
Rotation I: Week 1–8
Resident Name:
Rotation Dates:

<table>
<thead>
<tr>
<th>SKILL</th>
<th>ACGME Competency</th>
<th>Level</th>
<th>Final Date</th>
<th>Attending Physician/Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demonstrates knowledge of the principles of quality control, instrument calibration, calibration verification, and analyze analytical range</td>
<td>3,4,6</td>
<td>I</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Applies the principles of quality-control analysis in determining if patient results should be verified and released or repeated</td>
<td>1,2,3,5</td>
<td>I</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reviews results of New York State and College of American Pathologists Proficiency Testing Program to determine if laboratory results are within acceptable limits; determine cause(s) of error(s) for the result(s) exceeding acceptable limits</td>
<td>3,4,5,6</td>
<td>I</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acts as a consultant to clinical staff regarding availability of test procedures and proper collection and preservation of samples</td>
<td>2,3,4,5,6</td>
<td>I</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Understands principles of automated peripheral blood-cell counting</td>
<td>3,4,6</td>
<td>I</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interpret CBC cytograms</td>
<td>1,2,3,4,5,6</td>
<td>II</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Performs manual differentials</td>
<td>1,3,4,6</td>
<td>I</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interprets peripheral-blood smears</td>
<td>1,2,3,4,5,6</td>
<td>II</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evaluates unusual body-fluid samples</td>
<td>1,3,4,6</td>
<td>II</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Understands principles of automated urine chemistry and urine-sediment analysis</td>
<td>1,3,4,6</td>
<td>I</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identifies common urine casts and crystals</td>
<td>1,3,4,6</td>
<td>I</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Understands the principles of hemoglobin electrophoresis and associated tests to identify abnormal hemoglobins</td>
<td>1,3,4,6</td>
<td>I</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interprets hemoglobin electrophoresis</td>
<td>1,2,3,4,5,6</td>
<td>II</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### RESIDENT EVALUATION: HEMATOLOGY

#### Rotation I: Week 1–8

**Resident Name:**

**Rotation Dates:**

<table>
<thead>
<tr>
<th>Task</th>
<th>Dates</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interprets anemia evaluations</td>
<td>1,2,3,4,5,6</td>
<td>II</td>
</tr>
<tr>
<td>Understands principles of automated-coagulation testing</td>
<td>1,3,4,6</td>
<td>I</td>
</tr>
<tr>
<td>Interprets coagulation profiles</td>
<td>1,2,3,4,5,6</td>
<td>II</td>
</tr>
<tr>
<td>Interprets thrombophilia profiles</td>
<td>1,2,3,4,5,6</td>
<td>II</td>
</tr>
<tr>
<td>Interprets lupus anticoagulation studies, and coagulation-factor inhibitor studies</td>
<td>1,2,3,4,5,6</td>
<td>II</td>
</tr>
<tr>
<td>Understands principles of platelet-function testing</td>
<td>1,3,4,6</td>
<td>I</td>
</tr>
<tr>
<td>Interprets platelet-function studies</td>
<td>1,2,3,4,5,6</td>
<td>II</td>
</tr>
<tr>
<td>Utilization and critical evaluation of the published medical literature to support the practice of laboratory hematology</td>
<td>4</td>
<td>I</td>
</tr>
</tbody>
</table>

