Curriculum on Clinical Microbiology

Educational Purpose and Goals

Supplemental knowledge of properties of microbial pathogens is an important adjuvant to properly identifying and treating infectious diseases problems. Additionally, close interface between the fellow and the microbiology laboratory contributes to improved patient care.
The purpose of this rotation is to expose the fellows to the science of the clinical microbiology laboratory. Participants learn utility of procedures for specimen collection, limitations to the laboratory techniques important in identification of bacteria, fungi, and viruses pathogenic for humans, methods of susceptibility testing on various specimens, and OSHA regulations. Various laboratory techniques will be performed as appropriate. This rotation will provide an opportunity for the Fellow to better understand the capacities and limitations of the diagnostic microbiology laboratory and to understand serologic and molecular assays from samples, including fixed tissues.

Principal Teaching Methods

Waleed Khalife, PhD., will supervise this rotation. Other support comes from the pathology and microbiology laboratory staff. The principle text is Mandells' Principles and Practice of Infectious Diseases. The course director will assign additional readings as appropriate.

Educational Content

Mix of diseases: Fellows are exposed to a wide variety of infectious diseases problems on the microbiology laboratory rotation. These include, but are not limited to, the febrile patient, upper respiratory, pleuropulmonary, and bronchial infections, urinary tract infections, cardiovascular infections, central nervous system infections, skin and soft tissue infections, prosthetic device infections, infections related to trauma and bites, gastrointestinal infections, bone and joint infections, infections of the reproductive organs, viral hepatitis, HIV related opportunistic infections, infections in immunocompromised or neutropenic patients, infections in patients with leukemia or lymphoma, infections in geriatric patients, infections in travelers, use and management of antimicrobial agents in the outpatient setting, and infections in parenteral drug abusers.

Patient characteristics. A diverse patient population is served in Lansing and MSU. Patients include both gender groups as well as individuals of a broad spectrum of ethnic, racial and socioeconomic backgrounds. Fellows will also have contact with some of the international students that are

present on the MSU campus. Fellows will be exposed to the unique social, family, behavioral, and economic issues faced by outpatients and participate in patient counseling and community education, as appropriate

Learning venues: The clinical microbiology laboratory experience will take place at Sparrow Hospital. Patient encounters will occur at the MSU Clinical Center, the HIV/Virology clinic, and Sparrow Hospital.

Structure of rotation: This rotation occurs in the first year of the program. Fellows work half days in the clinical microbiology laboratory for 2 consecutive months resulting in approximately 40 half day experiences. During this time fellows will be involved in pathogen isolation, sensitivity testing, advanced diagnostics including PCR and molecular techniques, educational programs for health care providers, and interface with the Infection Control Department. While on the Microbiology laboratory rotation fellows will continue to have outpatient clinic responsibilities in both the HIV/Virology clinic and General ID clinic and round on appropriate weekends (1/4). They will attend all conferences and are expected to read and be prepared to discuss key literature.

Principal Ancillary Educational Materials

Mandells' Principles and Practice of Infectious Diseases, and Mayhalls' Hospital Epidemiology and Infection Control will be used as base texts for fellow education. Fellows have access to web based resources and other texts and videos through the hospital libraries.

Methods of Evaluation

Fellow Performance: At the conclusion of the rotation, faculty will summarize and accurately describe the fellow's performance on the provided form, discuss this evaluation with the fellow and return the form to the residency director. The evaluation is competency-based, fully assessing core competency performance. The evaluation will be part of the fellow file and will be incorporated into the semiannual performance review for directed fellow feedback.
Semiannually the fellow will be evaluated by the program director in a formal, written evaluation session. These evaluations will be transcribed and signed by both the residency program director and the fellow.

Program and Faculty Performance: The fellow will summarize and accurately describe faculty performance, facilities, and experience and return it to the program office for inclusion in a computer-generated report to insure fellow anonymity. The Fellowship Training and Evaluation Committee will review results annually.

Institutional Resources: Strengths and Limitations

Strengths: A commitment to high quality laboratory performance. The microbiology laboratory occupies approximately 3000 square feet at Sparrow Hospital and is equipped to perform diagnostic assays. The Laboratory is accredited through the College of American Pathologists. Additional space for molecular diagnostics was opened in 2007.

Limitations: None

Rotation Specific Competency Objectives

Patient care

This rotation is not primarily a patient care rotation. While on this rotation fellows will continue to regularly provide patient care. F-1 fellows are expected to collect data precisely, logically, and efficiently, perform focused physical exams approaching the level of a sub specialist, demonstrate clinical reasoning in ambiguous situations, establish monitoring procedures to assess needs for changes in therapeutic programs or adverse side effects, apply public health policies to patient care and possess knowledge of common ID syndromes/diseases sufficient to appropriately manage common Infectious Disease syndromes/diseases. Fellows will be responsible for medical record documentation, as appropriate, under the supervision of the medical attending.
In addition to the F-1 expectations, F-2 fellows are expected to appropriately manage common and uncommon ID syndromes/diseases sufficient to establish a subspecialty focused differential diagnosis, establish an appropriate management plan to determine need for changes in diagnostic and therapeutic interventions, observe patients for adverse side effects, and apply public health policies to patient care.

Medical Knowledge

Fellows will possess knowledge of and demonstrate growing understanding of expertise in the techniques of the Microbiology Laboratory, including safety procedures, the basic principles of pathogen identification, host-pathogen interaction, appropriate statistical analysis of resistance rates, and the role of the lab in a bioterrorism setting, read and be prepared to discuss key literature.

Interpersonal and Communication Skills

Fellows will engage in shared decision making, conduct meetings as appropriate, successfully negotiate nearly all difficult encounters unaided, function as a laboratory team member with minimal reliance upon attendings, and effectively communicate with health care providers, hospital administrators, and attending physicians.

Professionalism

Fellows are expected to exhibit honesty and trustworthiness, reliability in their duties, as well as demonstrate integrity, compassion, and respect in their interactions with colleagues from the same or different cultures/ages/sexes.

Fellows will be responsible for complete and prompt data collection and proper legible documentation and completion of assigned tasks.

Practice Based Learning and Improvement

Fellows will appraise and assimilate relevant scientific literature, integrate evidence based medicine, expert opinion and professional judgment, respond to the questions of co-workers, demonstrate self-initiative in the use of information technology available via the hospital library, the MSU electronic library, or the internet to access and retrieve materials for performance improvement in the Microbiology laboratory. Fellows are expected to show progressive self-learning throughout the rotation, with emphasis on learning from any cognitive or procedural errors.

Systems Based Practice

Fellows will demonstrate understanding of complexity of interactions between the laboratory and other agencies, help partner with other organizations to identify and act on laboratory improvement opportunities in the health care system, practice within external regulations (including OSHA and MIOSHA) and expectations, conserve resources while rotating in the Microbiology laboratory.