

Medical Microbiology Fellowship Track

Background and Goals.

Medical Microbiology is a critical aspect of the Pathology Service and essential to providing good patient care. The goal of this 1 year ACGME accredited fellowship program is to train and prepare Pathologists and Infectious Disease specialists to serve as Director of a clinical microbiology laboratory. Our graduates possess an in-depth understanding of medical microbiology including the selection, validation and interpretation of diagnostic microbiology tests. Our trainees are capable of managing a high volume, complex diagnostic laboratory. In addition, we expect that graduates of this program may chose to develop an area of research in microbiology that prepares them for a career as a laboratory director at an academic health center. To these ends, the program provides a comprehensive curriculum consisting of didactics, rotation through all sections of the clinical microbiology laboratory as well as rotations with various clinical services to gain an understanding of how testing in the microbiology laboratory informs clinical decision making. Particular emphasis is placed on laboratory operation and management. Fellows are required to complete all components of the ACGME curriculum within 12 months.

Curriculum:

Rotation Block Diagram:

Block	1	2	3	4	5	6	7	8	9	10	11	12
Institution	MGH	MGH		MGH	MGH	MGH		MGH	MGH	MGH	MGH	MGH
Rotation Name	Bacteriology*	Antimicrobial Susceptibility Testing	Vacation	Virology Serology	Molecular Micro	Mycology Tb Parasitology	Vac	ID ** Consult	POCT	Elective	Infection Control***	Lab Manag***
# of Weeks	15	5	2	4	4	6	2	4	2	8	48	48
% Outpatient	0	0	0	0	0	0	0	0	0	0	0	0
% Research	0	0	0	0	0	0	0	0	0	Variable up to 100%	0	0

* Note: Rotation length varies depending on the fellows prior training experience. Fellows entering the program after ID fellowship spend 4 additional weeks in the bacteriology laboratory and do not rotate on the Infectious Disease consult rotation. Fellows entering the program after pathology residency spend 4 weeks on the ID consult service (and 4 less weeks on the bacteriology rotation)

** This rotation is only for fellows with Pathology training. Fellows who enter program from ID spend 4 additional weeks on the bacteriology rotation.

*** Denotes a year long, longitudinal rotation that occurs concurrently with other rotations.

Rotations:

1. *Bacteriology:*

This rotation focuses on the principles of identification of medically important gram positive, gram negative and anaerobic bacteria. Emphasis is placed on gaining experience with Gram stains of primary and cultured specimens and learning traditional and automated methods of cultivation and identification of clinically relevant bacteria. Fellows are exposed to new, “non-traditional” methods of organism identification including the use of MALDI-TOF (Matrix-assisted laser desorption/ionization-Time of Flight) mass-spectrometry. Fellows gain experience in the optimal handling and planting of all specimen types. Fellows rotate through the different areas of the bacteriology laboratory starting with the “Front Desk” where specimens are accessioned and planted. Fellows also rotate through the different areas of the bacteriology laboratory based on specimen type including urine, stool, throat, respiratory, CSF, wound and blood cultures.

2. *Susceptibility Testing*

Given the importance of antimicrobial susceptibility testing, a dedicated rotation is spent learning how routine antimicrobial susceptibility testing is performed. Special emphasis is placed on understanding the limitations of the various susceptibility testing methods and interpretation of results. The fellow is also expected to gain an in-depth understanding on the principles and procedures commonly used in antimicrobial susceptibility testing of medical important bacteria and yeast. The fellow also develops an understanding of how the Clinical Laboratory Standards Institute (CLSI) M-100 is used in the susceptibility laboratory and the fellow gains an overall appreciation on how these standards are devised. The fellow also gains experience in developing the annual hospital antibiogram detailing antimicrobial susceptibility patterns for commonly identified bacteria and yeast isolated over the past year. During this rotation, the fellow has extensive interactions with the MGH Infection Control Unit to learn methods to track the emergence of antimicrobial resistance in the clinical setting and to limit the spread of drug resistance throughout the hospital.

B. Goals:

Culture and direct detection of viral pathogens is an essential component of the clinical microbiology laboratory. During this rotation, the fellow gains core competency in culturing medically important viruses using traditional tissue culture methods as well as enhanced methods. In addition, the fellow gains expertise in the direct detection of

viruses using standard methods including direct fluorescent antibody (DFA) testing. During this rotation, the fellow also gains expertise in serologic methods of detecting pathogens including agglutination methods as well as learning how to use newer fully automated instruments.

4. *Molecular Diagnostics:*

Many difficult to culture organisms can be detected and quantitated using amplified and non-amplified molecular methods. During this rotation, the fellow learns the theory behind molecular detection of micro-organisms. The fellow gains experience in performing both qualitative and quantitative testing of blood, urine, respiratory specimens and CSF for several common medically important viruses (HIV, HCV, HBV, HSV, EBV, CMV, Influenza), common bacterial pathogens with infection control implications (MRSA, CDif) and difficult to culture bacteria (Gonorrhea and Chlamydia) and Mycobacteria.

5. *Mycology/Mycobacteriology/Parasitology:*

This rotation provides an in-depth exposure to the detection and identification of medically important fungi, mycobacteria and parasites. The fellow is expected to gain expertise in the morphologic identification of fungi and parasites as well as an in-depth understanding of culture based identification methods of fungi, mycobacteria and parasites.