#### RESIDENT EVALUATION: HEMATOLOGY

#### Rotation I: Week 9–12

**Resident Name:**

**Rotation Dates:**

<table>
<thead>
<tr>
<th>Task</th>
<th>Dates</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prepares and interprets bone-marrow aspirates</td>
<td>1,2,3,4,5,6</td>
<td>II</td>
</tr>
<tr>
<td>Performs bone-marrow aspiration</td>
<td>1,2,3,5</td>
<td>II</td>
</tr>
<tr>
<td>Interprets CBC cytograms</td>
<td>1,2,3,4,5,6</td>
<td>II</td>
</tr>
<tr>
<td>Interprets peripheral-blood smears</td>
<td>1,2,3,4,5,6</td>
<td>II</td>
</tr>
<tr>
<td>Evaluates unusual body-fluid samples</td>
<td>1,2,3,4,5,6</td>
<td>II</td>
</tr>
<tr>
<td>Interprets hemoglobin electrophoresis</td>
<td>1,2,3,4,5,6</td>
<td>II</td>
</tr>
<tr>
<td>Interprets anemia evaluations</td>
<td>1,2,3,4,5,6</td>
<td>II</td>
</tr>
<tr>
<td>Interprets coagulation profiles</td>
<td>1,2,3,4,5,6</td>
<td>II</td>
</tr>
<tr>
<td>Interprets thrombophilia profiles</td>
<td>1,2,3,4,5,6</td>
<td>II</td>
</tr>
<tr>
<td>Interprets platelet-function studies</td>
<td>1,2,3,4,5,6</td>
<td>II</td>
</tr>
<tr>
<td>Monitors and understands QC and proficiency testing and makes appropriate suggests for corrective action</td>
<td>2,3,4,5,6</td>
<td>II</td>
</tr>
</tbody>
</table>
### RESIDENT EVALUATION: HEMATOLOGY
**Rotation I: Week 9–12**

Resident Name:
Rotation Dates:

| Utilization and critical evaluation of the published medical literature to support the practice of laboratory hematology. | 4 | II |

### ACGME competencies
1= Patient Care  
2= Interpersonal Skills and Communication  
3= Medical Knowledge  
4= Practice-Based Learning and Improvement  
5= Professionalism  
6= Systems-Based Practice
Resident responsibilities

Rotation I: Weeks 1–8

Week 1: Core Lab Coagulation Bench—David Brown

Skill Level I:

- Understand the general principles of screening coagulation tests (e.g., prothrombin time (PT), activated partial thromboplastin time (aPTT), fibrinogen, D-dimer.
- Understand the international normalized ratio (INR) derivation and its clinical significance.
- Understand the effect of hematocrit and blood-drawing technique on anticoagulation of blood samples for coagulation testing.

Week 2: Special Hematology—Miriam Perekasly

Manual and Hgb Fractionation Benches

Skill Level I:

- Learn the clinical indications for laboratory tests involved in the assessment of intrinsic and extrinsic RBC defects/disorders.
- Know the pathophysiology and characteristic laboratory findings of the major disorders causing normocytic, microcytic, and macrocytic anemia.
- Describe iron metabolism and laboratory tests for iron depletion.
- Understand hemoglobin synthesis and degradation.
- Understand the principles of hemoglobin screening by HPLC and electrophoresis at acid and alkaline pH.
- Understand the principle and clinical utility of screening tests for the presence of Hemoglobin S.
- Know the pathophysiology and laboratory features of intravascular and extravascular hemolysis.
- Understand the principle and clinical utility of Kleihauer Betke and/or flow cytometric analysis for fetal hemoglobin.

Skill Level II:

- Interpret hemoglobin electrophoretic patterns and ancillary tests for the diagnosis of
  o major hemoglobinopathies
  o RBC disorders related to enzyme defects
  o Hereditary spherocytosis and other RBC membrane/cytoskeletal defects
o Paroxysmal nocturnal hemoglobinuria
o Hemolytic anemia
o Congenital dyserythropoietic anemias

Week 3: Core Lab—David Brown

Skill Level I:

- Understand clinical indications for peripheral blood-cell enumeration and differential analysis.
- Know the components of a complete blood count (CBC) and understand the information provided by each.
- Understand the principles of automated cell counting including red blood cell (RBC) indices and their derivation.
- Understand how “absolute values” are determined and how they differ from “relative percent.”
- Identify spurious white-blood count (WBC), RBC, hemoglobin (Hgb) and platelet determinations, and be able to propose a course of action to be followed for reporting results.
- Understand appropriate WBC correction for the presence of nucleated RBC.
- Understand automated differential analysis and manual review criteria.
- Understand the absolute neutrophil count (ANC) and its clinical utility, as well as problems associated with band counts.
- Understand QC procedures specific to cell counters, such as Rumke limits on differential cell counts and Bull analysis of indices.
- Understand principles of automated and manual reticulocyte enumeration, and respective technical limitations.
- Understand principles of microhematocrit determination and its technical limitations.
- Understand the principles of erythrocyte-sedimentation rate.
- Understand the principle and utility of supravital stains, including reticulocyte stain, Hgb H preparation, and Heinz body preparation.

