DIVISION OF HEMATOPATHOLOGY

HEMATOPATHOLOGY FELLOWSHIP HANDBOOK

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Hematopathology Fellowship:
General Description of the Hematopathology Educational Experience

The hematopathology fellowship at UPMC-Presbyterian is a broad-based experience in all aspects of both clinical and anatomic hematopathology. The program stresses a multiparameter approach to both bone marrow and solid tissue diagnostic hematopathology combining standard morphologic techniques with data obtained from ancillary immunohistologic, in situ hybridization, flow cytometric, molecular and cytogenetic investigations. Bone marrow sign out includes review of peripheral blood and marrow aspirate smears, marrow histologic preparations and other ancillary studies.

The fellowship includes educational experiences in the following specific areas: adult bone marrow sign out, adult clinical bone marrow procedures, lymph node (and related tissue) pathology, flow cytometry, pediatric hematopathology, molecular & genomic pathology, cytogenetics, laboratory hematology, coagulation, histology and immunohistochemistry, and laboratory management and decision making. The precise duration of each rotation is flexible. Laboratory management and decision making is primarily a component of the laboratory-based rotations.

After the first two months, fellows also participate in the on-call schedule (with faculty back-up). The fellow is expected to actively participate in a variety of hematopathology teaching conferences. The fellow is also expected to participate in the informal and more formal teaching of medical students, pathology and non-pathology residents, hematology/oncology fellows, and medical technologists. He/she will also interact with hematologists, oncologists, and other interested clinicians. Fellows are expected to undertake at least one investigational project and are strongly encouraged to present at national meetings. Fellows are also expected to complete a Quality Assurance/Quality Improvement project. Fellows are expected to perform marrow aspirates and biopsies in the Internal Medicine Hematology Section.

Conferences include a Hematopathology Case Conference (weekly), a Patient Safety and Risk Management conference that alternates with a Journal Club (weekly), a Molecular & Genomic Pathology/Hematopathology Conference (monthly), a Pediatric Leukemia Tumor Board (monthly), an adult Hematologic Malignancy Conference (2 weeks per month), Benign Hematology Case Conference (weekly) and other departmental AP or CP oriented conferences. Fellows will also take advantage of multiple interactive electronic, web-based resources to access information, including laboratory information systems, on-line radiology image resources, and literature searches.

Levels of responsibility (see Hematopathology Progressive Goals and Objectives [Milestones] chart that follows): Because fellows will come to the program with a variable level of experience and because those from outside UPMC will not be familiar with many logistical aspects of our practice, it is expected that fellows will progress through the graded responsibility described for resident trainees, but at a more rapid pace, and progress to a level as indicated in the chart that exceeds that of a senior resident.

The following 6 sections describe the general goals and objectives for the overall fellowship program in relation to the six core competencies as defined by the American Council on Graduate Medical Education (ACGME). Goals and expectations

that would be specific to individual rotations are further described in the rotation specific descriptions that follow this section.

Patient Care

Goal

Fellows must develop diagnostic competence to provide for effective patient care.

Competencies (See also specific rotation descriptions.)

1. Demonstrate diagnostic decision-making skills appropriate to his/her level of training.
2. Manage appropriate laboratory staff.
3. Demonstrate ability to triage testing as to importance or urgency in a cost-effective and appropriately time-sensitive manner.

Objectives (See also specific rotation descriptions.)

1. Construct appropriate written reports in language that other physicians, especially surgeons and oncologists, will understand.
2. Demonstrate ability to order appropriate ancillary testing through ancillary laboratories and hematopathology staff.
3. Order testing on a STAT basis when appropriate for patient care and/or limit testing to those studies needed to make the most specific diagnosis by current guidelines.

Medical Knowledge

Goal

Fellows must demonstrate knowledge of established and evolving aspects of hematopathology diagnostic testing and state of the art hematopathology diagnosis and classification.

Competencies (See also specific rotation descriptions.)

1. Demonstrate knowledge of the normal hematopoietic and lymphoid systems.
2. Demonstrate knowledge of both neoplastic and non-neoplastic disease entities that predominantly affect the hematopoietic/lymphoid systems.
3. Demonstrate an ability to apply this knowledge in varied clinical settings.

Objectives (See also specific rotation descriptions.)

1. Obtain an acceptable score on written practical examinations, including those administered within the Division (with a score of competent) and the Fellow In-Service Hematopathology Examination (FISHE) administered by the American Society for Clinical Pathology (ASCP) (score above the 25th percentile).
2. Demonstrate an acceptable level of performance during daily sign-out activities, as assessed by milestone evaluations and multisource evaluations.
3. Demonstrate ability to decide what type of testing is needed to limit the differential diagnoses in most cases.

Practice-Based Learning and Improvement

Goal

Fellows must be able to evaluate and adopt new knowledge as changes demand. This includes the development or refinement of skills that will be used long after fellowship training has ceased.

Competencies

- Identify strengths, deficiencies and limits in one's knowledge and expertise.
- Systematically analyze practice, using quality improvement methods, and implement changes with the goal of practice improvement
- Locate, appraise and assimilate evidence from scientific studies related to hematopathology.
- Use information technology to optimize learning
- Participate in the education of medical students, residents and other healthcare professionals, as documented by evaluations of a fellow's teaching abilities by faculty and/or learners.

Objectives

1. Demonstrate ability to search the medical literature to answer medically related questions that arise in daily practice.
2. Appropriately utilize available texts and self-learning resources, such as study sets, etc.
3. Construct and complete a quality improvement project with appropriate guidance.
4. Demonstrate ability to critically evaluate original publications at journal clubs, other conferences, and in the evaluation of diagnostic cases.
5. Demonstrate progression in skill level, as assessed by weekly EPA-based evaluations, bimonthly clinical competency committee reviews, and on bi-annual review with fellowship director.
6. Demonstrate effective and knowledgeable case presentation(s) at divisional conferences.
7. Demonstrate ability to perform appropriate biomedical literature searches through available electronic tools (example: PubMed search).
8. Demonstrate ability to teach residents, students, and fellows from other departments while on-service.

Systems Based Practice

Goal

Fellows must demonstrate an awareness of and responsiveness to the various regulatory bodies (including institution based policies, local and national regulatory agencies) that affect daily practice and laboratory management.

Competencies

- Incorporate considerations of cost awareness and risk-benefit analysis in diagnostic evaluations.
- Understand the various administrative and technical functions involved in running a hematopathology division or hematology laboratory.
- Understand the need for quality assurance assessments.
- Participate in laboratory management meetings as appropriate on laboratory based rotations.
- Know the role of regulatory agencies that affect the practice of hematopathology.

Objectives

1. Demonstrate ability to choose appropriate immunohistochemistry panels, in situ hybridization studies, and molecular testing appropriate to making a specific diagnosis.
2. Attend rotation specific laboratory management meetings.

3. Review the roles of various regulatory organizations (College of American Pathologists [CAP], state, and federal, such as the Joint Commission on Accreditation of Healthcare Organizations [JCAHO]) that are involved in regulating laboratory practice and how they can impact laboratory hematology.
4. Participate in mock or internal CAP inspections when possible.
5. Become familiar with proficiency testing programs used in the Division of Hematopathology and its associated clinical laboratories.
6. Participate in appropriate faculty-supervised quality improvement projects.

Professionalism

Goal

Professional behavior is one of the most basic requirements of any physician, including hematopathologists. This includes demonstrating reliability, punctuality, appropriate demeanor, appearance, completion of work assignments, and ethical behavior.

Competencies

- Compassion, integrity, and respect for others.
- Responsiveness to patient needs that supersedes self-interest.
- Respect for patient privacy.
- Communicate effectively with hematology-oncology, other physicians and other healthcare professionals.
- Work effectively as a member of a health care team.
- Act in a consultative role to other physicians and healthcare professionals.
- Function as a member of an interdisciplinary team.

Objectives

1. Obtain at least satisfactory evaluations of interactions with physician colleagues, attending staff, support personnel, as evidenced by the multisource and other evaluations.
2. Schedule outside activities so as not to interfere with work-related activities, such as on-call responsibilities and service commitments.
3. Demonstrate an understanding and working knowledge of the Health Insurance Portability and Accountability Act (HIPAA) and sensitivity to protecting the disclosure of patient specific information by completing HIPAA on-line training modules.
4. Demonstrate ability to work with other healthcare team members, as evidenced by multisource evaluations.

Interpersonal and Communication Skills

Goal

Fellows should be able to communicate with a variety of medical center faculty, trainees, and staff. These functions are critical to being a successful hematopathologist. This must also be done with a working knowledge of patient privacy rights.

Competencies

1. Demonstrate mutual respect for others in communicating with faculty, other trainees, and support personnel.
2. Convey diagnoses and available diagnostic testing results to other physicians and appropriate support personnel in an accurate and secure manner that reflects the limitations of the currently available findings.

Objectives

1. Demonstrate ability to convey preliminary diagnoses in verbal, written and electronic form that includes appropriate limitations, such as differential diagnoses still to be considered, other information still needed (and/or pending).
2. Be able to communicate information verbally and in writing in a format and style that is appropriate for the level of the practitioner or support personnel with whom one is interacting.
3. Accurately convey final diagnoses both orally and in writing to the submitting physician and other appropriate personnel (hematology-oncology fellows, nurse practitioners).
4. Discuss possible treatment implications of diagnoses with hematology-oncology professionals and other appropriate physicians.
5. Write complete reports in a timely fashion. Reports must also be accurate, grammatically correct, and easily understood.
6. Demonstrate ability to seek consultations from other members of the faculty (usually as directed by the attending pathologist) and accurately convey the consulting pathologist's impressions to the primary sign-out attending.

Teaching Methods

1. One-on-one teaching over the microscope during diagnostic case sign-out and within the clinical laboratories.
2. Observation and modeling of attending physicians.
3. Attendance and/or presentation at the following conferences:
    a. Hematopathology Journal Club (*monthly*)*†
    b. Patient Safety and Risk Management in Hematopathology Conference (*bi-weekly*)*
    c. Hematopathology/Molecular & Genomic Pathology Conference (*weekly*)*‡
    d. Children's Hospital of Pittsburgh Leukemia Tumor Board (*monthly*)*‡
    e. Hillman Cancer Center Hematologic Malignancy Conference (*bi-weekly*)*
    f. Benign Hematology Case Conference (*bi-weekly*)*
    g. Seminar in Laboratory Medicine (*weekly*)**
    h. Anatomic Pathology Ground Rounds (*weekly*)
    i. Hematopathology Flow Cytometry Conference (*bi-weekly*)

    **Required attendance for fellows*

    ***Fellows are required to present once/year*

    †*Fellows are required to present 3-4 times/year*

    ‡*Fellows are required to present while on Adult Bone Marrow, Pediatric Hematopathology, Lymph Node and/or Cytogenetics rotations*
4. Attendance at didactic lectures (i.e. Cornell Tutorial on Neoplastic Hematopathology, ASCP Lab Management University).
5. Use of actual and virtual teaching sets of glass slides and case studies.
6. Reading of textbooks available in the hematopathology division or online at the Health Sciences Library or Falk Library.
7. Completion of required modules from the on-line ASCP Lab Management University Program.

Assessment Methods

1. Weekly entrustable professional activity (EPA)-based electronic evaluations by attending faculty and staff (based on direct supervision and observation).
2. Bi-monthly multisource (formerly 360-degree) evaluations (by faculty, office staff, technologists, residents, and each other).
3. Verbal feedback during daily interactions with attendings and other teaching faculty and staff.
4. Fellow In-Service Hematopathology Examination (FISHE) (administered on-line by ASCP twice/year).
5. Direct, objective written practical examinations administered twice/year within the Division of Hematopathology.
6. ASCP CheckPath Hematopathology examination (administered quarterly).
7. Bi-monthly clinical competency committee review.
8. Review of rotation checklists with fellowship director or designee at least bi-annually (see specific rotation checklists).
9. Monthly review of case log numbers by fellowship director or designee (also reviewed with fellow at bi-annual evaluation meetings).
10. Bi-annual review of required conference attendance by fellowship director or designee (also reviewed with fellow at bi-annual evaluation meetings).
11. Bi-annual evaluations with fellowship director or designee, followed by a written summary.
12. Final written letter of competency assessment from fellowship director.
13. See also specific rotations for any rotation specific assessment methods.

Assessment Method (Program Evaluation)

Fellows have periodic opportunities to evaluate specific rotations through an on-line web-based system administered by the departmental graduate medical education office. Faculty also periodically discuss the fellowship program at divisional staff meetings. Both fellows and faculty review the fellowship program annually at the Division of Hematopathology Fellowship Program Evaluation Committee meeting.

Level of Supervision

See specific rotation descriptions.

Educational Resources

- Textbooks in the Division of Hematopathology.
- Teaching sets including:
    a. Peripheral Blood and Fluid Slide Study Set that can be checked out from the hematopathology secretaries (Hill 354) (the directory of cases is in the resident's drive [X:\Hemepath_PBandFLUID_slide_set]).
    b. Hematopathology Virtual Slide Study Set (folder with case list can be checked out from the hematopathology secretaries [Hill 354] and a spreadsheet with a link to the cases is located in the resident's drive [X:\Hemepath_study_set]).
- Journals and textbooks available in the Division of Hematopathology and also in the School of Medicine Health Sciences Library (hardcopy and electronic access).
- Other electronic resources, including textbooks, hematopathology-related web-sites, UPMC-created educational and research modules.
- See also specific rotation descriptions.

Division of Hematopathology
6 Competency Expectations for Hematopathology Fellows

1. **Patient Care: (Professional expertise/decision-making skills in bone marrow & lymph node and related pathology, body fluid evaluation, coagulation, laboratory hematology, flow cytometry and hematopathology-related cytogenetics and molecular diagnostics)**
   The trainee must develop a satisfactory level of diagnostic competence and ability to provide effective patient care. This includes decision-making skills required for making the diagnosis as well as recognition of what constitutes cost-effective practice. It also includes being able to manage laboratories and function as a critical consultant to clinical physicians and other support staff. This competency includes evaluation of the overall performance of the trainee, and whether performance is appropriate to the level of the trainee.

2. **Medical Knowledge: (Basic knowledge of hematopathology including the practice of hematopathology)** Trainees must learn about all aspects of hematopathology as well as learning about how to practice state of the art hematopathology. They must be able to apply this information in different settings. They must demonstrate knowledge of the normal hematopoietic/lymphoid system and abnormal non-neoplastic and neoplastic disorders that either primarily or secondarily affects the hematopoietic/lymphoid system. Knowledge of the clinical aspects of these disorders is also critical. The trainees are assessed in this area based on both their knowledge base and their application of knowledge throughout the course of their training period. Trainees are assessed based on their level of training and with reference to the rotations they have completed.

3. **Practice-Based Learning and Improvement: (Acquisition and critical analysis of new knowledge and new skills with the ultimate goal of improved practice of hematopathology)**
   Trainees must be able to evaluate and synthesize new knowledge in the face of an ever-changing field. These skills involve critical review of the literature and utilizing other resources to obtain new information leading to improved skills that can be applied to real-time case materials. The most successful trainees will establish practice-based learning and improvement skills that will continue long after completion of their official training. The trainees are assessed in this area based on their diligence in aiming to acquire new practical and basic knowledge, their ability to critically analyze the literature and other sources of new information and their ability to use the new information to become better hematopathologists.

4. **Interpersonal and Communication Skills**: (**Communication skills with peers, technical staff, administrative staff, clinicians, and others in person, in conferences and over the telephone)**
   Being able to work well with a multitude of different types of medical center faculty, other trainees and staff and being able to communicate well are critical skills for a successful hematopathologist. This includes, but is not restricted to, the effective communication both in the appropriate dissemination of information that other health professionals require for patient care and other purposes (e.g. diagnoses, preliminary reports, teaching conferences) and getting needed support for patient care, educational and other activities from faculty, other trainees and staff. Communication must take into account all current regulatory issues

(HIPAA). Interactions with faculty, other trainees and staff should be based on mutual respect, be effective and contribute to a comfortable and productive work environment. This area is assessed based on trainee's interaction and communication with diverse members of the healthcare team.