6. *Point-of-Care testing:*

This rotation provides an in-depth exposure to point-of-care testing for the rapid diagnosis of infectious agents. Examples include rapid testing for Streptococcal pharyngitis and respiratory pathogens (i.e. influenza, RSV, etc.). The logistical organization of performing point-of care testing and quality assurance is emphasized as well as the limitations and interpretation of results. During this rotation, (if the opportunity arises), the fellow participates in the “inspection” of an MGH affiliated laboratory that performs point-of-care testing.

7. *Laboratory Management:*

Effective, day-to-day management of the clinical microbiology laboratory is one of the most important skills necessary for a laboratory director. *This longitudinal experience occurs over the course of the entire fellowship.* The fellow is expected to actively participate in all decisions affecting the operation of the laboratory. This experience provides the fellow with the essential skills needed to serve as laboratory director.

Topics to be covered include: Budgeting, purchasing, selection of new tests, quality control, quality assurance, laboratory safety, human resource management, laboratory inspection, information system management, etc.

8. Infection Control/Antimicrobial Stewardship:

This rotation provides in-depth exposure to the principles of infection control and antimicrobial stewardship. The clinical microbiology laboratory works in partnership with the infection control unit to detect and limit the spread of hospital acquired infections. During this rotation, the fellow works closely with the infection control unit to learn infection control methods and how the microbiology laboratory plays a role in infection control. The fellow is required to attend the weekly infection control unit meeting where all aspects of infection control are discussed. When appropriate, the fellow is assigned a project to assist the infection control unit in an active investigation. The microbiology laboratory directors serve on the hospital infection control committee and during the fellowship, the fellow join this committee as a member. In addition, the MGH pharmacy, infectious disease division and clinical microbiology laboratory function as the stewards for antimicrobial usage. The fellow is expected to actively participate in daily antimicrobial stewardship rounds and at the semiannual microbiology-pharmacy-infectious disease meeting. This longitudinal experience occurs over the course of the entire fellowship training period to ensure that the fellow has the opportunity to learn from a variety of infection control issues and problems.

9. Elective:

The educational goal of this rotation is to provide an in-depth exposure to scholarly research or exposure to an area of the laboratory in which the fellow wishes to gain a more in-depth clinical experience. For fellows electing to pursue a scholarly project, this elective provides dedicated, protected time to conduct a research project. All research projects are conducted under the direct supervision of a faculty member. There are ample research opportunities available throughout the Pathology service and the Division of Infectious Diseases.

Current Fellow (2015–2016).

Mia Platt, M.D, Ph.D
Sarah E. Turbett, M.D.

Core Faculty. The Medical Microbiology fellowship program has faculty members from the Department of Pathology and Division of Infectious Diseases.

Eric S. Rosenberg, M.D

Director of Microbiology
Medical Microbiology Fellowship Program Director
Associate Professor of Medicine



Dr. Rosenberg is the Director of the Clinical Microbiology Laboratory and serves as the Microbiology Fellowship Program Director. Dr. Rosenberg is an Infectious Disease physician and member of the Infectious Disease Division and Department of Pathology. Dr. Rosenberg's research interests include HIV pathogenesis and diagnosis with a particular interest in acute HIV infection.

Mary Jane Ferraro, PhD, MPH

Co-Director of Microbiology
Professor of Pathology and Professor of Medicine

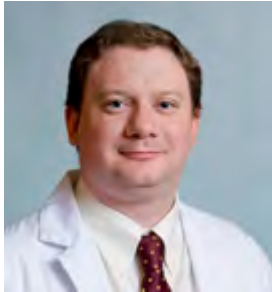


Dr. Ferraro is the Co-Director of the Microbiology laboratory and serves as a core faculty member in many of the fellowship rotations. Her research interests the development of methods for early, direct detection of microorganisms in clinical specimens; automation of diagnostic methods in the Clinical Microbiology Laboratory; utilization and cost-effectiveness of diagnostic tests in Clinical Microbiology; development and validation of new approaches to antimicrobial susceptibility testing; and in vitro susceptibility studies of new antimicrobial agents.

John Branda, MD

Associate Director of Microbiology

Assistant Professor of Pathology



Dr. Branda is Associate Director of the Clinical Microbiology Laboratories at MGH, and an Assistant Professor of Pathology at Harvard Medical School. He is one of the core faculty members for the MGH fellowship in Medical Microbiology, and directs the rotations in mycobacteriology, mycology, parasitology and infectious diseases serology. His research interests include improving patient care through the development of new diagnostic testing strategies, and optimizing utilization of laboratory testing and antimicrobial agents. He has a special interest in diagnostic testing for tick-borne illnesses, such as borreliosis, babesiosis, anaplasmosis and tularemia.

Virginia Pierce, MD

Instructor in Pathology

Assistant Director of Microbiology

Dr. Pierce is the Assistant Director of the Microbiology Laboratory and serves as Associate Fellowship Program Director. Dr. Pierce is board certified in Pediatric Infectious Diseases and Medical Microbiology. Her research interests include the development and evaluation of new testing strategies in clinical microbiology and improvement of existing diagnostic approaches and algorithms.

Kent Lewandrowski, MD

Professor of Pathology

Associate Chief of Pathology

Director of Pathology Laboratories and Molecular Medicine

Director Point-of-care Testing



Dr. Lewandrowski is the Director of Pathology Laboratories and Molecular Medicine. He oversees the Point-of-care rotation. His research interests include Point-of-care diagnostics, Serum cardiac markers, and Utilization and outcomes research.

Stephen B. Calderwood, M.D.

Please insert Dr. Calderwood's blurb/picture here.

David C. Hooper, M.D.

Please insert Dr. Hooper's blurb here.

For more information, contact Dr. Eric S. Rosenberg, Program Director, at erosenberg1@mgh.harvard.edu. 617-724-7519