Skill Level II:

- Interpret results of automated and manual cell counts, and understand relevant technical limitations.
- Recommend appropriate steps for abnormal sample processing, analysis, and result reporting.
Week 4: Core Lab

Peripheral Blood Smear Review—DIFF BENCH, Miriam Perekalsky

Skill Level I:
- Know proper preparation and handling of peripheral-blood smears, including standard stains and special stains used to identify cellular structures and inclusions.
- Understand normal RBC, WBC, and platelet morphology.
- Be able to estimate WBC and platelet counts.

Skill Level II:
- Recognize abnormal RBC, WBC, platelet morphology.
- Recognize technical artifacts in WBC, RBC and platelet morphology.
- Recognize infectious disorders that can be diagnosed by blood smear.
- Recognize storage disorders and congenital disorders that have morphologic manifestations in the peripheral blood smear.

Week 5: Core Lab

Urinalysis Bench—David Brown

Skill Level I:
- Understand the clinical indications for and utility of urinalysis.
- Understand the principles of methods involved in urine chemistry and urine sediment analysis.
- Understand the limitations of manual and automated urine chemistry and sediment analysis.

Skill Level II:
- Interpret routine urine chemistry results and identify abnormal cells and organisms. Provide clinical follow-up as appropriate.

Body Fluid Bench

Skill Level I:
- Understand clinical indications for body-fluid analysis.
- Understand manual hemocytometer cell counting.
- Understand cytocentrifuge-sample preparation and slide staining.
• Identify blood and body-fluid-cell morphology.

**Skill Level II:**

• Interpret results of body-fluid analyses in the appropriate clinical context.
• Recognize malignant cells and recommend appropriate confirmatory tests.
• Correlate abnormal body-fluid-cell morphology with cytology, flow cytometry, and other relevant diagnostic test results.
• Identify body-fluid crystals. Distinguish between urate and calcium pyrophosphate crystals using polarized light.

Week 6–8: Special Coagulation Lab—Concepción Sabili

A. Coagulation-Based Studies

**Skill Level I:**

• Understand the clinical utility of coagulation and thrombosis testing.
• Develop basic understanding of hemostatic and thrombotic disorders.
• Understand the coagulopathy of liver disease.
• Understand the pathophysiology of vitamin K deficiency and antagonism.
• Understand the laboratory evaluation of disseminated intravascular coagulation (DIC).
• Understand the pathophysiology of the hemophilias (A, B, C).
• Understand the pathophysiology of arterial and venous thrombosis.
• Understand results of mixing studies and factor assays to guide further coagulation testing.
• Understand the principles of tests involved in the identification of lupus anticoagulant and antiphospholipid antibody syndromes.
• Recognize the effect of circulating anticoagulants on coagulation testing.
• Understand the monitoring of anticoagulation therapy.
• Understand the method of action of direct thrombin inhibitors and their effect on coagulation testing.
• Understand the principles of functional and antigenic assays for proteins of the anticoagulation and fibrinolytic systems.

**Skill Level II**

• Interpret results of coagulation and hypercoagulability testing and recommend further studies as needed.
• Interpret results of Bethesda assays for factor inhibitors.
• Interpret results of coagulation tests in the setting of fibrinolytic therapy.
• Interpret results of Heparin-Induced Thrombocytopenia testing (ELISA tests vs. serotonin-release assay/platelet-aggregation studies) in the appropriate clinical context.

B. Platelet Function Studies

**Skill Level I**

• Understand the clinical utility of platelet-function testing.
• Understand general principles of platelet-function testing.
• Understand the pathophysiology of acquired and congenital platelet-function disorders.
• Understand the pathophysiology leading to major von Willebrand Disease (vWD) subtypes and expected laboratory results.