5. **Professionalism: (Professional behavior including reliability, punctuality, demeanor, appearance, ethical issues, sensitivity to diverse patient/staff population)**
   Professionalism is one of the most basic requirements of being a physician. It ranges from simple issues such as reliability, punctuality and appearance to more complex issues of ethical behavior and sensitivity to issues of diversity. Trainees are assessed on both the more tangible measures of professionalism and its more subjective aspects.

6. **Systems Based Practice: (Learning the many ways in which the larger healthcare system and national healthcare environment impact on the practice of hematopathology, how to practice in a fashion consistent with the needs of these broader units and how to take advantage of the external resources the "system" provides in our practice)**
   Trainees must develop an awareness and responsiveness to the larger context of being part of a healthcare system. This includes appreciation of the administrative and technical functions of running a Division of Hematopathology and its varied laboratories, learning how to utilize the many hospital-based resources required for patient care and administrative activities, learning about the impact of outside regulatory agencies/organizations on the practice of medicine and having an appreciation of basic healthcare/pathology-related financial issues. Competence in this area is documented in part by participating in CAP inspection preparations and mock inspections, demonstrating effective utilization of systems based resources (e.g. electronic and personnel) and in making administrative quality improvement contributions to the Division.

Hematopathology Progressive Goals and Objectives (Milestones)

Competency	Core Rotation - 1st to 3rd Year Resident Beginning of Rotation	Core Rotation – 1st to 3rd year Resident Later in Rotation	Elective Rotation - 3rd and 4th year Resident	Fellow 1st 6 months	Fellow 2nd 6 months
Professionalism	Reliable, punctual, appropriate appearance, ethical behavior, sensitive to issues of diversity, HIPAA compliant	Same as near beginning of rotation but projects more confidence and handles difficult situations with greater ease.	In addition to elements already noted, can help advise more junior trainees and serve as a more senior role model.	In addition to elements noted for residents, functions so that others perceive fellow more like a junior faculty member. Create a professional CV. Conduct a successful job search if not continuing as a fellow.	In addition to prior accomplishments, interacts with other faculty and clinicians like a more confident junior faculty member, able to construct and maintain professional CV.
Patient Care	Preview marrow aspirate smears with direct faculty guidance. Review cases, record observations, formulate differential diagnosis.	Preview marrow aspirate smears semi-independently, directly interact with technologists. Review cases, record observations, formulate more complete differential diagnosis	Write and dictate reports for most routine cases.	Independently work-up and provide a complete diagnostic report for most routine cases.	Independently work-up and provide a complete diagnostic report to attending faculty with minimal required changes.
	Formulate list of immunohistochemical stains, cytochemical stains, and flow antibody combinations to resolve differential diagnosis. Review data from ancillary studies	Formulate more educated list of immunohistochemical stains, cytochemical stains, and flow antibody combinations to resolve differential	Independently order ancillary studies in a resource conscious way on most routine cases.	Independently order ancillary studies in a resource conscious way on routine cases.	Independently order ancillary studies in a resource conscious way on virtually all cases.

Competency	Core Rotation - 1st to 3rd Year Resident Beginning of Rotation	Core Rotation – 1st to 3rd year Resident Later in Rotation	Elective Rotation - 3rd and 4th year Resident	Fellow 1st 6 months	Fellow 2nd 6 months
	and record interpretation.	diagnosis. Review data from ancillary studies and record more complete interpretation.			
	Gross specimens for lymphoma work-up with directed supervision.	Gross specimens for lymphoma work-up with supervision as needed (after consulting fellow or appropriate faculty).	Gross specimens for lymphoma work-up with limited supervision and select ancillary testing independently for most routine cases.	Gross specimens for lymphoma work-up with very limited supervision and select ancillary testing independently for the majority of cases. Be able to help instruct junior trainees.	Able to gross and triage specimens independently and to supervise and instruct more junior trainees.
	With explicit directions, interact with clinicians and support staff.	With less explicit directions, interact with clinicians and support staff.	Function as a critical consultant to clinical physicians and support staff with some supervision.	Independently function as a critical consultant to clinical physicians and support staff in most situations.	Able to supervise more junior trainee's presentations and provide guidance for preparation.
	Be able to provide basic review of peripheral blood and interpret most common hematology tests.	Be able to provide basic review of peripheral blood, fluids and urines and interpret most standard hematology tests.	Provide consultative/laboratory report for general and special hematology tests, peripheral blood and fluid reviews working with faculty on more complex cases and with limited assistance on less complex cases.	Provide consultative/laboratory report for general and special hematology tests, peripheral blood and fluid reviews on simple and complex cases relatively independently but with final approval by faculty member.	Provide consultative/laboratory report for general and special hematology tests, peripheral blood and fluid reviews in all cases with only limited supervision.

Competency	Core Rotation - 1st to 3rd Year Resident Beginning of Rotation	Core Rotation – 1st to 3rd year Resident Later in Rotation	Elective Rotation - 3rd and 4th year Resident	Fellow 1st 6 months	Fellow 2nd 6 months
	Observe how others handle laboratory management issues.	Participate with faculty/senior technical staff in laboratory management issues.	Get directly involved in laboratory management issues with supervision.	Get involved in laboratory management issues with more limited supervision.	Participate in continuing education of technologists and support staff to improve patient care.
	Present at inter-departmental CPC conferences with extensive supervision.	Present at inter-departmental CPC conferences with less direct supervision.	Present at inter-departmental CPC conferences with limited supervision.	Independently present at inter-departmental CPC conferences.	Presents cases at clinical CPC conferences without supervision.
Medical Knowledge	Knowledge of morphology and immunophenotype of normal lymph node, spleen, bone marrow and peripheral blood. Knowledge of multiparameter approach to diagnosis of hematologic disorders.	Know criteria for major neoplastic and non-neoplastic hematopathologic entities. Know specific approach used to diagnose major neoplastic and non-neoplastic hematologic entities.	Know criteria for some of the less common hematopathologic entities in addition to those for major entities.	Have an extensive knowledge of broad range of neoplastic and non-neoplastic hematopoietic/lymphoid disorders and other disorders that involve or affect the hematolymphoid system including the pathologic and clinical aspects of these disorders.	Further increase hematopathology knowledge base in terms of rare entities and variations within more common entities. Learn more about the type of cases that lack a definitive diagnosis. Demonstrates ability to apply and discuss knowledge learned from instructional workshops or conferences attended.
	Recognize some of the more common neoplastic and non-neoplastic disorders. Know basic immunophenotypic/ genotypic/cytogenetic features where appropriate.	Recognize additional common neoplastic and non-neoplastic disorders and know ways in which specific entities are further subdivided. In addition to basic ancillary data	Recognize most common and some uncommon neoplastic and non-neoplastic disorders of the hematolymphoid system and know the immunophenotypic, cytogenetic and genotypic characteristics.	Recognizes broad range of hematologic disorders and recognizes when a definitive diagnosis cannot be rendered or where consultative help may be required.	Demonstrates an appreciation of the limitation(s) of current diagnostic schemes/classification systems (i.e. shows recognition for “gray zones” in diagnosis).

Competency	Core Rotation - 1st to 3rd Year Resident Beginning of Rotation	Core Rotation – 1st to 3rd year Resident Later in Rotation	Elective Rotation - 3rd and 4th year Resident	Fellow 1st 6 months	Fellow 2nd 6 months
		features, know pathophysiologic features of major entities. Complete greater than 80% of resident version of rotation checklist.	Completes more of appropriate checklists and sees more entities previously encountered through reading. Complete greater than 90% of resident version of rotation checklist.		Complete "extended version" of all rotation checklists.
	Know basic components of complete blood count and how they are obtained.	Know basic components of complete blood count and other major hematology tests and how they are obtained including major pitfalls. Also know basic principles of fluid and urinalysis interpretations. Know disease entities where diagnosis is based in large part on hematology laboratory testing.	Know full armamentarium of hematology testing, the purpose of each test and how to interpret combinations of tests. Know new developments in hematology instrumentation.	In addition to resident accomplishments, know details of more esoteric testing and what is on the horizon for laboratory hematology.	Be able to teach others about laboratory hematology including factual and interpretive elements. Know how to evaluate new instrumentation.
Practice-Based Learning	Become familiar with basic hematopathology educational resources.	Search literature for information pertaining to cases and apply it to diagnostic appraisals at sign-out and at conferences.	Critically analyze literature and other sources of new information pertaining to cases.	Master all skill expectations listed for more junior residents. Have general knowledge of hematopathology resources and literature and apply this	Have broad knowledge of hematopathology resources and literature and apply this information independently to daily

Competency	Core Rotation - 1st to 3rd Year Resident Beginning of Rotation	Core Rotation – 1st to 3rd year Resident Later in Rotation	Elective Rotation - 3rd and 4th year Resident	Fellow 1st 6 months	Fellow 2nd 6 months
				information to daily practice including dealing with more complex cases.	practice and to alter personal practice.
	Start to develop diagnostic differentials for some of the more common neoplastic and non-neoplastic disorders with significant faculty input. Construct reports based on others' examples.	Knows the differential diagnoses to consider for more commonly encountered neoplastic and non-neoplastic disorders. Improve reports based on comments received back from the faculty.	Able to construct more extensive differentials and apply knowledge by deciding what stains and ancillary testing would aid in distinguishing amongst the diagnostic possibilities being considered. Produce reports based on comments received back from the faculty who require few, if any, changes.	Demonstrates ability to use textbooks and medical literature to construct a differential diagnosis for most routine cases and decide what ancillary testing would be useful. Develop complete reports that reflect divisional style based on continued input from faculty. Independently use other colleagues and faculty as learning resources.	Demonstrates ability to apply knowledge from medical literature in constructing a differential diagnosis or choosing an appropriate work-up strategy of stains, ancillary testing, etc. Develop complete reports that reflect divisional style and integration of additional suggestions received on reports. Demonstrates ability to utilize other professional colleagues as learning resource(s).
Interpersonal/ Communication Skills	Present with clarity in conference settings with significant faculty guidance.	Present with clarity in conference settings with minimal faculty assistance.			

Competency	Core Rotation - 1st to 3rd Year Resident Beginning of Rotation	Core Rotation – 1st to 3rd year Resident Later in Rotation	Elective Rotation - 3rd and 4th year Resident	Fellow 1st 6 months	Fellow 2nd 6 months
	Works well with technologists and support staff and learns from them.	Greater interaction with technologists, including demonstrating an ability to teach them.	Can serve as a greater resource for technical staff.	Demonstrates the ability to present information to technologists and junior residents at levels appropriate for the audience.	Able to educate technologists and residents with ease in more impromptu settings as appropriate. Proactively seeks opportunities to educate others.
	Contact clinicians to obtain clinical and other information.	Able to convey straightforward information to clinicians.	Discuss preliminary reports and diagnoses with clinicians with ease. Able to convey more complex information to clinicians and consulting pathologists.	Able to convey complex information to clinicians and consulting pathologists and can answer questions about diagnoses or work-up. Discuss clinical implications of most routine diagnoses in depth.	Discuss clinical implications of routine and complex diagnoses in depth. Begin to function as a junior faculty in terms of providing consultative information to staff pathologists at UPMC and elsewhere as well as with clinicians.
Systems Based Practice	Know and utilize basic aspects of resources available in health system i.e. computer systems (CoPath, MARS), laboratories (hematology, molecular diagnostics, cytogenetics, histology), grossing, bone marrow laboratories.	Know and more fully utilize resources available in health system.	Learn about outside regulatory agencies/organizations. Develop an appreciation of basic healthcare/pathology related financial issues. Perform a mock CAP inspection, if possible.	Learn about the administrative and technical functions of running the Division of Hematopathology. Perform a mock CAP inspection, if possible.	Demonstrates understanding of more complex personnel management issues. Understands the various components of a diagnostic hematopathology service and the interaction with other related, but separate services, such as cytogenetics and

Competency	Core Rotation - 1st to 3rd Year Resident Beginning of Rotation	Core Rotation – 1st to 3rd year Resident Later in Rotation	Elective Rotation - 3rd and 4th year Resident	Fellow 1st 6 months	Fellow 2nd 6 months
					molecular laboratories). Has basic understanding of hospital budgetary issues that may be specific to hematopathology or pathology in general.

SPECIFIC ROTATIONS

Hematopathology Fellowship
Adult Bone Marrow Rotation

Description of Rotation or Educational Experience

Adult bone marrow sign-out at the UPMC involves assembling the relevant smear and histologic slides and ancillary data, an initial review including the performance of a peripheral blood and marrow differential by the fellow and bone marrow technologist, where appropriate, and then a final sign-out with a staff hematopathologist. A preliminary review of marrow smears is also performed upon their receipt as well as review of pertinent slides/reports from prior marrow evaluations. Diagnoses include an interpretation of all ancillary data such as any cytochemical stains or flow cytometric immunophenotypic studies. For new diagnoses of malignant disorders, the synoptic part of the reports needs to be completed. Interpretations of studies that have a longer turnaround time such as cytogenetic or molecular studies are expected to be included in addenda to the original report. Initially the fellow reviews cases and then signs them out with a staff hematopathologist while later, with permission of the staff, they are given increasing responsibilities (all slides are ultimately reviewed by a hematopathologist). Competencies in signing out marrows and associated immunophenotypic, cytogenetic and genotypic studies are one of the areas stressed in this fellowship. The fellow is expected to help educate other trainees when present. The fellow is also expected to be available to review peripheral blood and marrow aspirate smears and marrow biopsies with students, trainees and staff from other departments.

Patient Care

Goal

Fellows must be able to provide diagnostic peripheral blood and bone marrow interpretations that are appropriate to enable the effective treatment of health problems and the promotion of health. Fellows are expected to:

Competencies

- Demonstrate an ability to sign out peripheral blood, marrow aspirate and biopsy evaluations utilizing morphology and ancillary studies and recognize neoplastic and non-neoplastic disorders that may involve the peripheral blood and bone marrow.

Objectives

- Write concise diagnostic reports that include an accurate diagnostic interpretation and description, that are easily understood, as independently as current regulations allow.
- Be able to integrate cytogenetic, molecular, immunohistochemical, cytochemical, and immunophenotypic data in diagnostic reports.
- Write accurate and concise interpretive flow cytometry interpretations based on review of the raw data, interacting with the laboratory when appropriate.
- Learn the use of a multiparameter approach to diagnostic peripheral blood and bone marrow pathology (morphology, flow cytometric and immunohistochemical phenotypic studies, cytogenetic studies, molecular studies and clinical data.
- Learn how to make cost-effective test utilization decisions regarding state-of-the-art peripheral blood and bone marrow evaluations.

Medical Knowledge

Goal

Fellows must demonstrate knowledge of established and evolving biomedical, clinical, and epidemiological sciences, as well as the application of this knowledge to patient care.

Competencies

- Know normal and abnormal blood and bone marrow cell morphology.
- Ability to perform full bone marrow/peripheral blood differential counts.
- Develop a basic understanding of the diagnostic criteria for hematologic and non-hematologic disorders that may demonstrate bone marrow findings.
- Know the major clinical aspects of the disorders diagnosed by hematopathologists where bone marrow evaluation plays a significant role.

Objectives

- Complete checklist that includes acquisition of general knowledge related to hematopoietic disorders and bone marrow pathology as well as more specific knowledge about a list of important bone marrow neoplasms and non-neoplastic bone marrow related diagnoses.
- Write coherent diagnostic bone marrow and corresponding flow cytometry reports that indicate the ability to recognize the neoplastic hematopoietic/lymphoid disorders listed in the World Health Organization (WHO) classification and the non-neoplastic hematopoietic/lymphoid disorders that are expressed in the bone marrow.
- Obtain a score of competent on the written practical examination administered by the hematopathology division (twice/year).
- Achieve a score above the 25th percentile on at least the Spring FISHE examination administered by ASCP.
- See also general description.

Practice-Based Learning and Improvement

Goal

See general description.

Systems Based Practice

Goal

See general description.

Professionalism

Goal

See general description.

Interpersonal and Communication Skills

Goal

See general description.

Teaching Methods

- Direct sign-out at a multiheaded microscope with the primary attending hematopathologist, with one-on-one didactic and Socratic interaction.
- Use of actual and virtual teaching sets of glass slides and case studies including:
    - Hematopathology Virtual Slide Study Set (folder with case list can be checked out from the hematopathology secretaries [Hill 354] and a

spreadsheet with a link to the cases is located in the resident's drive [X:\Hemepath_study_set]).

- Reading of various textbooks and original literature available within the hematopathology division.
- Attendance and/or presentation at Hematopathology Conference (weekly), Patient Safety and Risk Management in Hematopathology Conference (bi-weekly), Hillman Cancer Center Hematologic Malignancy Conference (bi-weekly), and Benign Hematology Case Conference (bi-weekly).
- See also general description.

Assessment Method (fellows)

- Weekly EPA-based electronic evaluations by attending faculty (based on direct supervision and observation).
- Bi-monthly multisource (360-degree) evaluations.
- Verbal feedback during daily interactions with attendings and staff.
- ASCP CheckPath Hematopathology examination (quarterly).
- ASCP FISHE examination (twice/year).
- Direct, objective written practical examination administered by the Division (twice/year).
- Bi-monthly clinical competency committee review.
- Bi-annual review by fellowship program director or designee.
- Review of rotation checklist with fellowship director or designee at least bi-annually: **Checklist Adult Bone Marrow Rotation**
- Monthly review of case log numbers by fellowship director or designee (also reviewed with fellow at bi-annual evaluation meetings).

Assessment Method (Program Evaluation)

See general description.

Level of Supervision

One of the hematopathology attendings is assigned to cover the service (generally on a weekly basis). Fellows report to that faculty member, who provides direct and/or indirect supervision. In addition, if there is an insufficient bone marrow case load on the service to which the fellow is assigned (as determined by the supervising attending pathologist), then fellows are asked to identify additional cases to sign out with the faculty on the other adult marrow services. Ultimate responsibility for all patient care activities performed by the fellow is assumed by the attending hematopathologist covering the service, and all reports are ultimately signed out by the attending hematopathologist.

Bone Marrow After Hours Procedure located in MediaLab (policy BM 3.0 located at path Special Hematology/Bone Marrow Manual/Bone marrow collection/)

Educational Resources

- A teaching set of cytochemical stains and peripheral blood and bone marrow smears is available from the bone marrow technologists. Individual faculty members also have teaching slides.
- Hematopathology Virtual Slide Study Set (folder with case list can be checked out from the hematopathology secretaries [Hill 354] and a spreadsheet with a link to the cases is located in the resident's drive [X:\Hemepath_study_set]).
- Foucar K, Reichard K, Czuchlewski D. *Bone Marrow Pathology*, *3rd ed.* ASCP, 2010.
- Swerdlow SH, Campo E, Harris NL, et al (Eds). *WHO Classification of Tumours of Haematopoietic and Lymphoid Tissues*. IARC, 2017.

- Bain B, Clark D, Wilkins B. *Bone Marrow Pathology*, 4th Ed. Wiley-Blackwell, 2010.
- Foucar K, Viswanatha DS, Wilson CS. *Non-Neoplastic Disorders of Bone Marrow.* ARP, 2008.
- Jaffe, ES, Harris, NL, Vardiman, JW, et al. *Hematopathology*. Saunders, 2011.
- Ortolani C. *Flow Cytometry of Hematological Malignancies*. John Wiley & Sons, 2011.
- Crisan D (Ed). *Hematopathology: Genomic Mechanisms of Neoplastic Diseases*. Humana Press, 2010.
- Hematology/Special Hematology laboratory procedures may be viewed at: http://www.medialabinc.net/ (See division coordinator for specific usernames and passwords)
    - First, under “Viewing”, select “PUH CP”.
    - Select “View Documents & Manuals” Tab
    - Choose Manuals under left hand menus for “View Documents & Manuals”
    - Then choose appropriate manual
        “Automated Testing Laboratory” for Hematology manual or Special Hematology” for bone marrow, lymph node, and flow cytometry related manuals and procedures.

Hematopathology Fellowship
Adult Clinical Bone Marrow Procedures and Hematology/Oncology Clinical Experience

Description of Rotation or Educational Experience

Although the collection of bone marrow samples are frequently performed by hematologists-oncologists and other non-pathologist physicians or support staff, a hematopathologist must know how to perform a bone marrow biopsy and aspirate collection and may need to do so in a future practice setting. Hematopathology Fellows at UPMC are expected to perform at least 5 marrow aspirate and biopsy collections in the hematology/bone marrow transplant division or to have performed them previously. In order to help accomplish this, to better learn and to appreciate the clinical aspects of the disorders we diagnose and also to learn about what the clinician expects from hematopathologists, fellows are expected to spend at least 2 and one-half days rotating with members of the hematology/oncology division. Most of this experience will be obtained at the Hillman Cancer Center. Working with the OHA physician's assistants/nurse practitioners is recommended. Additional time at Hillman may be arranged on an individual basis, if additional time is needed to complete the minimum 5 marrow procedures required. Also see the Hematology/Oncology Clinical Experience schedule for more information. All bone marrow collection procedures must be recorded in the ACGME Case Log System prior to completion of the fellowship program.

Patient Care

Goal

Fellows must be able to perform bone marrow biopsy and aspirate collections that provide adequate aspirate and biopsy material for diagnosis, with concern also for patient safety and comfort.

Competencies

- Demonstrate an ability to perform successful bone marrow aspirate and biopsy collections that produce satisfactory specimens, with appropriate concern for patient comfort and safety.
- Demonstrate ability to interact with both patients and other treating physicians.

Objectives

- Fellows will perform at least 5 marrow collection procedures on living patients in the adult bone marrow hematology-oncology clinic at UPMC-Shadyside/Hillman Cancer Center under the guidance of the hematology-oncology faculty, hematology-oncology fellows, or hematology-oncology physician assistants/nurse practitioners that are skilled in performing these procedures OR will have documentation of prior satisfactory competence from residency or other training.
- Know the type of information clinical hematologist/oncologists require from hematopathologists.
- Fellows should be able to obtain consent from patients for a bone marrow procedure, explaining the procedure in appropriate terms that he/she can understand, while not causing undue anxiety or alarm.

Medical Knowledge

Goal

Fellows must demonstrate knowledge of the bone marrow collection procedure and know the hematopathology findings for the disorders seen in clinic.

Competencies

- Learn the types of needles and equipment required to perform a marrow collection.
- Be familiar with the clinical aspects of the hematologic disorders encountered.

Objectives

- Fellows must have a formal evaluation sheet completed, listing each marrow collection by the appropriate supervising physician or staff, as documentation that they have a practical working knowledge of how to perform a successful bone marrow procedure. This form also documents the observer's assessment of the fellow's interaction with the patient, as well as the adequacy of the sample collected (usually as assessed by the assigned hematopathologist signing out the case).
- Fellows should also be able to provide information related to hematopathology issues to the clinician(s) for patients encountered on this brief rotation.

Practice-Based Learning and Improvement

Goal

Fellows must demonstrate the flexibility to alter their procedure as needed if review of the final bone marrow sections and aspirate smears indicates an inadequate sample collection or if unnecessary patient discomfort occurs.

Competencies

- Provide self-assessment and positive response to criticism with regard to performing bone marrow collection procedures.
- Learn how to determine if they have obtained a specimen that is satisfactory for diagnosis.

Objectives

- Each marrow collection should be reviewed with appropriate hematopathology faculty who can assess whether the sample is adequate for diagnosis.
- Additionally, staff and faculty in hematology-oncology will provide feedback on-site related to issues regarding the fellow's concern for patient comfort, safety, and general well-being, or if they suspect the collection was inadequate or likely suboptimal.

Systems Based Practice

Goal

Fellows must demonstrate an awareness of and responsiveness to the larger context and system of health care, as well as the ability to call effectively upon other resources in the system to provide optimal health care.

Competencies

- Fellows should develop an awareness of the physical and staffing resources that may be needed to provide a marrow collection service, especially in future practice.

Objectives

- Observe the staff and faculty who perform bone marrow procedures with discussion, as appropriate.

Professionalism

Goal

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

Competencies

- Fellows should demonstrate compassion, integrity, and respect for others.
- Fellows should demonstrate respect for patient privacy and autonomy.

Objectives

- Demonstrate appropriate concern for the patient's well-being during the marrow collection procedure, which will be assessed by the supervising physician or staff.
- Demonstrate compliance with HIPAA privacy requirements.
- Show respect for the patient's right to refuse a marrow collection or request that another person perform the collection.

Interpersonal and Communication Skills

Fellows must demonstrate an ability to communicate effectively with patients directly. This may include explaining the reasons for obtaining a marrow sample, what will be assessed, and conveying the risks and benefits of the marrow collection. He/she may also need to allay any fears or anxiety a patient may have about the marrow procedure and explain to the patient how he/she will be informed of the results.

Competencies

- Fellows must demonstrate flexibility in their interactions with patients and be prepared to explain some of the risks and benefits of the procedure in language that the patient can understand.
- Fellows must also be able to assess the patient's comfort and concern during the procedure.

Objectives

- Fellows must be prepared to obtain consent if needed.
- Fellows should assess patient level of comfort through observation and direct verbal communication with patient.

Teaching Methods

- Direct one-on-one supervision by hematology-oncology attendings, physician assistants or nurse practitioners who perform bone marrow collection procedures.
- Reading textbook materials indicated below.
- See also general description.

Assessment Method (fellows)

- Direct observation/supervision by hematology-oncology attendings, physician assistants or nurse practitioners.
- Evaluation of the bone marrow sample adequacy by hematopathology faculty.
- Written assessment of each bone marrow collection procedure by having supervising faculty/staff complete the requisite evaluation form. Bone Marrow Aspirate Biopsy Form
- EPA-based electronic evaluations by attending faculty and/or staff (based on direct supervision and observation).
- Review of case log numbers (paper form and ACGME Case Log System) with fellowship director or designee at bi-annual fellow evaluation meetings.

Assessment Method (Program Evaluation)

See general description.

Level of Supervision

Fellows report to staff and faculty within the hematology-oncology bone marrow outpatient clinic at UPMC-Shadyside/Hillman Cancer Center, who directly supervise the fellow both in seeing clinical patients and when performing bone marrow collection procedures. Bone marrow sample adequacy evaluations are performed by the attending hematopathologist to whom the bone marrow case is assigned.

Educational Resources

- Ryan DH, Felgar RE. Examination of the marrow in Lichtman, et al., *Williams Hematology, 7th ed*. McGraw Hill, 2006.
- Foucar K, Reichard K, Czuchlewski D. *Bone Marrow Path*ology, *3rd ed*. ASCP, 2010.
- Riley RS, Hogan TF, Pavot DR, et al. A pathologist's perspective on bone marrow aspiration and biopsy: I. performing a bone marrow examination. J Clin Lab Anal 2004;18:70-90.
- Staff and faculty within the Division of Hematology-Oncology.
- ACGME Case Log System (http://acgme.org/).

Hematopathology Fellowship
Lymph Node Pathology
(and related solid tissue hematopathology)

Description of Rotation or Educational Experience

The hematopathology division is responsible for the gross processing and final sign-out of most diagnostic lymph node biopsies (and related solid tissue hematopathology). Fellows are responsible for handling and triaging the gross specimen either directly, or more often indirectly by providing assistance as needed and oversight of "lymph node" technologists. They then review all histologic material and gather the ancillary data such as the flow cytometric immunophenotypic data. Depending on the experience of the fellow, they may at this point order additional ancillary studies such as immunohistochemical stains. As they progress, they are also expected to dictate cases in advance of their sign-out. After interpreting everything, the case including the ancillary studies will be signed out with the faculty hematopathologist. Addenda will be issued for ancillary studies such as genotypic studies completed after the case has been signed out. This part of the fellowship will include review of any solid tissue hematopathology consults or any consults specifically sent to the faculty on this service. This functional approach to diagnostic lymph node pathology is an area that is stressed in the fellowship. In addition, fellows will review any fluorescence in situ hybridization testing performed on lymph nodes or other solid tissues, which are signed out in the Division of Hematopathology. Fellows also play a role in the education of residents, clinical fellows and hematologists/oncologists.

Patient Care

Goal

Fellows must be able to provide diagnostic lymph node interpretations that are appropriate to enable the effective treatment and the promotion of health. Fellows are expected to:

Competencies

- Demonstrate an ability to sign out lymph nodes and other related biopsy evaluations utilizing morphology and ancillary studies.
- Recognize the majority of neoplastic and non-neoplastic disorders that may involve tissues.
- Develop familiarity with the interpretation of fluorescence in situ hybridization studies performed on lymph nodes or other solid tissues.

Objectives

- Write concise diagnostic reports that include an accurate diagnostic interpretation and description, that are easily understood, as independently as current regulations allow.
- Be able to integrate cytogenetic, molecular, and immunophenotypic data in diagnostic reports.
- Write accurate and concise flow cytometry interpretations based on review of the raw data interacting with the laboratory when appropriate.
- Review and actively participate in the interpretation of fluorescence in situ hybridization studies performed on lymph nodes or other solid tissues and signed out in the Division of Hematopathology (**please record all FISH cases reviewed while on this rotation**).
- Learn the use of a multiparameter approach to diagnostic lymph node pathology (morphology, flow cytometric and immunohistologic phenotypic studies, genotypic studies, cytogenetic studies and clinical data).

- Learn to diagnose reactive lymphadenopathies, Hodgkin lymphomas, the non-Hodgkin lymphomas and other hematopathologic disorders seen in tissue biopsies.
- Learn how to make cost-effective test utilization decisions regarding state-of-the-art lymph node and related tissue evaluations.

Medical Knowledge

Goal

Fellows must demonstrate knowledge of established and evolving biomedical, clinical, and epidemiological features of hematolymphoid disorders involving lymph nodes and related tissues, as well as knowing how to apply this knowledge to patient care.

Competencies

- Know normal and abnormal lymphoid and related tissue morphology.
- Have a basic understanding of the diagnostic criteria for hematopoietic/lymphoid disorders that may involve or primarily involve tissues.
- Know the major clinical aspects of disorders diagnosed by hematopathologists using lymph nodes and related tissue biopsies.

Objectives

- Complete checklist that includes acquisition of general knowledge related to lymph node and related tissue pathology.
- Understand the pathobiology of the disorders that involve lymph nodes and related tissues.
- Write coherent diagnostic lymph node and corresponding flow cytometry reports that indicate the ability to recognize the neoplastic hematopoietic/lymphoid disorders listed in the most recent WHO classification and the non-neoplastic hematopoietic/lymphoid disorders that are expressed in extramedullary tissues.
- Obtain a score of competent on the written practical examination administered by the hematopathology division.
- Achieve a score above the 25th percentile on at least the Spring FISHE examination administered by ASCP.
- See also general description.

Practice-Based Learning and Improvement

See general description.

Systems Based Practice

See general description.

Professionalism

See general description.

Interpersonal and Communication Skills

See general description.

Teaching Methods

- Direct sign-out at a multiheaded microscope with the primary attending hematopathologist, with one-on-one didactic and Socratic interaction.
- Use of actual and virtual teaching sets of glass slides and case studies including:
    - Hematopathology Virtual Slide Study Set (folder with case list can be checked out from the hematopathology secretaries [Hill 354] and a spreadsheet with a link to the cases is located in the resident's drive [X:\Hemepath_study_set]).

- Reading of a various textbooks and original literature available within the hematopathology division.
- Attendance and/or presentation at Hematopathology Conference (weekly), Patient Safety and Risk Management in Hematopathology Conference (bi-weekly), and Hillman Cancer Center Hematologic Malignancy Conference (bi-weekly).
- See also general description.

Assessment Method (fellows)

- Weekly EPA-based electronic evaluations by attending faculty (based on direct supervision and observation).
- Bi-monthly multisource (360-degree) evaluations.
- Verbal feedback during daily interactions with attendings and staff.
- Review of lymph node rotation checklist with fellowship director or designee at least bi-annually: **Checklist LYMPH NODE Rotation**
-
- ASCP CheckPath Hematopathology examination (quarterly).
- Direct, objective written practical examination administered by the Division (twice/year).
- ASCP FISHE examination (twice/year).
- Bi-monthly clinical competency committee review.
- Bi-annual review with fellowship program director or designee.
- Monthly review of case log numbers by fellowship director or designee (also reviewed with fellow at bi-annual evaluation meetings). **Please record all FISH cases reviewed while on this rotation:** HEMEPATH FISH CASE LOG

Assessment Method (Program Evaluation)

See general description.