**Skill Level II**

• Interpret platelet-function studies including screening tests, platelet aggregation, and platelet-secretion studies
• Interpret studies performed for the evaluation of vWD

**Rotation II: Weeks 9–12**

**Bone Marrow Laboratory**

**Skill Level II**

• Serve on Medicine Hematology/Oncology Consultation Service.
• Assist in preparation of bone-marrow specimens.
• Prepare preliminary interpretation of bone-marrow aspirate and biopsy findings.
• Perform a bone-marrow aspiration and biopsy.

**Core Lab**

**Skill Level II**

• Increase competency in peripheral-blood-smear review, correlating findings with clinical history.
• Formulate a differential diagnosis, and suggest appropriate laboratory testing for follow-up.
• Correlate peripheral-blood-smear findings with bone-marrow morphology.
• Increase competency in review of body fluid cell morphology, correlating results with cytology, flow cytometry, and other relevant diagnostic test results.
• Monitor daily and monthly quality-control data and proficiency testing.
Special Coagulation—Concepción Sabili

**Skill Level II**

- Increase competency in interpreting acquired and congenital platelet-function abnormalities.
- Summarize laboratory evidence of hemostatic and thrombotic disorders and be able to assess and explain bleeding and thrombosis risk.
- Understand monitoring and complications of biologics as drugs (recombinant-activated Protein C, recombinant F VIIa).
- Monitor quality-control and proficiency testing for manual tests.

Special Hematology

**Skill Level II**

- Interpret hemolytic-anemia profiles, coordinate test results from hematology laboratory and blood bank to evaluate intrinsic and extrinsic causes of hemolysis.
- Monitor quality-control and proficiency testing for manual tests.

Resident supervision

As indicated under resident responsibilities by functional area and skill level.

Supplemental materials:


**Microbiology Rotation**

**Overview**

- Over sixteen weeks in the clinical microbiology laboratory residents assume increasing levels of responsibility. Their rotations include bench-level training as well as involvement with the microbiology supervisors, director, infectious-disease physicians, and house staff.
- The clinical microbiology laboratory consists of the areas of bacteriology, mycobacteriology, mycology, parasitology, virology, serology, and molecular microbiology.
- At the conclusion of this rotation the residents are expected to have gained a satisfactory level of competence in the field of clinical microbiology.

**Duration**

- Sixteen weeks

**Competence goals and objectives**

**Patient Care**

- Appropriate specimen selection to diagnose a particular infectious disease.
- The processes and media used to cultivate potentially pathogenic microorganisms from clinical specimens.
- The utility of direct specimen staining for presumptive diagnosis and the selection of empiric therapy.
- The methods and specimen types required to diagnose a parasitic infection.
• The use of various techniques for the detection and identification of blood parasites.
• The utility of rapid tests to diagnose legionella, influenza, and RSV.
• The use of toxin assays to diagnose the etiologic agent of a diarrheal disease.
• The use of traditional and shell vial techniques for the culture of viruses from clinical specimens.
• The use of rapid tests as an aid to species identification.
• The appropriate specimens and transport conditions for the performance of HIV, HBV, CMV and HCV viral load assays.
• The use of amplified tests to diagnose specific sexually transmitted diseases.
• The use of serologic assays to diagnose syphilis.
• The utility of antigen tests for the diagnosis and prognosis of cryptococcal disease.
• The use of serological tests to manage invasive streptococcal disease.
• The use and limitations of viral serology. Diagnosis versus the determination of immune status.
• Be able to determine the most appropriate antibiotic choice based on pharmacokinetic data and the individual test result.

Medical Knowledge

• The methods utilized to identify potential bacterial, mycobacterial, fungal, parasitic, and virologic pathogens.
• The colonial morphology of and appearance of microorganisms in culture.
• The effect of growth medium on colonial morphology.
• The most common pathogens recovered from cultures obtained from various sites.
• The performance of real-time PCR assay to detect nasal carriage of MRSA.
• The integration of real-time PCR assays into a program to detect antibiotic-resistance mechanisms.