Level of Supervision

One or two of the hematopathology attendings is assigned to cover the service (generally on a weekly basis). Fellows report to these faculty members, who provide direct and/or indirect supervision. Ultimate responsibility for all patient care activities performed by the fellow is assumed by the attending hematopathologist(s) covering the service, and all reports are ultimately signed out by the attending hematopathologist(s).

Educational Resources

- Lymph node chapter in: Mills SE, Carter D, Greenson JK, et al (Eds). *Sternberg's Diagnostic Surgical Pathology, 5th ed*. Lippincott, Williams & Wilkins, 2010. [Highly recommended]
- Swerdlow SH, Campo E, Harris NL, et al (Eds). *WHO Classification of Tumours of Haematopoietic and Lymphoid Tissues*. IARC, 2017. [Highly recommended]
- Jaffe ES, Harris NL, Vardiman JW, et al. *Hematopathology*. Saunders, 2011.
- O'Malley DP, George TI, Orazi A, et al. *Benign and Reactive Conditions of Lymph Node and Spleen.* ARP, 2009.
- Ioachim HL, Medeiros LJ. *Ioachim's Lymph Node Pathology, 4th ed*. Lippincott, Williams & Wilkins, 2009.
- Cerroni L, Gatter K, Kerl H. *Skin Lymphoma: The Illustrated Guide, 3rd ed*. John Wiley & Sons, 2009.
- Garcia CF, Swerdlow SH. Best practices in contemporary diagnostic immunohistochemistry: panel approach to hematolymphoid proliferations. Arch Pathol Lab Med 2009;133:756-65. PMID:19415950

- Checkpath Hematopathology (images, histories and explanations of faculty CME program for Hematopathology). Located in Hill 354 (check with division secretaries).
- Teaching/conference sets of glass slides of marrows, lymph nodes, etc. Located in Dr. Swerdlow's office (check with division coordinator).
- Hematopathology Virtual Slide Study Set (folder with case list can be checked out from the division secretaries [Hill 354] and a spreadsheet with a link to the cases is located in the resident's drive [X:\Hemepath_study_set]).
- Special Hematology laboratory procedures may be viewed at: http://www.medialabinc.net/ (See division coordinator for specific usernames and passwords)
    i. First, under "Viewing", select "PUH CP".
    ii. Select "View Documents & Manuals" Tab
    iii. Choose Manuals under left hand menus for "View Documents & Manuals"
    iv. Then choose appropriate manual
        "Special Hematology" for lymph node and flow cytometry related manuals and procedures.

Hematopathology Fellowship
Flow Cytometry

Description of Rotation or Educational Experience

While most of the interpretive teaching and indications for flow cytometric immunophenotypic testing will occur during marrow and lymph node sign out, one week will be spent in the laboratory learning some of the technical aspects involved in these studies. In addition, during the pediatric hematopathology/laboratory hematology rotation, fellows will review the following flow cytometry tests with the hematopathologist responsible for flow only sign-out: paroxysmal nocturnal hemoglobinuria (PNH) and neutrophil oxidative burst assay (NOBA). Fellows are also encouraged to review flow cytometric studies performed on fluids during the pediatric hematopathology/laboratory hematology rotation. During the flow cytometry rotation and throughout the fellowship year, fellows are encouraged to gain an awareness of the regulatory requirements relevant to the flow cytometry laboratory, including those required by the CAP.

Patient Care

Goal

Fellows must be able to provide diagnostic flow cytometry interpretations that are appropriate to enable the effective treatment of health problems and the promotion of health. In order to provide accurate interpretations, fellows must have an understanding of the technical aspects of flow cytometric testing, including compensation, quality control, quality assurance, and evaluation of new antibodies or staining methods.

Competencies

- Demonstrate an ability to interpret flow cytometry evaluations and recognize the majority of neoplastic and non-neoplastic disorders that may involve bone marrow, tissue samples, blood samples and body fluid samples. (This is an expectation that extends throughout fellowship, as the fellow will interpret and write-up marrow and tissue flow cytometric studies while rotating on the bone marrow and lymph node services.)
- Demonstrate an understanding of the diagnostic limitations of flow cytometry when evaluated in the absence of other diagnostic data such as tissue morphology, bone marrow aspirate smear morphology, or appropriately made blood smear or fluid cytologic preparations.
- Demonstrate an understanding of some of the testing that may be specific to the flow cytometry laboratory and how these tests are used in patient care (i.e. PNH testing, NOBA testing, lymphocyte subset testing).
- Understand how flow cytometry can be used to assess minimal residual disease.

Objectives

- Understand sample preparation, basic flow cytometry, quality control, gating on specific cell populations, determination of positive versus negative staining and methods of data presentation.
- Know indications for testing, taking into account cost effective medicine.
- Become familiar with the preparation of specimens.
- Know how specialized assays such as immunodeficiency related testing (NOBA, CD4 counts) are performed and reported.
- Become familiar with in-house and Children’s Oncology Group (COG) minimal residual disease assays.
- Know the clinical significance of the specialized assays mentioned above.

- Develop an understanding of how analytic software is used to aid in interpretation, with review of gating concepts/strategies vs. cluster analysis and other applicable methods.

Medical Knowledge

Goal

Fellows must demonstrate knowledge of the technical aspects and specific testing issues unique to the flow cytometry laboratory and how these influence diagnostic decision making.

Competencies

- Acquire a working technical knowledge of how samples are stained, how flow cytometers work, and methods of data analysis, with emphasis on the specific testing performed in the UPMC hematopathology division laboratory.
- Learn normal and abnormal flow cytometry findings in the various tissues and body fluids studies. (Much of this interpretive knowledge will be gained as part of the lymph node and bone marrow rotations.)
- Learn the expected flow cytometry findings in the immunophenotyping of disorders diagnosed by hematopathologists.

Objectives

- Complete checklist that includes acquisition of general knowledge related to hematopoietic disorders of the bone marrow, blood, and lymph node tissues, as well as more specific knowledge.
- Obtain a score of competent on the written practical examination administered by the hematopathology division (twice/year).
- Obtain at least a score above the 25th percentile on the Spring FISHE examination administered by ASCP.
- Review the aspects of the testing unique to flow cytometry (NOBA assay, PNH, minimal residual disease testing) through either direct laboratory observation or independent reading of laboratory procedure manuals or appropriate textbooks available within the hematopathology division or flow cytometry laboratory.

Practice-Based Learning and Improvement

Goal

See general description.

Systems Based Practice

Goal

Fellows 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.

Competencies

- Incorporate considerations of cost awareness and risk-benefit analysis in ordering flow cytometric testing.
- Demonstrate an awareness of regulatory requirements as relevant to hematopathology and to flow cytometry specifically, including those required by the CAP and, if applicable, local or state regulations.

Objectives

- Become familiar with the technical resources used in the operation of a flow cytometry laboratory.

- Demonstrate ability to choose appropriate flow cytometry panels for making a specific diagnosis or for most effectively evaluating a particular sample.
- Participate in mock CAP laboratory inspection, if timing of inspection coincides with fellowship, or preparation for real or mock CAP inspection.
- Review online CAP checklist requirements in flow cytometry, located in MediaLab, that are utilized for most laboratory inspections and certification.
- Become familiar with proficiency testing programs used in the flow cytometry laboratory by participating in at least one CAP and/or UK NEQAS survey.
- Attend flow cytometry laboratory management and quality assurance/quality control meetings (contact Dr. Monaghan or flow cytometry lead technologist/supervisor to schedule).
- May participate in faculty-supervised quality improvement projects that are relevant to flow cytometry evaluation or utilization of this testing.

Professionalism

Goal

See general description.

Interpersonal and Communication Skills

See general description.

Teaching Methods

- Use of teaching sets and case studies (see “FlowLab Teaching” folder in J drive).
- Reading of various textbooks and original literature available within the hematopathology division.
- Direct observation of laboratory and analyzer operation, including direct observation of technologists and bench personnel.
- Attendance and/or presentation at Hematopathology Conference (weekly), Patient Safety and Risk Management in Hematopathology Conference (bi-weekly), Hematopathology Flow Cytometry Conference (bi-weekly), and flow cytometry laboratory management and quality assurance/quality control meetings.
- See also general description.

Assessment Method (fellows)

- Weekly EPA-based electronic evaluations by attending faculty and/or staff (based on direct supervision and observation).
- Bi-monthly multisource (360-degree) evaluations.
- Verbal feedback during daily interactions with attendings and staff.
- Review of rotation checklist with flow cytometry laboratory director, fellowship director, or designee at least bi-annually: **Checklist Flow Cytometry Rotation**
- Direct, objective written practical examination administered by Division (twice/year).
- ASCP FISHE examination (twice/year).
- ASCP CheckPath Hematopathology examination (quarterly).
- Bi-monthly clinical competency committee review.
- Bi-annual review by fellowship director or designee.
- Monthly review of case log numbers by fellowship director or designee (also reviewed with fellow at bi-annual evaluation meetings).

Assessment Method (Program Evaluation)

See general description.

Level of Supervision

Fellows report directly to the medical director of the flow cytometry lab or appropriate designee who provides direct and/or indirect supervision. Ultimate responsibility for all patient care activities performed by the fellow is assumed by the medical director and/or attending hematopathologist(s) covering the flow cytometry service, and all reports are ultimately signed out by the attending hematopathologist(s) covering the flow cytometry service.

Educational Resources

- Carey, JL, McCoy JP, Keren DF (Eds). *Flow cytometry in clinical diagnosis, 4th ed*. ASCP, 2007.
- Craig, FE (Ed). *Clinics in Laboratory Medicine: Flow Cytometry.* 2007;27:453-718.
- Craig FE, Foon, KA. Flow cytometric immunophenotyping for hematologic neoplasms. Blood 2008;111:3941-67.
- Ortolani C. *Flow Cytometry of Hematological Malignancies*. John Wiley & Sons, 2011.
- Cherian S, Wood BL. *Flow Cytometry in Evaluation of Hematopoietic Neoplasms: A Case-Based Approach.* CAP, 2012.
- Wood BL, Cherian S, Borowitz MJ. "The flow cytometric evaluation of hematopoietic neoplasia." In McPherson RA, Pincus MR. *Henry's Clinical Diagnosis and Management by Laboratory Methods, 23rd ed*. Elsevier, 2017.
- Wood BL. Principles of minimal residual disease detection for hematopoietic neoplasms by flow cytometry. Cytometry B Clin Cytom 2016;90:47-53.
- Educational videos and presentations posted on the International Clinical Cytometry Society (ICCS). http://www.cytometry.org (Ask Dr. Monaghan for access)
- Flow cytometry laboratory procedures may be viewed at: http://www.medialabinc.net/ (See division coordinator for specific usernames and passwords)
    - First, under "Viewing", select "PUH CP".
    - Select "View Documents & Manuals" Tab
    - Choose Manuals under left hand menus for "View Documents & Manuals"
    - Then choose appropriate manual
        "Special Hematology" for flow cytometry related manuals and procedures.

Hematopathology Fellowship
Pediatric Hematopathology

Description of Rotation or Educational Experience

The object of this rotation, which is combined with the Laboratory Hematology rotation, is for fellows to become familiar with pediatric hematopathology: interpretation of bone marrow aspirates, biopsies, peripheral blood smears, and body fluids. The fellow learns how to interpret results by integrating the information obtained by these methods together with flow cytometric results, molecular findings, immunohistochemistry studies, cytogenetics and clinical hematology tests. Pediatric lymph node biopsies that have flow cytometric immunophenotyping studies are also reviewed. Fellows will become familiar with the evaluation of hemoglobinopathies, including interpretation of HPLC (high performance/high pressure liquid chromatography) results at Children's Hospital of Pittsburgh. Fellows also participate either with a faculty member or independently in the Children's Hospital of Pittsburgh Leukemia Tumor Board and in the Pediatric Hematology/Oncology fellows' microscopic slide review conferences, which are performed in person at Children's Hospital of Pittsburgh or via web-based conferencing (for displaying images and other relevant information on guest computers within the UPMC network) and a conference call set-up or speaker phone, depending on the number and location of conference participants. In addition, fellows will participate in laboratory operations and management meetings as scheduled during the rotation.

Patient Care

Goal

Fellows must be able to provide diagnostic bone marrow interpretations on samples from pediatric patients and accurately evaluate other pediatric samples related to hematopathology that are appropriate to enable the effective treatment of health problems and the promotion of health. In addition, fellows should also be aware of some of the privacy and consent issues that may be unique to pediatric patient settings.

Competencies

- Demonstrate an ability to sign out bone marrow aspirate and biopsy evaluations utilizing morphology and ancillary studies and recognize the majority of neoplastic and non-neoplastic disorders that may involve bone marrow and blood.
- Provide accurate and clinically useful interpretations of pediatric peripheral blood smears, body fluid specimens, and HPLC results seen in the Division of Hematopathology.

Objectives

- Write concise diagnostic reports that include an accurate diagnostic interpretation and description, that are easily understood, as independently as current regulations allow.
- Be able to integrate cytogenetic, molecular, immunohistochemical, cytochemical, and immunophenotypic data in diagnostic reports.
- Write accurate and concise flow cytometry interpretations based on review of the raw data, interacting with the laboratory when appropriate.
- Write accurate comments (for entry into the laboratory information system) that reflect cells or abnormalities identified on blood smear and body fluid review. This may also involve accurately instructing the technologists at Children's Hospital of Pittsburgh with regard to up-dating the differential counts and cell designations.

Medical Knowledge

Goal

Fellows must demonstrate knowledge of established and evolving biomedical, clinical, and epidemiological information, as well as the application of this knowledge to patient care. This requires an understanding of the unique aspects of pediatric hematopathology.

Competencies

- Learn normal and abnormal blood cell morphology.
- Learn the diagnostic aspects of the hematologic diseases that may be found primarily or exclusively in pediatric and adolescent patients.
- Develop a basic understanding of the diagnostic criteria for the hereditary hematologic diseases that are usually or often first diagnosed in children, such as hemoglobinopathies.
- Learn the interpretation of HPLC results for the detection of aberrant and normal hemoglobins.
- Learn the major clinical aspects of pediatric disorders diagnosed by hematopathologists.

Objectives

- Complete checklist that includes acquisition of general knowledge related to hematopoietic disorders and bone marrow pathology as well as more specific knowledge about a list of important bone marrow neoplasms and bone marrow related diagnoses.
- Write coherent diagnostic bone marrow and corresponding flow cytometry reports that indicate the ability to recognize the neoplastic hematopoietic/lymphoid disorders listed in the WHO classification and the non-neoplastic hematopoietic/lymphoid disorders that are expressed in the bone marrow.
- Review hemoglobin HPLC results and interpretations with attending faculty at Children's Hospital of Pittsburgh (contact Dr. Dobrowolski to schedule).

Practice-Based Learning and Improvement

See general description.

Systems Based Practice

See general description.

Professionalism

See general description.

Interpersonal and Communication Skills

See general description.

Teaching Methods

- Direct sign-out at a multiheaded microscope or in the clinical laboratory with the primary attending pathologist/teaching faculty, with one-on-one didactic and Socratic interaction.
- Use of actual and virtual teaching sets of glass slides and case studies including:
    - Peripheral Blood and Fluid Slide Study Set that can be checked out from the hematopathology secretaries (Hill 354) (the directory of cases is in the resident's drive [X:\Hemepath_PBandFLUID_slide_set]).

- Hematopathology Virtual Slide Study Set (folder with case list can be checked out from the hematopathology secretaries [Hill 354] and a spreadsheet with a link to the cases is located in the resident's drive [X:\Hemepath_study_set]).

- Reading of various textbooks and original literature available within the hematopathology division.
- Attendance and/or presentation at Hematopathology Conference (weekly), Patient Safety and Risk Management in Hematopathology Conference (bi-weekly), Children's Hospital of Pittsburgh Leukemia Tumor Board (monthly), and Pediatric Fellow Teaching Conference (monthly).
- See also general description.

Assessment Method (fellows)

- EPA-based electronic evaluations by attending faculty (based on direct supervision and observation).
- B-monthly multisource (360-degree) evaluations.
- Verbal feedback during daily interactions with attendings and staff.
- Review of rotation checklist with fellowship director or designee at least bi-annually: **Checklist PEDIATRIC Hematopathology Rotation**

- ASCP CheckPath Hematopathology examination (quarterly).
- Direct, objective written practical examination administered by the Division (twice/year).
- ASCP FISHE examination (twice/year).
- Bi-monthly clinical competency committee review.
- Bi-annual review by fellowship program director or designee.
- Monthly review of case log numbers by fellowship director or designee (also reviewed with fellow at bi-annual evaluation meetings).

Assessment Method (Program Evaluation)

See general description.

Level of Supervision

One of the hematopathology attendings is assigned to cover the service (generally on a weekly basis). Fellows report to this faculty member, who provides direct and/or indirect supervision. Ultimate responsibility for all patient care activities performed by the fellow is assumed by the attending hematopathologist covering the service, and all reports are ultimately signed out by the attending hematopathologist.

Educational Resources

- Collins RD, Swerdlow SH. *Pediatric hematopathology*. Churchill Livingstone, 2001.
- Orkin SH, Nathan DG, Ginsburg D, et al. *Nathan and Oski's Hematology of Infancy and Childhood, 7th ed.* Saunders, 2008.
- Penchansky L. *Pediatric Bone Marrow*. Springer, 2004.
- Proytcheva MA. *Diagnostic Pediatric Hematopathology.* Cambridge University Press, 2011.
- Swerdlow SH, Campo E, Harris NL, et al (Eds). *WHO Classification of Tumours of Haematopoietic and Lymphoid Tissues*. IARC, 2017.
- Bain B. *Haemoglobinopathy Diagnosis, 2nd ed*. Blackwell Pub, 2006.
- Steinberg MH. *Disorders of Hemoglobin: Genetics, Pathophysiology, and Clinical Management, 2nd ed*. Cambridge University Press, 2009.

- Actual and virtual teaching sets of glass slides and case studies including:
    - Peripheral Blood and Fluid Slide Study Set that can be checked out from the hematopathology secretaries (Hill 354) (the directory of cases is in the resident's drive [X:\Hemepath_PBandFLUID_slide_set]).
    - Hematopathology Virtual Slide Study Set (folder with case list can be checked out from the hematopathology secretaries [Hill 354] and a spreadsheet with a link to the cases is located in the resident's drive [X:\Hemepath_study_set]).
- Hematology/Special Hematology laboratory procedures may be viewed at: http://www.medialabinc.net/ (See division coordinator for specific usernames and passwords)
    - First, under "Viewing", select "PUH CP".
    - Select "View Documents & Manuals" Tab
    - Choose Manuals under left hand menus for "View Documents & Manuals"
    - Then choose appropriate manual
        "Automated Testing Laboratory" for Hematology manual or "Special Hematology" for bone marrow, lymph node, and flow cytometry related manuals and procedures.

Hematopathology Fellowship
Molecular & Genomic Pathology

Description of Rotation or Educational Experience

The molecular oncology rotation allows the fellow to become familiar with the basic molecular biologic techniques used to support hematopathology. The Division of Molecular & Genomic Pathology (M&GP) laboratory is responsible for a variety of studies including B-cell (IGH and IGK) and T-cell (TCRB and TCRG) clonality, specific chromosomal translocations (*BCR-ABL1 and PML-RARA),* assessment of *JAK2* V617F and *CALR* mutations associated with some myeloproliferative neoplasms, and *NPM1* and *FLT3* mutations associated with acute myeloid leukemia. In addition to these in-house assays, a variety of send-out molecular hematopathology tests are reviewed in the M&GP Division. A myeloid next-generation sequencing (NGS) assay is also signed out in the Division of Hematopathology.

The fellow will become familiar with the professional functions associated with sample analysis including physician responsibility for correlating clinical history with laboratory requests to ensure proper clinical testing, selection of tests to be performed, review of test progress, interpretation and communication of preliminary results, and interpretation and reporting of final results in oral and written form. The fellow is expected to attend key M&GP conferences (primarily the Friday Hematologic Oncology [Hemeonc]/Genetics Consensus Conference and the Tuesday MGP Trainee Education Conference).

Fellows should be aware that it is expected that fellows will direct their efforts to the rotation during regular working hours and will not take more than one week of their vacation during this rotation.

Patient Care

Goal

Fellows must have a working understanding of how related oncologic molecular testing is used in either (a) making a specific primary diagnosis, (b) follow up of patients as testing for residual disease, or (c) as a supplemental or confirmatory diagnostic tool. They should also be able to participate in a molecular pathology service at the faculty level, since this is a role some hematopathologists perform in practice.

Competencies

- Demonstrate an understanding of how molecular testing is applied to the diagnosis and follow-up of hematopoietic/lymphoid diseases.
- Be able to interpret molecular studies performed in the evaluation of hematopoietic/lymphoid disorders and write a diagnostic report.

Objectives

- Acquire adequate knowledge about hematopathology molecular testing through didactic materials (such as lecture powerpoints) and textbooks available in the M&GP Division (week 1).
- Demonstrate progressive responsibility to compose draft final reports on at least one-half of relevant cases (weeks 2 through 4).
- Present relevant molecular laboratory data for the cases discussed in the weekly hematopathology interesting case conference.

- Demonstrate an ability to directly interpret routine PCR, RT-PCR, sequencing, and microarray findings and be able to relate these results to the patient's overall diagnosis.

Medical Knowledge

Goal

Fellows must demonstrate knowledge of established and evolving biomedical, clinical, and epidemiological aspects of hematopathology-related molecular diagnostic testing, as well as the application of this knowledge to patient care.

Competencies

- Understand the basic concepts of molecular biology.
- Understand the testing methods used for specific molecular hematopathology tests performed in the M&GP Division, selected send-out molecular hematopathology tests, as well as myeloid NGS signed out in the Division of Hematopathology.
- Know the basic molecular basis for the major hematopoietic/lymphoid neoplasms.
- Know what is considered to be state-of-the-art diagnostic molecular testing in hematopathology.

Objectives

- Review the basic concepts of molecular biology through appropriate reading of textbooks and primary literature.
- Sign out of molecular hematopathology cases with M&GP faculty, and sign out of myeloid NGS with faculty in the Division of Hematopathology (schedule with attending hematopathologist assigned to NGS service). **Please record all myeloid NGS cases reviewed while on this rotation:** MYELOID NEXT GENERATION SEQUENCING CASE LOG.

Practice-Based Learning and Improvement

Goal

See general description.

Systems Based Practice

See general description.

Professionalism

See general description.

Interpersonal and Communication Skills

See general description.

Teaching Methods

- Direct sign-out with the primary attending pathologist, with one-to-one didactic and Socratic interaction.
- Reading of various textbooks and original literature available within the Hematopathology or M&GP Divisions.
- Attendance and/or presentation at Hematopathology/Molecular & Genomic Pathology Conference (monthly).
- See also general description.

Assessment Method (fellows)

- Verbal feedback during daily interactions with attendings and staff.

- End of rotation meeting/final review with M&GP designee.
- Review of rotation checklist with fellowship director or designee at least bi-annually: CHECKLIST MOLECULAR & GENOMIC PATHOLOGY ROTATION
- Weekly EPA-based electronic evaluations by attending faculty (based on direct supervision and observation).
- Bi-monthly multisource (360-degree) evaluations.
- ASCP CheckPath Hematopathology Examination (quarterly).
- ASCP FISHE examination (twice/year).
- Direct, objective written practical examination administered by the Division of Hematopathology (twice/year).
- Bi-monthly clinical competency committee review.
- Bi-annual review by fellowship program director or designee.
- Monthly review of case log numbers by fellowship director or designee (also reviewed with fellow at bi-annual evaluation meetings). Please record all myeloid NGS cases reviewed while on this rotation: MYELOID NEXT GENERATION SEQUENCING CASE LOG.

Assessment Method (Program Evaluation)

See general description.

Level of Supervision

One of the M&GP attending pathologists is assigned to cover the Molecular Hematopathology service (generally on a weekly basis). In addition, one of the attending hematopathologists is assigned to cover the Myeloid NGS service (generally on a weekly basis). Fellows report to these faculty members during their rotation, who provide direct and/or indirect supervision. Ultimate responsibility for all patient care activities performed by the fellow is assumed by the attending molecular pathologist or attending hematopathologist covering the services, and all reports are ultimately signed out by the attending pathologists.

Educational Resources

1. Readings and didactic materials available in the Division of M&GP.
2. Interesting case collection available in the Division of M&GP.
3. Primary literature available in the Division of Hematopathology, the Falk Health Sciences Library, or electronically.

Hematopathology Fellowship
Cytogenetics

Description of Rotation or Educational Experience

This rotation allows the fellow to familiarize him or herself with the procedures carried out in the Cytogenetics laboratory, their application to clinical cases, and the roles of classical and molecular cytogenetics in clinical practice, specifically in hematopathology. The majority of the specimens studied will be bloods and bone marrows from patients with leukemia or myelodysplastic syndromes and diagnostic lymph node biopsies. It is also an opportunity to review the major cytogenetic abnormalities seen in specific types of hematopoietic/lymphoid disorders.

Patient Care

Goal

Fellows must have a working knowledge of basic cytogenetics testing methods and interpretation of results in order to be able to apply such testing to the diagnosis and clinical follow up of patients with hematopoietic and lymphoid neoplasms. Increasingly, this information is being incorporated into the diagnosis and classification of diseases defined within the WHO classification of hematopoietic and lymphoid tumors

Competencies

- Learn the indications for cytogenetic testing relevant to hematopathology.
- Be able to interpret classical and fluorescence in situ hybridization (FISH) cytogenetic findings.
- Develop a familiarity with microarray methodologies in assessing chromosomal gains and losses.

Objectives

- Know indications for testing, taking into account cost effective medicine.
- Understand the rationale and methods of procedures and the basic safety precautions practiced in the laboratory, as described in the laboratory procedure manual.
- Learn the basic laboratory procedures: cell culture initiation, harvest, banding, chromosome analysis, karyotyping and FISH (metaphase and interphase).
- Practice karyotyping and basic write-ups of the results within a cytogenetics report.
- Learn the advantages and limitations of karyotyping and molecular cytogenetic methods. Recognize the sources for result discrepancy.
- Participate actively in the sign out of cases with the Laboratory Director and colleagues and keep a list of the cases. Fellows should review all current cases related to hematopathology and hematopathology-associated specimens (bone marrow and hematopathology tissue workups).
- Observe the use and understand the limitations of microarray methods.
- Attend one of the monthly microarray case review conferences, if possible.
- Participate in faculty-supervised quality improvement projects, if possible.

Medical Knowledge

Goal

Fellows must demonstrate knowledge of established and evolving biomedical, clinical, and epidemiological aspects of cytogenetics as they relate to hematopathology, as well as the application of this knowledge to patient care and the basic foundation of these studies.

Competencies

- Understand how the different types of cytogenetic tests are used in hematopathology, how they are performed, and how they are interpreted.
- Know the cytogenetic abnormalities in the major hematopathologic disorders and their clinical significance.

Objectives

- Review recent articles and text from the classical and molecular cytogenetics literature, to become familiar with the fields of genetics and cytogenetics, cytogenetic methods, and applications to clinical medicine, particularly with regard to hematopathology.
- Review the files of interesting cases to observe the longitudinal changes in karyotypes over the course of treatment and to see how various cytogenetic findings are interpreted.
- Complete rotation checklist.

Practice-Based Learning and Improvement

See general description.

Systems Based Practice

See general description.

Professionalism

See general description.

Interpersonal and Communication Skills

See general description.

Teaching Methods

- Direct sign-out with the service director or other designated faculty, with one-on-one didactic and Socratic interaction.
- Use of teaching sets and case reviews.
- Reading of various textbooks and original literature.
- Attendance and/or presentation at Hematopathology Conference (weekly).
- See also general description.

Assessment Method (fellows)

- Verbal feedback during daily interactions with attendings and staff.
- End of rotation meeting with the cytogenetics laboratory director or designee.
- Weekly EPA-based electronic evaluations by attending faculty (based on direct supervision and observation).
- Bi-monthly multisource (360-degree) evaluations.
- ASCP CheckPath Hematopathology examination (quarterly).
- ASCP FISHE examination (twice/year).
- Direct, objective written practical examination administered by the Division of Hematopathology (twice/year).
- Bi-monthly clinical competency committee review.
- Bi-annual review by fellowship program director or designee.
- Review of rotation checklist with fellowship director or designee at least bi-annually: **CHECKLIST CYTOGENETICS ROTATION**
-

- Monthly review of case log numbers by fellowship director or designee (also reviewed with fellow at bi-annual evaluation meetings). **Please record all cases reviewed while on this rotation: CYTOGENETICS CASE LOG**

Assessment Method (Program Evaluation)

See general description.

Level of Supervision

Cytogenetics faculty are assigned to cover the clinical cytogenetics service (generally on a daily basis). Fellows report to that faculty member, who provides direct and/or indirect supervision. In addition, fellows interact directly with laboratory technologists in the cytogenetics laboratory. Ultimate responsibility for all patient care activities performed by the fellow is assumed by the cytogenetics director/attending cytogeneticist covering the clinical service, and all reports are ultimately signed out by the attending cytogeneticist.

Educational Resources

- Cytogenetics Laboratory Procedure Manual
- Cytogenetics Laboratory Oncology FISH Probe List
- Swerdlow SH, Campo E, Harris NL, et al (Eds). *WHO Classification of Tumours of Haematopoietic and Lymphoid Tissues*. IARC, 2017.
- Keagle MB, Gersen SL. *The Principles of Clinical Cytogenetics, 2nd ed*. Humana Press, 2005.
- McGowan-Jordan J, Simons A, Schmid M (Eds). *ISCN 2016: An International System for Human Cytogenomic Nomenclature (2016).* Karger, 2016.
- Sverre H, Mitelman F. *Cancer Cytogenetics, 3rd ed*. Wiley-Blackwell, 2009.
- Pittsburgh Cytogenetics Laboratory reading list for Residents and Fellows.
- Internet resources:
    - http://atlasgeneticsoncology.org//
    - http://cgap.nci.nih.gov/Chromosomes/Mitelman
    - http://pittgenetics.com/

Hematopathology Fellowship
Laboratory Hematology

Description of Rotation or Educational Experience

This rotation, which is combined with the Pediatric Hematopathology rotation, offers the fellow the opportunity not only to learn about automated and non-automated hematology testing, but also to learn about the role of the laboratory in the diagnosis of hematological disorders and to learn the features of the types of disorders encountered, with emphasis on non-neoplastic hematopathology. The general hematology section of the automated testing laboratory (ATL) performs complete blood counts (CBCs), routine coagulation studies, urinalysis and body fluid counts and smear evaluations on adult patients.

The fellow will become acquainted with the following principles and practice of automated laboratory hematology:

1. Beckman Coulter DxH800 and automated DxH slidemaker stainer (SMS): specific methods and features of these hematology analyzers are utilized to evaluate multiple blood parameters, daily set up, instrument troubleshooting, quality control (Q.C.) procedures and understanding of instrument flags. Fellow will observe operation of instrument.

2. Coagulation automated equipment [STA-R Evolution (Diagnostica Stago, Inc)]: morning set up, trouble shooting, Q.C. procedures and understanding of instrument flags. Fellow will observe operation of instrument.

3. Urinalysis equipment including Sysmex UF-1000i: set-up and operation, QC/QA procedures, instrumentation principles of operation, instrument archive of abnormal crystals, casts, and cells within urine sediments.

4. Cellavision: Fellow will observe the performance of peripheral blood differentials with digital imaging and review criteria for its use.

5. Review of abnormal hematology laboratory results, abnormal peripheral blood smears and body fluid cytocentrifuge preparations or smears.

6. Experience in laboratory quality control, quality assurance and proficiency testing.

The Special Hematology Laboratory performs cytochemical stains with the following tests sent to other UPMC or reference laboratories: hemoglobinopathy testing, red blood cell enzyme testing, osmotic fragility testing and autohemolysis. All other results are returned to the special hematology laboratory for review by the hematopathologist assigned to the ATL service. For both in-house and send-out special hematology tests, the fellow will review and understand the methodology for all procedures, participate in assay procedures performed at the CLB, review and interpret the results, relate results to clinical data, review indications for testing, and how the results should be used. The fellow will also learn more about the specific disorders being investigated using these tests, such as hemoglobinopathies, red cell enzyme deficiencies, and other non-neoplastic red cell, white cell, and platelet disorders.

Patient Care

Goal
Fellows must be able to understand current diagnostic hematology instrumentation and the testing performed within hematology laboratories or automated laboratories that are appropriate to enable the effective diagnosis and treatment of disease processes.