Practice-Based Learning and Improvement

• Attendance at adult-and-pediatric infectious-disease plate rounds, provide input based on laboratory findings.
• Attendance at adult-and-pediatric infectious-disease case conference.
• Attendance at Pediatric Journal Club and didactic lectures.
• Attendance at the microbiology didactic lecture series.
• Attendance at weekly meetings with Dr. LaBombardi for a review of the previous week, performance assessment, and preparation for the following week.
Interpersonal and Communication Skills

- Report critical results to the appropriate health-care provider.
- Interact with the medical staff in interpreting laboratory findings.
- Interact with infectious-disease clinicians when non-routine antimicrobial susceptibility studies are requested.
- Act as a liaison between pathology and microbiology for consults on shared specimens and cases.

Professionalism

Residents must demonstrate a commitment to carrying out professional responsibilities and an adherence to ethical principles.

Residents are expected to demonstrate:

1. compassion, integrity, and respect for others;
2. responsiveness to patient needs that supersedes self-interest;
3. respect for patient privacy and autonomy;
4. accountability to patients, society and the profession; and,
5. sensitivity and responsiveness to a diverse patient population, including but not limited to diversity in gender, age, culture, race, religion, disabilities, and sexual orientation.

Systems-Based Practices

- Understand the principles of quality control.
- The requirements for validating new test procedures.
- Provide assistance to infection control.
- Assist in the preparation of budgets.
- Prepare business plans to justify the acquisition of new test methodologies.
Resident responsibilities

Weeks 1–4:

Introduction to the clinical-microbiology service. Specimen accessioning, review of specimen-rejection criteria, the performance and reporting of gram stains, India ink, and calcofluor white stains. The use of enriched, selective, and differential culture media and the appearance of potentially pathogenic microorganisms on media. Common urinary-tract pathogens. Predominant bacteria and yeast isolated from blood cultures. The differentiation of potential pathogens from normal flora in respiratory and wound specimens. The use of direct antigen test as an adjunct to culture.

Methods employed to identify aerobic and anaerobic microorganisms. The performance and interpretation of antibiotic-susceptibility tests. The use of expert systems as an aid to the determination of antibiotic-resistance mechanisms. The development and use of antibiograms. The use of screening tests as an epidemiological tool.

Week 5: The culture, identification, and susceptibility testing of fungi from clinical specimens. The use of morphological tests to identify moulds.

Week 6: The culture, identification, and susceptibility testing of mycobacteria from clinical specimens. The changing clinical picture of tuberculosis and the predominance of the non-tuberculous mycobacteria as causes of clinical diseases.

Week 7: The methods used to process specimens and identify parasites from the stool, blood, urine, and other body sites.

Week 8: The processing and identification of viruses cultured from clinical specimens. The need for special transport media and the use of molecular methods as a replacement for viral culture.

Week 9: The role of diagnostic serology in the diagnosis of clinical disease. The difference between diagnostic serologic tests from those used to determine immune status.


Weeks 11–16: Review topics, quality-assurance projects, and participation in research. Involvement in the administrative functions of the microbiology laboratory.

Resident supervision

• Vincent LaBombardi, Ph.D.
Evaluation
Residents are evaluated and supervised by the faculty laboratory director. The rotations is structured in a way that the resident receives appropriate, graduate, and progressive instruction, whether he/she completes the rotation at one time or in shorter periods in different laboratories at the different teaching institutions.

Tumor Cytogenetics Rotation

Overview
The general objective of this rotation is to familiarize pathology residents with cytogenetics and fluorescence in-situ hybridization (FISH) methods. Both techniques are used for detection of chromosomal and/or gene rearrangements in tumor tissue.

Competence goals and objectives
At the conclusion of these two-to-four-weeks’ rotation, the clinical-pathology resident is expected to have achieved a satisfactory level of competence in the following:

Patient care
- How to perform FISH.
- How to determine monosomy/trisomy by FISH, HER2 amplification and abnormal bladder (Urovysion) FISH result.

Medical knowledge
- Recognition of normal chromosomes by banding pattern.
- Major chromosomal abnormalities associated with CML, AML, ALL, Burkitts, CLL.
- Definition of clonal cytogenetic abnormalities.

Practice-based learning and Improvement
- incorporate formative evaluation feedback into daily practice;
- locate, appraise, and assimilate evidence from scientific studies related to their patients’ health problems;
- use information technology to optimize learning; and,
- participate in the education of patients, families, students, residents and other health professionals.