Competencies
- Demonstrate a working familiarity with current analyzer instrumentation.
- Learn to recognize disorders with morphologic manifestations identified in peripheral blood, body fluids, and urine samples.

Objectives
- Fellow will observe the instrumentation features outlined above in the general rotation description.
- Fellow will increase his/her general skill in Laboratory Hematology with emphasis on cell types seen in peripheral blood, body fluids, and urine microscopy.
- Know when non-neoplastic red cell, white cell, and platelet disorders should be suspected and what laboratory tests should be performed to make a definitive diagnosis.

Medical Knowledge

Goal
Fellows must demonstrate knowledge of established and evolving biomedical, clinical, and epidemiological features of disorders with hematologic aspects that present with abnormalities in peripheral blood smear or automated testing data (cell counts, hemoglobin, hematocrit, mean corpuscular volume, mean corpuscular hemoglobin, mean corpuscular hemoglobin concentration, etc.), as well as being able to apply this knowledge to patient care.

Competencies
- Learn normal and abnormal blood cell, body fluid, and urinary sediment morphology, including review of abnormal casts and crystals in urine sediment.
- Demonstrate an understanding of automated hematology, urinalysis and coagulation instrumentation and develop a familiarity with special hematology testing related to red blood cell, white blood cell, and platelet disorders.
- Learn the criteria and basis for non-neoplastic hematologic disorders that are largely diagnosed by using results from a general or special hematology laboratory.

Objectives
- Review the major clinical aspects of disorders diagnosed by hematopathologists, concentrating on non-neoplastic disorders and clinically benign, but abnormal or atypical findings.
- Review of Peripheral Blood and Fluid Slide Study Set that can be checked out from the hematopathology secretaries (Hill 354) (the directory of cases is in the resident's drive [X:\Hemepath_PBandFLUID_slide_set]).
- Fellows must also score competently on the hematopathology division written practical examination and achieve an acceptable score on the ASCP FISHE examination.
- See also general description.

Practice-Based Learning and Improvement

Goal
See general description.

Systems Based Practice

Goal

Fellows 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.

Competencies

- Understand how considerations of cost awareness and risk-benefit analysis play a role in deciding what tests a clinical laboratory should provide in-house versus send-out testing.
- Demonstrate an awareness of regulatory requirements as relevant to the operation of a modern hematology laboratory or laboratory section.
- Know quality assurance and quality control procedures.
- Understand how a complex patient-oriented clinical laboratory is managed, including the scope of testing, specific testing methodology, and documentation of test accuracy.

Objectives

- Participate in a mock/interim CAP laboratory inspection, when possible.
- Review online CAP checklist requirements in hematology, located in MediaLab, that are utilized for most laboratory inspections and certification.
- Become familiar with proficiency testing programs used in the hematology laboratory.
- Participate in faculty-supervised quality improvement projects, if possible.
- Attend laboratory management and quality assurance/quality control meetings for CLB, Shadyside, and/or Children's Hospital of Pittsburgh (contact Dr. Contis or Dr. Djokic to schedule).
- Learn how electronic resources are used in a modern hematology or automated testing laboratory that includes hematology testing.

Professionalism

See general description.

Interpersonal and Communication Skills

Goal

Fellows must demonstrate interpersonal and communication skills that result in the effective exchange of information and teaming with other physician colleagues and professional associates.

Competencies

- Communicate effectively with hematology-oncology physicians and other healthcare professionals.
- Act in a consultative role to other physicians and health professionals.
- Function as a team player.
- Be able to interact well with laboratory technical and managerial personnel.

Objectives

- Accurately convey information orally, in writing, and/or by electronic means to the submitting physician and other appropriate personnel (hematology-oncology fellows, nurse practitioners, physician assistants).
- Discuss possible treatment implications of laboratory findings with physicians and other appropriate health-care professionals.

- Demonstrate a familiarity with laboratory management principles, especially in regard to effective communication with laboratory professionals (technologists and management personnel).
- Demonstrate ability to seek consultations from members of the faculty or staff, as necessary.
- Demonstrates ability to communicate well with laboratory technical personnel.

Teaching Methods

- One-on-one teaching over the microscope or in the clinical laboratory during diagnostic case sign-out with the attending pathologist, with one-on-one didactic and Socratic interaction.
- Use of teaching sets including:
    - Peripheral Blood and Fluid Slide Study Set that can be checked out from the hematopathology secretaries (Hill 354) (the directory of cases is in the resident's drive [X:\Hemepath_PBandFLUID_slide_set]).
- Reading of a various textbooks and original literature available within the hematopathology division, as well as online procedure manuals.
- Direct observation of laboratory and analyzer operation, including direct observation of technologists and bench personnel.
- Observation of interactions between faculty laboratory directors and laboratory staff or supervisors.
- Attendance and/or presentation at Hematopathology Conference (weekly), Patient Safety and Risk Management in Hematopathology Conference (bi-weekly), Benign Hematology Case Conference (bi-weekly), and hematology laboratory management and quality assurance/quality control meetings.
- See also general description.

Assessment Method (fellows)

- Weekly EPA-based electronic evaluations by attending faculty (based on direct supervision and observation).
- Bi-monthly multisource (360-degree) evaluations.
- Verbal feedback during daily interactions with attendings and other teaching faculty and staff.
- ASCP CheckPath Hematopathology examination (quarterly).
- ASCP FISHE examination (twice/year).
- Direct, objective written practical examination administered by the Division (twice/year).
- Bi-monthly clinical competency committee review.
- Bi-annual review by fellowship program director or designee.
- Review of rotation checklist with fellowship director or designee at least bi-annually: **CHECKLIST LABORATORY HEMATOLOGY ROTATION**
- Monthly review of case log numbers by fellowship director or designee (also reviewed with fellow at bi-annual evaluation meetings). **Please record all ATL (peripheral blood and body fluid) slide reviews and all hemoglobin HPLC cases reviewed while on this rotation:**
    - PB AND FLUID REVIEW LOG
- See also general description.

Assessment Method (Program Evaluation)

See general description.

Level of Supervision

One of the hematopathology attendings is assigned to cover the ATL service for review of abnormal blood and body fluid preparations, related testing issues, and review of send-out testing results on specific patients (generally on a weekly basis). Fellows report to that faculty member while on the rotation, who provides direct and/or indirect supervision. Ultimate responsibility for all patient care activities performed by the fellow is assumed by the attending faculty/laboratory director covering the service, and all reports are ultimately signed out by the attending faculty.

Educational Resources

- Glassy EF. *Color Atlas of Hematology: An Illustrated Field Guide Based on Proficiency Testing, 2nd ed.* CAP, 2018.
- Gulati G, Caro J. *Blood Cells: An Atlas of Morphology*. ASCP, 2007.
- Galagan KA, Blomberg D, Cornbleet PJ, Glassy EF (Eds). *Color Atlas of Body Fluids: An Illustrated Field Guide Based on Proficiency Testing*. CAP, 2006.
- Hussong JW, Kjeldsberg CR (Eds). *Kjeldsberg's Body Fluid Analysis*. ASCP, 2015.
- Hoyer JD, Kroft SH (Eds). *Color Atlas of Hemoglobin Disorders: A Compendium Based on Proficiency Testing*. CAP, 2003.
- Bain BJ. *Haemoglobinopathy Diagnosis, 2nd ed*. Blackwell Publishing, 2006.
- Haber MH, Blomberg D, Galagan K, Glassy EF, Ward PCJ (Eds). *Color Atlas of the Urinary Sediment: An Illustrated Field Guide Based on Proficiency Testing*. CAP, 2010.
- Mundt LA, Graff L. *Graff's Textbook of Routine Urinalysis and Body Fluids, 2nd ed*. Wolters Kluwer, 2010.
- McPherson RA, Pincus MR. *Henry's Clinical Diagnosis and Management by Laboratory Methods, 23rd ed*. Elsevier, 2017.
- George TI. Automated hematology instrumentation. In: Tirnauer JS, Schrier SL (Eds). *UpToDate*, 2018. www.uptodate.com
- Peripheral Blood and Fluid Slide Study Set that can be checked out from the hematopathology secretaries (Hill 354) (the directory of cases is in the resident's drive [X:\Hemepath_PBandFLUID_slide_set]).
- Hematology laboratory procedures may be viewed at: http://www.medialabinc.net/ (See division coordinator for specific usernames and passwords)
    - First, under "Viewing", select "PUH CP".
    - Select "View Documents & Manuals" Tab
    - Choose Manuals under left hand menus for "View Documents & Manuals"
    - Then choose appropriate manual
        "Automated Testing Laboratory" for Hematology manual or "Special Hematology" for bone marrow, lymph node, and flow cytometry related manuals and procedures.

Hematopathology Fellowship
Coagulation

Description of Rotation or Educational Experience

The coagulation rotation for the Hematopathology Fellow is 4 weeks in length and located at Vitalant (formerly the Institute for Transfusion Medicine), on the corner of Dawson and the Boulevard of the Allies (see detailed directions below). The fellows share a quiet office space located on the first floor Annex of the building and are provided with a syllabus of the most recent articles on coagulation. A small library including text and reference books, as well as a selection of hematology journals is available for fellow use. The fellows are expected to utilize their time when not performing the activities described below, taking advantage of these resources to assist in mastering the goals and objectives of this rotation.

On your first day, ask the receptionist at the Vitalant front desk for the Systems Support Technologist (Karen Grasso, kgrasso@itxm.org), or Mike Meyer, or one of the other fellows or residents and they will assist you with what to do and with whom to report. In the unlikely event that Karen Grasso, Mike Meyer, or any of the residents are not in, ask for Deb Small, Dr. Bontempo, Dr. Chibisov, or Dr. Kiss.

Clinical sign-out activities:
Once oriented to the daily routine of the laboratory, the fellow, along with the other fellows, residents, and medical students participating in the program will be provided with patient information from that given day's laboratory blood samples. The material is divided among the rotation participants, and they are responsible for obtaining clinical information and histories from the referring or admitting physicians for each patient; generally done by computer with access to MARS or telephone. If there are no medical students on any given day, it is the responsibility of the fellow to obtain pertinent information on the patients through the electronic medical record or by calling the appropriate hospital or doctor's office. This activity occurs in the afternoons beginning around 3:00 PM, except for the individual's first day, at which time they should report by 2:30 PM.

Once the information is collected, the rotation participants meet as a group with one of the Vitalant medical faculty for case sign-outs. This is the interpretation of the patient's coagulation profile in relationship to the clinical findings (e.g., lupus anticoagulant). The results from the previous day's testing are then discussed utilizing the clinical information that was obtained, providing the trainees with the link between the clinical histories/backgrounds, the test results, and ultimately how to provide a clinical diagnosis. This activity occurs in the late afternoons, usually beginning between 4:00-4:30 PM, and depending on how many cases there are, can last until approximately 6:00 PM.

Laboratory-based activities:
During the rotation, it is the fellow's responsibility to schedule time to observe the performance of various coagulation testing; this can be done by contacting the coagulation laboratory supervisor.

Other activities:
The opportunity for small clinical research projects is available for interested fellows and their participation is encouraged and welcomed.

Patient Care

Goal

Fellows must be able to understand the various disorders that affect hemostasis in order to provide diagnostic information that is appropriate to enable the effective treatment of health problems and the promotion of health.

Competencies

- Become familiar with clinical coagulation issues.
- Develop the ability to interpret abnormal laboratory and clinical findings to make a specific diagnosis.
- Develop an understanding of how coagulation testing is performed and used in the evaluation and diagnosis of patients with abnormalities of the hemostasis pathways.
- Develop a working ability to consult on abnormalities of coagulation with other physicians and laboratory personnel.

Objectives

Learning Objectives Oriented to Patient Care:

- Understand how to formulate a written interpretive coagulation report. (Many of the reports use coded predefined text, but the fellow should understand how to formulate these or similar interpretations in practice.)
- Understand and be able to recommend therapeutic strategies for coagulation abnormalities.
- Be able to formulate testing algorithms for evaluating hemostatic problems or for the follow-up of abnormal findings.
- Be able to oversee a coagulation laboratory and provide coagulation-related consultations.

Daily Practical Expectations:

- The fellow will be provided with a list of patients each day on which coagulation studies are requested. The fellow will obtain appropriate patient clinical histories and indications for coagulation testing from review of electronic medical records, referring physician notes, and through direct conversation with the referring physician (generally by phone).
- Fellows will then present and/or discuss the clinical findings and laboratory results with the attending physician assigned (usually in the afternoon).

Medical Knowledge

Goal

Fellows must demonstrate knowledge of basic coagulation biology (including its molecular basis), abnormal coagulation states, and therapeutic agents that affect coagulation (both those used for direct coagulation or anti-coagulation therapy and those used for other purposes, but secondarily affect coagulation). In addition, fellows must understand established testing methods for evaluation of coagulation abnormalities, as well as the application of this knowledge to specific patient cases.

Competencies

- Demonstrate an understanding of coagulation testing, including abnormalities of the coagulation factor pathways and platelet function.
- Know the pathogenesis of basic coagulation disorders and how these are treated.

- Know the impact of exogenously administered agents (specific medications, blood-derived products, recombinant factors) used in treating or managing coagulation abnormalities as well as those that are used for other purposes but affect hemostatic parameters.

Objectives

- Learn normal and abnormal coagulation pathways.
- Review the major clinical aspects and the diagnostic criteria of coagulation disorders diagnosed by hematopathologists.
- Learn the specific tests utilized to define which pathway (thrombotic vs. platelet, for example) is affected, determine what the precise abnormalities are, and identify what additional testing is needed and know how these tests are performed.
- Learn which molecular assays are used to diagnose disorders characterized by hypercoagulation or other coagulation disorders.
- Obtain a score of competent on the test administered by Dr. Bontempo to assess the fellow's proficiency in understanding coagulation.
- Achieve an acceptable score on the Spring administration of the ASCP FISHE examination (score above the 25th percentile).

Practice-Based Learning and Improvement

See general description.

Systems Based Practice

Goal

Fellows 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.

Competencies

- Understand how considerations of cost awareness and risk-benefit analysis play a role in deciding what coagulation tests are necessary.

Objectives

- Demonstrate to the coagulation laboratory attending physicians that s/he can effectively interpret coagulation testing utilizing a variety of resources in the health system and can choose the appropriate tests or panel of tests that will assist in making a specific diagnosis and treatment plan through daily sign-out discussions.
- Know how consultative coagulation services organizationally relate to other aspects of hematopathology, both within UPMC and elsewhere.

Professionalism

See general description.

Interpersonal and Communication Skills

See general description.

Teaching Methods

- Direct review of laboratory results on specific patients during daily sign-out and discussion.
- Reading of various textbooks and original literature available within the hematopathology division or at the Institute for Transfusion Medicine (ITxM).

- Direct observation of laboratory analyzer operation, and direct observation or interaction with technologists.

Assessment Method (fellows)

- Verbal feedback during daily interactions with attendings and staff.
- Direct examination administered by Dr. Bontempo or designee.
- Weekly EPA-based electronic evaluations by attending faculty (based on direct supervision and observation).
- ASCP CheckPath Hematopathology examination (quarterly).
- ASCP FISHE examination (twice/year).
- Bi-monthly clinical competency committee review.
- Bi-annual review by fellowship program director or designee.

Assessment Method (Program Evaluation)

See general description.

Level of Supervision

One of the Vitalant medical faculty is assigned to cover the coagulation service (generally on a weekly basis). Fellows report directly to that faculty member, who provides direct and/or indirect supervision. Ultimate responsibility for all patient care activities performed by the fellow is assumed by the attending faculty covering the service, and all reports are ultimately signed out by the attending faculty.

Educational Resources

Various textbooks and resources, including a detailed syllabus are provided by the ITxM service while on the rotation. This includes a copy of the examination with final answers, given after fellows complete the examination for future reference. Additionally, a variety of hematology textbooks, most of which have chapters related to coagulation diagnosis and evaluation are also available within the Division of Hematopathology. Other textbooks focusing on coagulation testing are available in the Division of Hematopathology, as well.

Directions to Vitalant

3636 Boulevard of the Allies, Pittsburgh, PA 15213, 412-209-7270:

From Hill Building: After you exit the CLB/Hill Building, go down Euler Way and turn left onto Halket Street. Cross Forbes Avenue and go past Magee Women's Hospital to the intersection with the Boulevard of the Allies where Panera is on your left. Make a left turn at that intersection staying in the middle lane of the Boulevard of the Allies until the next traffic light that crosses Bates Street, at which point you will be in the far right lane of Boulevard of the Allies. At the intersection of Dawson Street and Boulevard of the Allies, the pink brick building on your right is Vitalant. Continue through the traffic light at Dawson Street (passing the Vitalant building), and make a right turn on the very next street past Dawson Street, which is Parkview Avenue. Drive the length of the block to the next stop sign, make a right onto Swinburne Street, and at the next stop sign, you will make another right turn onto Dawson Street before the Vitalant building. The Vitalant building will be on your left and the parking lot is just before the building. Once parked, walk to the front of the building which is on Dawson Street and once inside the front door, the receptionist will buzz you in.

Hematopathology Fellowship
Immunohistochemistry Laboratory Experience

Description of Rotation or Educational Experience

This is a brief rotation that is designed to familiarize the fellow with the daily operations of a high-volume immunohistochemistry laboratory. The microscopic review of high quality immunohistochemical stains is an integral part of the diagnostic evaluation of most bone marrow cases and tissue samples to be evaluated for possible lymphoma or other hematologically related disease. Furthermore, hematopathologists may also be responsible for the oversight of an immunohistochemistry laboratory in future practice.

The fellow will report to the senior technologist in the Immunohistochemistry Laboratory when starting this 1-day rotation (see schedule). The laboratory technologists will oversee the fellow's active participation in learning the technical and administrative issues involved in the operation of the immunohistochemical and general histology laboratory.

Patient Care

Goal

Fellows must be able to understand the various steps involved in the production of high quality immunohistochemical stains in order to provide diagnostic information that is appropriate to enable the effective treatment of lymphomas, leukemias, myeloproliferative neoplasms, myelodysplasias, and various related diseases.

Competencies

- Become familiar with basic operations and management of immunohistochemistry laboratories.
- Develop a working understanding of the steps involved in various stains in order to trouble-shoot problems in clinical diagnostic practice.

Objectives

- Fellow will observe the set up and preparation of immunohistochemical stains.
- Learn some of the management issues involved in operating an immunohistochemistry laboratory.

Medical Knowledge

Goal

Fellows must demonstrate a working knowledge of immunohistochemistry stain preparation and be able to apply this knowledge in their daily practice of sign-out and/or assessment of staining quality to ensure accurate diagnosis.

Competencies

- To understand theoretical basis and technical aspects of immunohistochemistry.

Objectives

- Learn the principles behind immunohistochemistry and the steps involved through practical observation and appropriate reading of textbooks, primary literature, and standard operating procedure manuals of the UPMC laboratory.

Practice-Based Learning and Improvement

Goal

Fellows must demonstrate the ability to investigate and evaluate new knowledge to improve continuously patient care and diagnostic expertise, based on constant self-evaluation and lifelong learning.

Competencies

- Understand how to investigate and solve problems with specific stains.
- Know resources to keep abreast of changes in immunohistochemistry laboratories.

Objectives

- Investigate unusual staining results to determine if this may be an isolated problem with the specific stain or tissue or a more systematic problem with equipment or methodology.
- Know resources that the laboratory uses to learn about new developments in the field and to help in troubleshooting problems.
- IHC Stain List located at https://www.medialabinc.net/ (See division coordinator for specific usernames and passwords) or UPMC - Anatomic Pathology Web Services

Systems Based Practice

Goal

Fellows 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.

Competencies

- Know regulatory aspects related to supervision of an immunohistochemistry laboratory.
- Understand considerations of cost awareness and resource utilization when ordering immunohistochemistry stains.

Objectives

- Understand the regulatory requirements (CAP, state and local, as applicable) of immunohistochemistry laboratories with regard to inspection requirements and quality control.

Professionalism

See general description.

Interpersonal and Communication Skills

See general description.

Teaching Methods

- Direct interaction with laboratory technical staff.
- Reading of various textbooks, procedure manuals, and original literature available within the hematopathology division or within the laboratory.
- Direct observation of laboratory personnel and automated stainer operation.

Assessment Method (fellows)

- Monthly EPA-based electronic evaluations by attending faculty and/or staff (based on direct supervision and observation).
- Bi-monthly multisource (360-degree) evaluations.
- Verbal feedback during daily interactions with attendings and staff.
- Bi-monthly clinical competency committee review.
- Bi-annual review by fellowship program director or designee.
- Review of rotation checklist with fellowship director or designee **CHECKLIST Immunohistochemistry Rotation**

-

Assessment Method (Program Evaluation)

See general description.

Level of Supervision

Fellows report directly to the designated technical staff in the immunohistochemistry laboratory, who provide direct and/or indirect supervision. Ultimate responsibility for patient care activities performed in the immunohistochemistry laboratory is assumed by the laboratory medical director.

Educational Resources

- Orazi A, Foucar K, Knowles DM, et al (Eds). *Knowles' Neoplastic Hematopatholog*y, 3rd ed. Lippincott Williams & Wilkins, 2013.
- Immunohistochemistry laboratory procedure manual
- Dako and Ventana literature (available in laboratory)

Hematopathology Fellowship
Laboratory Management and Laboratory Decision Making

Description of Rotation or Educational Experience

Training in laboratory management and decision making is basically a facet of all aspects of hematopathology practice. Training in this topic does not constitute a distinct block. Rather, it is spread across all other rotations. Fellows are considered integral members of the staff of the Department of Pathology and have the opportunity to participate in discussion of matters related to management of the hematopathology related laboratories. In addition to attending laboratory management meetings, at least as part of the flow cytometry and clinical hematology rotations, the faculty will actively involve fellows in acute and longer-term management issues. Fellows are also expected to be proactive in this regard. In addition, fellows are expected to complete a core set of online laboratory management courses provided through the ASCP Lab Management University program by the end of the fellowship year and are encouraged to complete CAP inspection team leader training if he/she has not already done so during residency.

Patient Care

Goal

Fellows must be able to manage hematology-associated laboratories and to direct laboratory technologists and other personnel in order to provide cost-effective and accurate diagnostic or laboratory results that will aid in the effective treatment of disease. The objectives vary, depending on the specific rotation on which the fellow is working. All objectives are listed below for reference.

Competencies

- Be able to direct laboratory technologists and other personnel.
- Be able to assist laboratories in dealing with acute and more chronic problems.
- Be able to assist with questions of specimen handling and questionable results.
- Have experience with direct responsibility for some laboratory activities.

Objectives

- Triage bone marrow specimens, fill out work-up requests, and tell the bone marrow technologists how to handle individual cases.
- Decide on initial flow cytometry panels and later on any additional studies needed and effectively communicate these decisions to the technologists.
- Triage fresh lymph node and related specimens by directing others.
- Advise the technologists in the hematology laboratories about technical, pathological, and other laboratory issues.
- Provide direct oversight of lymph node assistant.
- Be on call approximately one week out of four (after the first 2 months of fellowship), with faculty back-up (direct and/or indirect supervision), but with primary responsibility for on-call decision making that includes direction of technologists in the hematology section of the Automated Testing Laboratory and in the flow cytometry laboratory, as well as making diagnostic decisions.

Medical Knowledge

Goal

Fellows must learn the basic principles of laboratory management and decision making.

Competencies

- Develop an appreciation for time-management and know how to direct appropriate support personnel in the provision of patient care.

- Understand the typical hierarchy of laboratories (bench technologist, technical specialist, lead technologist, supervisors, and laboratory managers) and what role each one plays.
- Understand the role of the pathologist laboratory director in various academic and other settings.
- Understand basic concepts of pathology laboratory leadership, personnel management, operations, financial management, compliance and laboratory informatics.
- Demonstrate an awareness of regulatory requirements as relevant to hematopathology, including those required by the CAP and, if applicable, local or state regulations.

Objectives

- Demonstrate the ability to help manage appropriate support staff and personnel.
- Know how to organize a quality assurance and quality control program and understand the difference between these two concepts.
- Review online CAP checklist requirements for hematology and flow cytometry laboratories, located in MediaLab, that are utilized for most laboratory inspections and certification.
- Become familiar with proficiency testing programs used in the hematology and flow cytometry laboratories.
- Participate in a mock/interim CAP laboratory inspection, when possible.
- Understand the roles of various laboratory directors at UPMC by observation of these individuals and discussion with them.
- Attend didactic session with laboratory senior administrative director or designee covering a variety of management centered topics, (i.e. types of facilities in which fellows may one day be working, private vs. employee physician models, medical director administrative responsibilities, and importance of communication skills and various types of employer and employee relationships).
- Attend at least five Laboratory Leadership Meetings (ATL lab, flow cytometry lab, etc.) (fellows will be added to Teams Meetings Invitations, attend as possible).
- Complete 15 online laboratory management courses provided through the ASCP Lab Management University program. ASCP Lab Management University Checklist
- Complete CAP Inspection Team Leader Training (**OPTIONAL**) (https://learn.cap.org/Activity/5875709/Detail.aspx).

Practice-Based Learning and Improvement

Goal

Fellows must demonstrate the ability to investigate and evaluate changes in testing offered, specimen volumes, and personnel staffing that may affect the organization and work-flow of the laboratory, based on constant self-evaluation and lifelong learning.

Competencies

- Use information technology to optimize learning.
- Demonstrate flexibility in personnel supervision that reflects newly acquired medical information or service needs.

Objectives

- Demonstrate progressive independence in specimen management, as assessed on bi-annual review with fellowship director.

- Investigate unusual results to determine if this may be an isolated problem with the specific stain or tissue or a more systematic problem with equipment or methodology.
- Learn how to assess and evaluate new instrumentation for the laboratories and review validation studies.
- Demonstrate an awareness of changes in staffing that might affect how samples must be handled and by whom.
- Demonstrate ability to orient other fellows, residents, and students to the laboratory organization and triage of samples.

Systems Based Practice

Goal

Fellows 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.

Competencies

- Understand how the various laboratories relate to the larger laboratory structure.
- Understand the division of management between anatomic pathology and clinical pathology laboratory services.
- Develop a basic understanding of how the laboratory services relate to other clinical services and how this affects laboratory decisions as to what testing to provide.
- Understand the reasoning behind decisions to perform certain testing in-house versus sending out to an external laboratory.

Objectives

- Develop an ability to direct and/or manage appropriate personnel to facilitate cost effective provision of healthcare, wherein all members of the team perform functions to which they are optimally suited or trained.
- Review send out test results when on the hematology laboratory rotation.
- Become involved in at least one quality control or quality assurance project.

Professionalism

See general description.

Interpersonal and Communication Skills

See general description.

Teaching Methods

- Direct interaction with laboratory technical staff, administrators, and laboratory medical directors.
- Reading of various textbooks, procedure manuals, and original literature available within the hematopathology division or within the laboratory.
- Direct observation of faculty interactions and modeling of appropriate behavior.
- Didactic session with laboratory senior administrative director or designee covering a variety of management centered topics.
- Attendance at laboratory administrative/leadership meetings at UPMC-Presbyterian, UPMC-Shadyside, and/or Children's Hospital of Pittsburgh.
- Online laboratory management courses provided through the ASCP Lab Management University program.
- Online laboratory inspection team leader training offered through the College of American Pathologists (OPTIONAL).

- See also general description.

Assessment Method (fellows)

- Weekly EPA-based electronic evaluations by attending faculty (based on direct supervision and observation).
- Bi-monthly multisource (360-degree) evaluations.
- Verbal feedback during daily interactions with attendings, administrators, and staff.
- Direct, objective written practical examination administered by the Division (twice/year).
- Bi-monthly clinical competency committee review.
- Bi-annual review by fellowship program director or designee.
- Review of rotation checklist with fellowship director or designee at least bi-annually: ASCP Lab Management University Checklist
-

Assessment Method (Program Evaluation)

See general description.

Level of Supervision

Fellows report directly to the designated hematopathology faculty or laboratory medical directors covering a specific rotation or assigned to on-call coverage, who provide direct and/or indirect supervision. Fellows may seek advice directly or via telephone conversation and/or e-mail (if during an on-call or non-urgent situation). Ultimate responsibility for all patient care activities performed by the fellow is assumed by the attending faculty/laboratory director covering the service/on-call coverage, and all reports are ultimately signed out by the attending faculty.

Educational Resources

- Individual faculty acts as a mentoring resource or provides additional texts on principles of laboratory management.
- McPherson RA, Pincus MR. *Henry's Clinical Diagnosis and Management by Laboratory Methods*, *23rd ed*. Elsevier; 2017.
- Harmening DM. *Laboratory Management: Principles and Processes, 2nd ed*. D.H. Pub. & Consulting, 2007.
- Wagar EA, Horowitz RE. *Laboratory Administration for Pathologists*. CAP, 2011.
- Patterson K, Grenny J, McMillan R. *Influencer: The Power To Change Anything*. McGraw-Hill, 2007.
- Patterson K, Grenny J, McMillan R, Switzler A. *Crucial Conversations: Tools for Talking When Stakes Are High*. McGraw-Hill, 2002.
- Patterson K, Grenny J, McMillan R, and Switzler A. *Crucial Confrontations: Tools for Resolving Broken Promises, Violated Expectations, and Bad Behavior*. McGraw-Hill, 2004.
- Lencioni P. *The Five Dysfunctions Of A Team: A Leadership Fable*. Jossey-Bass, 2002.
- Maxwell JC. *The 360º Leader: Developing Your influence From Anywhere in the Organization*. Nelson Business, 2006.
- Bossidy L, Charan R, Burck C. *Execution: the Discipline of Getting Things Done*. Crown Business, 2002.
- ASCP Lab Management University
- CAP Inspection Team Leader Training

- Hematology/Special Hematology laboratory procedures may be viewed at: http://www.medialabinc.net/ (See division coordinator for specific usernames and passwords)
    - First, under “Viewing”, select “PUH CP”.
    - Select “View Documents & Manuals” Tab
    - Choose Manuals under left hand menus for “View Documents & Manuals”
    - Then choose appropriate manual
        “Automated Testing Laboratory” for Hematology manual or “Special Hematology” for bone marrow, lymph node, and flow cytometry related manuals and procedures.

Hematopathology Quality Improvement Project Guidelines

Goals and Objectives: To know how quality improvement projects are performed in clinical laboratories by actively participating in the planning and execution of one.

- To learn how to better navigate a large and complex health system.
- To enhance fellow/laboratory professional interactions.
- To be able to better manage a clinical laboratory.

Guidelines: Select a clinical laboratory area and faculty mentor and jointly plan a quality improvement project. The project should involve one of the clinical laboratories and can be done either with the laboratory medical director or with another hematopathologist involved in the laboratory. It is expected that most projects will relate to the flow cytometry, bone marrow, UPMC-Presbyterian and general hematology, UPMC-Shadyside general hematology, UPMC-Magee Women's general hematology, or Children's Hospital of Pittsburgh laboratories. It is expected that each hematopathology faculty member will be willing to work with at least one fellow. The project may be done concurrently with any of the rotations, time allowing. Quality improvement projects may also be done in laboratories outside of the Hematopathology Division (e.g. Molecular & Genomic Pathology, Cytogenetics, or Coagulation) with permission of both the director of these laboratories and the hematopathology fellowship director. **All projects should be planned by October 1st and completed by March 31st.** The completed report form (attached) should be reviewed and signed by both the supervising faculty member and the fellowship director.