Interpersonal and communication skills
- communicate effectively with patients, families, and the public, as appropriate, across a broad range of socioeconomic and cultural backgrounds;
• communicate effectively with physicians, other health professionals, and health related agencies;
• work effectively as a member or leader of a health care team;
• act in a consultative role to other physicians and health professionals;

Professionalism
• demonstrate compassion, integrity, and respect for others;
• responsiveness to patient needs that supersedes self-interest; respect for patient privacy and autonomy;

Systems-based practice
work effectively in various health care delivery settings;
coordinate patient care within the health care system;
incorporate considerations of cost awareness and risk-benefit analysis in patient and/or population-based care as appropriate;
advocate for quality patient care and optimal patient care systems;
work in interprofessional teams to enhance patient safety and improve patient care quality;
and,
participate in identifying system errors and implementing potential systems solutions.

Duration:
• Four weeks

Resident responsibilities
• Week 1: Residents observe the following procedures: Setting up tissue cultures for chromosome preparations, harvesting procedures, slide making, and chromosomal banding and staining. Residents are shown how to use the semi-automated karyotyping system. Residents are taught how to perform karyotyping. Residents are suposed to give a case presentation at the clinical-case conference (Tuesday, 9 AM). One of the abnormal-case presentations: work with Dr. Najfeld. Two three tutorials (one hour each) with the supervisor of the lab, Angela Scalise. (Medical knowledge, patient care, communication and interpersonal skills, and professionalism.)
• Week 2: Residents observe techniques used in FISH: slide making, denaturation of target DNA, preparation of probe, denaturation of probe DNA, post-hybridization washing, counter-staining, scoring, and imaging simultaneously with observing FISH techniques. Residents will continue to do karyotyping. Two to three tutorials with the supervisor of the lab, Angela Scalise. (Medical knowledge, patient care, communication, and interpersonal skills.)
• Week 3: 5–10 Karyotypes. Residents are supposed to prepare a case presentation for clinical conference (work and tutorial with Dr. Najfeld). Beginning to score hematological FISH cases as a third observer. (Medical knowledge, patient care, communication, and interpersonal skills, professionalism.)

• Week 4: At least two abnormal cytogenetic cases to karyotype. Score bladder and breast FISH cases as a third scorer. Two to four tutorials with Angela Scalise and Dr. Najfeld. (Medical knowledge, patient care.)

Resident supervision

• Dr. Najfeld

Evaluation

• Residents are directly supervised and evaluated by Dr. Najfeld.

Laboratory Management and Medical Informatics

Overview

Duration

• One month minimum; up to three months, if chosen for electives.

Competence goals and objectives

Management

Patient Care

• Understand laboratory operations in both highly automated as well as manual laboratories, including information flow from laboratory order through result reporting; choosing reference laboratories and monitoring their performance; laboratory design, layout, and instrument selection; establishing laboratory policies (technical, safety, hazardous waste, and infection control); and application of conflict-resolution and problem-solving techniques in responding to complaints about laboratory service. (Medical knowledge, practice-based learning, systems-based practice, communication and interpersonal skills.)

• Understand the principles of human-resources management, including basic job-interview skills, determining number of personnel (staffing requirements) and their productivity, ensuring the competency of personnel to perform their assigned functions, discipline. (Practice-based learning, systems-based practice, communication and interpersonal skills, professionalism.)
Medical Knowledge

- Have an understanding of finance, accounting, and reimbursement including budgetary planning, managing and controlling laboratory operations, basic accounting principles and procedures, and use of benchmark tools for productivity and financial analysis. Understand the professional and economic relationships among pathologists, hospitals, other physicians, non-physician employees, and health-care managers. (Systems-based practice.)

- Understand and be able to apply principles of continuous quality improvement or total quality management (CQI, TQM) and quality assurance in the provision of necessary laboratory services in a timely fashion. (Practice-based learning.)

Practice-based Learning and Improvement

- Be able to work effectively with medical staff to modify test-ordering behavior, and thus maximize cost-effective utilization of laboratory resources when patterns of inappropriate laboratory-test utilization are identified. (Communication and interpersonal skills, professionalism.)