Hematopathology Quality Improvement Project Report Form
(Completed form to be no longer than 2 pages)

Name: _____

Faculty Advisor: _____

This project has been successfully completed in a competent fashion:

Faculty Advisor: _____
Signature

Fellowship Director: _____
Signature

Title of Project: _____

Nature of problem to be addressed and how it was identified (Introduction):

Quality Improvement Plan (Materials & Methods):

Results:

Outcome and Conclusions (Discussion):

Hematopathology Director's Meeting with Fellow at 6-Month Intervals During ACGME Year

Coordinator provides items 1-9. Fellow brings all documentation related to items 10-11

1. Review of Fellow Written Practical Examination (administered by Division twice/year)
2. FISHE score(s) (ASCP Fellow In-Service Hematopathology Examination, twice/year)
3. CheckPath Hematopathology results, chart, questions (quarterly)
4. Clinical Experience and Education (formerly Duty) Hours summary (from MedHub)
5. Conference attendance form as evidence of conference attendance and/or presentation
6. Diagnostic specimen count chart/case logs (reviewed monthly) including:
    a. CoPath specimen count – Adult and pediatric bone marrows (PHB); lymph nodes and related solid tissues (PHS, other); flow cytometry, cytogenetics, FISH, and molecular procedures (PHB, PHS, other)*
    b. PB and Fluid Review Case Log – PB and body fluid smears/reviews (ATL)[#]
    c. Cytogenetics Case Log – Cytogenetic/FISH cases reviewed while at Pittsburgh Cytogenetics Laboratory[#]
    d. Myeloid Next-Generation Sequencing Case Log – Myeloid NGS cases directly reviewed in the Molecular Diagnostics Laboratory[#]
    e. Hemepath FISH Case Log – FISH cases directly reviewed in the Division of Hematopathology[#]
7. Summary of electronic evaluations:
    a. Fellow evaluations of each rotation
    b. Fellow evaluations of faculty
    c. Faculty EPA-based evaluations of fellow
    d. Multisource (360-degree) evaluation(s) of fellow presentations and interpersonal skills (from faculty, office staff, technologists, residents, and each other)
8. Other written feedback the Fellowship Director has received on the fellow not included in electronic evaluations (i.e. feedback from clinicians, medical students, other rotators, etc)
9. Six competency form
10. **Portfolio (including)**:
    a. Diagnostic specimen case logs: [*Practice based learning and improvement, system based practice, medical knowledge, patient care*]
        i. Bone marrow biopsy/aspirate form (with documentation of procedure performance and review of sample adequacy)
        ii. PB and Fluid Review Case Log (ATL service) – keep a list or copy of de-identified reports[#]
        iii. Cytogenetics Case Log (Cytogenetic cases directly reviewed at Pittsburgh Cytogenetics Laboratory) – keep a list or copy of de-identified reports[#]
        iv. Myeloid Next-Generation Sequencing Case Log (Myeloid NGS cases reviewed in the Division of Hematopathology) – keep a list or copy of de-identified reports[#]
        v. Hemepath FISH Case Log (FISH cases reviewed in the Division of Hematopathology) – keep a list or copy of de-identified reports[#]
    b. Notes for Journal Club presentations, including any additional literature reviewed [*Practice based learning and improvement, medical knowledge*]
    c. Maintain folder on shared network drive with conference presentations (e.g. powerpoint slides, handouts) [*practice based learning and improvement, interpersonal and communication skills, medical knowledge, patient care*]
    d. Copies of clinical reports prepared by fellow comparing before/after sign-out with faculty corrections. Examples should include at least 2 bone marrow reports and 2 lymph node reports incorporating literature searches and/or incorporating

cytogenetic/genomic results. [*Practice based learning and improvement, systems based practice, medical knowledge, patient care, interpersonal and communication skills*]

e. Copies of any written feedback not received through the routine assesment process. [*All competencies*]
f. Summary of any quality improvement plans/problem solving/management issues the fellow was involved in with a description of the problem, how it was identified and the resolution. [*Practice based learning and improvement, systems based practice*]
g. Manuscripts and abstracts prepared including initial (i.e. prior to faculty input) and final drafts [*Practice based learning and improvement*]
h. Copy of all completed checklists/forms: [*All competencies*]
    i. Adult Bone Marrow Rotation Checklist
    ii. Lymph Node Rotation Checklist
    iii. Flow Cytometry Rotation Checklist
    iv. Pediatric Hematopathology Rotation Checklist
    v. Molecular & Genomic Pathology Rotation Checklist
    vi. Cytogenetics Rotation Checklist
    vii. Laboratory Hematology Rotation Checklist
    viii. Focused Histiocytic Neoplasms and Disorders Experience Checklist
    ix. Immunohistochemistry Rotation Checklist
    x. ASCP Lab Management University Checklist
    xi. Documentation of completed CAP Inspection Team Leader Training (OPTIONAL)
    xii. Hematopathology Quality Improvement Project Report Form

11. Review/Discussion of Projects

*Numbers supplied by Fellowship Coordinator
#Give a copy to the Fellowship Coordinator at the end of each month/rotation

PORTFOLIO for Hematopathology Fellows:

- Diagnostic specimen count chart/case logs (reviewed monthly) including: [*Practice based learning and improvement, system based practice, medical knowledge, patient care*]
    - CoPath specimen count – Adult and pediatric bone marrows (PHB); lymph nodes and related solid tissues (PHS, other); flow cytometry, cytogenetics, FISH, and molecular procedures (PHB, PHS, other)*
    - Bone marrow biopsy/aspirate form (with documentation of procedure performance and review of sample adequacy)
    - PB and Fluid Review Case Log (ATL service) – keep a list or copy of de-identified reports#
    - Hemoglobin Analysis Case Log (HPLC review at Children's Hospital of Pittsburgh) – keep a list or copy of de-identified reports#
    - Cytogenetics Case Log (Cytogenetic cases directly reviewed at Pittsburgh Cytogenetics Laboratory) – keep a list or copy of de-identified reports#
    - Myeloid Next-Generation Sequencing Case Log (Myeloid NGS cases reviewed in the Division of Hematopathology) – keep a list or copy of de-identified reports#
    - Hemepath FISH Case Log (FISH cases reviewed in the Division of Hematopathology) – keep a list or copy of de-identified reports#
- Notes for Journal Club presentations, including any additional literature reviewed [*Practice based learning and improvement, medical knowledge*]
- Maintain folder on shared network drive with conference presentations (e.g. powerpoint slides, handouts) [*Practice based learning and improvement, interpersonal and communication skills, medical knowledge, patient care*]
- Copies of clinical reports prepared by fellow comparing before/after sign-out with faculty corrections. Examples should include at least 2 bone marrow reports and 2 lymph node reports incorporating literature searches and/or incorporating cytogenetic/genomic results. [*Practice based learning and improvement, systems based practice, medical knowledge, patient care, interpersonal and communication skills*]
- Copies of any written feedback not received through the routine evaluation process [*All competencies*]
- Summary of any quality improvement plans/problem solving/management issues the fellow was involved in with a description of the problem, how it was identified, and the resolution. [*Practice based learning and improvement, systems based practice*]
- Manuscripts and abstracts prepared including initial (i.e. prior to faculty input) and final drafts [*Practice based learning and improvement*]
- Copy of all completed checklists/forms: [*All competencies*]
    - Adult Bone Marrow Rotation Checklist
    - Lymph Node Rotation Checklist
    - Flow Cytometry Rotation Checklist
    - Pediatric Hematopathology Rotation Checklist
    - Molecular & Genomic Pathology Rotation Checklist
    - Cytogenetics Rotation Checklist
    - Laboratory Hematology Rotation Checklist
    - Focused Histiocytic Neoplasms and Disorders Experience Checklist
    - Immunohistochemistry Rotation Checklist
    - ASCP Lab Management University Checklist
    - Documentation of completed CAP Inspection Team Leader Training (OPTIONAL)
    - Hematopathology Quality Improvement Project Report Form

*Numbers supplied by Fellowship Coordinator
#Give a copy to the Fellowship Coordinator at the end of each month/rotation

UPMCME Educational Policies Executive Summary

The policies of University of Pittsburgh Medical Center Medical Education (UPMCME) are designed to promote an optimal learning environment for our graduate medical education (GME) trainees and to comply with all applicable regulations. All faculty and residents follow UPMC policies, so UPMCME policies and UPMC policies are coordinated. UPMCME policies fall into 3 loose domains- curriculum related policies, resident centered policies, and institution/GME related policies. An annotated directory of these policies follows.

Full, up-to-date policies are located in Medhub at https://upmc.medhub.com/u/f/myhome_resources.mh?action=view&resourceID=3654

The following is an abridged list of UPMCME policies relevant to fellows, with brief descriptions.

Curriculum and Learning Environment Related Policies

Appointment/Reappointment/Probation/Dismissal: Describes the universal 1 year contract and the obligations of notification within 4 months if not being renewed or promoted. Describes the process for residents' voluntary termination. Describes grounds for and process of involuntary termination. UPMC Legal consultation is mandatory, and appeal may follow, according to the dictates of that policy

Clinical Experience and Education Hours and Learning Environment: Describes the UPMCME policy on safe clinical experience and education (duty) hours and learning environment. Describes standard ACGME regulations.

Duty Hours Exceptions: Describes in detail the program eligibility requirements and process for requesting 88 hour work week exceptions.

Moonlighting: Describes the UPMCME position on moonlighting. It must conform to ACGME regulations, must be prospectively approved and monitored. External moonlighting is counted, and is NOT covered by UPMC insurance.

Evaluation: Describes multiple facets of evaluation- resident, faculty, and program. Mandates feedback and an Annual Program Evaluation, includes a template.

Fatigue: Describes fatigue effects and methods to prevent/combat. Describes program obligations to monitor and assist with safe sleep habits.

Professional Conduct- Teacher Learner: Coordinated policy with the School of Medicine describes responsibilities of teachers and learners in the learning environment. Proscribes certain behaviors and provides process for reporting same. Describes the adjudication and appeals processes.

PSD Professional Conduct: Describes documentation, reporting, and penalty for inappropriate or unprofessional behavior on duty.

Special Institutional Education Programs: Describes the category of programs not accredited by ACGME, but otherwise functioning and being paid by the same mechanisms as accredited programs. Requirements are much the same as ACGME requirements. There is a separate GME subcommittee and an application process with template attached.

Supervision: Describes general principles of faculty supervision of residents as well as specific must-call examples. Describes levels of supervision ranging from direct (mandatory for PGY-1) to acceptance of progressive responsibility based on performance evaluation. A check list for Program compliance is attached.

Resident Centered Policies

Disability: Describes program and applicant responsibilities in meeting the requirements of the Americans with Disabilities Act, as well as UPMCME policy. The basis for offering accommodations is the anticipation that the candidate has the capability to graduate competent to practice the specialty and to meet certification and Pennsylvania licensure requirements.

Eligibility, Selection, Transfer: Describes eligibility requirements of applicants for our programs and the process of selection. Describes the process for acceptance of transferring residents from outside programs.

Fitness for Duty (UPMC HS-HR0721): Describes a variety of reasons and appearances of being unfit for duty and the appropriate responses/actions. Describes sources for remediation, such as Employee Assistance Program, Life Solutions, and the role of Human Resources.

Grievance and Appeal: Describes the overall evaluation, feedback, and disciplinary processes. Defines the process for a resident grievance (claim of treatment contrary to existing policies), or appeal (second opinion on a disciplinary, remedial, or other action). Resident must file within 10 days and review panel respond within 30 days. Higher levels of appeal are also described.

Non-Academic Grievance & Appeal: Describes process of resident's discussing/reporting work environment issues. Describes ascending levels to which issues may be taken in an environment free of intimidation or fear of retaliation.

Harassment: Defines in detail and prohibits harassment in the UPMC workplace. Describes the process of reporting same.

Impairment: Describes UPMC policy against drug and alcohol abuse with regard to the workplace and the actions taken if impairment occurs.

Leave of Absence: Describes personal leave of absence up to 14 weeks, for non-FMLA and non-military matters. Requesting process, benefits, use of vacation time, and return to work are discussed.

Administrative Leave of Absence: Describes an additional type of leave, up to 6 months, not covered by Personal, Military, or FMLA leave policies. This type of leave may be initiated by UPMC or by the resident.

FMLA: Describes UPMC policy to conform with the 1993 Family and Medical Leave Act. Up to 12 weeks unpaid, except disability, in any 12 month period may be granted, and can be followed by up to 14 weeks of Personal Leave in appropriate circumstances.

Medical Screenings: Replaced by UPMC Policy HS-HR0700. Defines pre-employment requirements at a minimum: a health questionnaire, drug screening, general health screen, and immunizations. Other special cases are described. A 5 month completion interval for residents has been granted by PSD.

PA Licensure and Progression: Describes Pennsylvania State Board requirement to pass Step 3 (USMLE) before entering year 3 of training. UPMCME requires first attempt during year 1 and allows no more than 3 total attempts before dismissal.

Qualified Scholarship: Describes the process by which a resident may be awarded a scholarship for tuition or other eligible expenses.

Social Networking (UPMC and UPMCME): Defines parameters for UPMC employees to avoid misuses of public media. Provides examples pertinent to residents' work and social lives.

Institution/GME Related Policies

Disaster: Describes measures to be followed to provide residents/fellows with quality education in the event of circumstances that significantly alter the educational environment and experience.

GME Committee: The GME Committee has the oversight authority and responsibility for all aspects of graduate medical education, as well as assuring that all the requirements set by the ACGME and other accrediting bodies are met. Describes the membership, roles, and responsibilities of the GME Committee.

GME Office: Describes the roles and responsibilities of the GME Office, which actualizes the GMEC's institutional and administrative oversight of all graduate medical training programs. The mission of the GME Office is to ensure academic quality and professional Integrity while ensuring safe and quality care for patients.

Supplemental Education Funds: Describes the procedures to utilize the funds and identifies reimbursable expenses such as books, conferences, licensures and recruitment.

Vendor Interactions (UPMC): Describes guidelines for faculty, staff, students of the Schools of the Health Sciences and UPMC Personnel when interacting with representatives from certain industries. The goal is to eliminate vendor influence in setting academic curriculum, evidence-based decision making and patient care.

Visa: Describes the process to ensure full compliance for immigration and visas issues. Details the standards, responsibilities, and resources available for all International Medical Graduates (IMG) applying for a professional graduate medical program of UPMCME

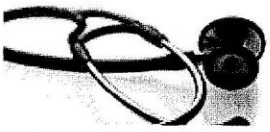
GME Committee: The GME Committee has the oversight authority and responsibility for all aspects of graduate medical education, as well as assuring that all the requirements set by the ACGME and other accrediting bodies are met. Describes the membership, roles, and responsibilities of the GME Committee.

WEB RESOURCES: GME SITES

GME: http://www.upmc.com/careers/GME/Pages/default.aspx

GME Knows: https://scholar.shp.upmc.com/GMEknows/SitePages/Home.aspx

IRD: http://www.upmc.com/careers/GME/Pages/contact-us.aspx



RFAP

The Resident and Fellows Assistance Program enable residents, fellows and their household family members to successfully address personal, job-related and career needs in a confidential environment. Our goal is to help you balance your work and personal life.

Personalized Work*Life* Services

These are specialist services which provide on-line or telephone referrals to much needed resources.
Click the areas below to go directly to your Work*Life* portal. (Your click opens up a new window or tab which represents an exit from the GME intranet and entrance into *Life*Solutions Work*Life* service portal.)

Financial Matters	Relocation	Adoption
Health & Wellness	Childcare	Legal Matters
Daily Living	Home Improvement	Eldercare

Call now and you can speak with a Work*Life* specialist on any topic. Call 1.800.647.3327

Coaching and Counseling Services In-Person or by Telephone

You can receive up to 6 sessions per issue, completely private and confidential and not a part of any health plan coverage. They are ready to assist you with:

The stress of the GME program	Balancing work and life
Family, marital and other relationships	Test taking skills
Managing stress, anxiety or depression	Alcohol and drug concerns

To schedule with our professionals, please call 1.800.647.3327

Multiple Locations

We have 7 offices throughout UPMC hospitals with professionals ready to assist you. Locations include Oakland near the Holiday Inn, UPMC Braddock, UPMC McKeesport, UPMC Mercy, UMC Passavant, UPMC Shadyside and UPMC St. Margaret's. In addition to our offices at UPMC facilities, we have over 60 locations in western Pennsylvania.

To schedule with our professionals, please call 1.800.647.3327

Resident and Fellow Test-taking Preparation Program

This program is designed to enable residents and fellows to develop the skills needed to be successful test takers. Passing the USMLE, IN-Practice, In-Service and Board Certification exams are necessary components of medicine and essential to practice.

Program Components
1) Work with test-taking professional
2) Up-to-date library of relevant test review and preparation resources
3) Test-taking stress reduction techniques
4) Assessment of strengths, weaknesses, exam taking history and analysis of old exam scores

Program Flexibility
1) No Cost
2) Six Sessions Per Issue
3) Free Parking
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Please call 412.647.3669 between 8am - 5pm to schedule an appointment, or click HERE to download more information.