Interpersonal Communication Skills

- Be able to participate with medical staff in the development of clinical practice guidelines for cost-effective use of laboratory tests for diagnosis and management of patient problems. (Practice-based learning, systems-based practice, communication and interpersonal skills.)

- Be able to follow up on problems and complaints in a timely manner and solve underlying system problems. (Medical knowledge, patient care, practice-based learning, systems-based practice, communication and interpersonal skills, professionalism.)

Professionalism

- Be able to demonstrate skills in leadership, motivation, and communication. (Communication and interpersonal skills, professionalism.)

- Be able to participate effectively on institutional: medical staff, administration, governing board, and health-system network administration. (Systems-based practice, communication and interpersonal skills, professionalism.)

Systems-based Practice

- Be able to monitor utilization of laboratory tests within the hospital and health system to identify patterns of test utilization that are inappropriate in light of the clinical-practice guidelines for both over- and underordering of laboratory tests. (Practice-based learning, systems-based practice.)

- Understand and be able to comply with licensure, accreditation, and other regulatory requirements (CAP, JCAHO, CLIA, DA, OSHA and state and local standards and regulations). (Systems-based practice.)
• Be able to do strategic planning (setting goals) for the clinical laboratory including market analysis, projections, consensus building, brainstorming, and long-range strategic planning. (Practice-based learning, systems-based practice.)

• Understand principles of marketing including differences in client needs between hospital and outpatient laboratories. (Systems-based practice.)

• Understand medico-legal issues such as the risks of clinical pathology and strategies to avoid them; the definition of fee splitting, self-referral, unnecessary or excessive testing, fraudulent billing, and inadequate or under-testing. (Medical knowledge, systems-based practice.)

Informatics

Patient Care
• Be able to use LIS resources to investigate laboratory problems and to monitor the effect of intervention to resolve those problems.

Medical Knowledge
• Be able to understand laboratory-information-system selection, implementation, and ongoing operation.
• Understand the use of LIS resources and of local databases to support the laboratory’s continuous quality-improvement program.

Practice-based Learning and Improvement
• Be able to use biostatistical tools in support of laboratory problem-solving, evaluation of test performance, and patient-care decision-making.
• Be able to use bibliographic databases to monitor progress in clinical-laboratory technology and practices and as a resource for laboratory problem-solving.
• Be able to use bibliographic databases to choose relevant journal articles for study and to maintain a bibliographic database pertaining to pathology topics of personal interest.

Interpersonal Communication Skills
• Be able to use information technologies to promptly communicate and effectively convey the significance of laboratory findings to other physicians and providers.

Professionalism
• Maintain current knowledge about data confidentiality and security issues.
Systems-based Practice

- Be able to integrate clinical information with laboratory information system (LIS) to ensure the clinical relevance and appropriateness of laboratory programs, procedures, and tests in effective patient-care decision-making

Resident responsibilities

- Week 1: Introduction and tour of the automated-core-laboratory (ACL) facility, reading of procedure manuals for the ACL, integration of automation and robotics with the laboratory information system.
- Week 2: Use of desktop PC for LIS, CIS, Library, Medline, Internet, word processing, and spreadsheet functions.
- Week 3: Financial, management, and marketing aspects of laboratory operations; budgeting; cost control; scheduling; service quality, client service and courier service; regional and reference laboratory issues; hospital laboratory services; and provision of services to physician offices.
- Week 4: Laboratory utilization and patient-care management; integration of LIS and CIS at Mount Sinai and throughout Health System; problem-solving.
- Weeks 1 through 4: Participation in all meetings of Center for Clinical Laboratories Medical Director and management staff, except those of a highly sensitive or confidential nature.

Resident supervision

- Dr. Melissa Pessin, assisted by senior-management staff at the Center for Clinical Laboratories at Mount Sinai Hospital.

Evaluation

- At the conclusion of the rotation in laboratory management and medical informatics the clinical-pathology resident is expected to have achieved a satisfactory level of competence in assessment of a broad spectrum of management issues in routine laboratory operations and demonstrate ability to make logical and objective decisions for effective solutions.
- Residents are evaluated and supervised by the teaching faculty.