

Tufts Medical Center General ID Consultation Service

a) Goals, Objectives, and ACGME Competencies

Goals

To teach ID residents the physiological basis of infectious diseases, the differential diagnosis and treatment of these diseases, and the broad array of skills required to carry out effective, timely and courteous consultation in infectious diseases. The emphasis in this segment is on tertiary-care inpatients on surgical, medical, high-risk obstetric-gynecologic and psychiatric services. Throughout the program, there is an emphasis on the development of cost-effective, evidence-based management plans for investigation and treatment.

Objectives

First Year ID Residents:

- To gain a basic understanding of the major diagnoses, pathophysiology, differential diagnosis, and therapy of general infectious diseases encountered in the tertiary care setting.
- To use primary classical and recent literature in the care of patients with infectious diseases and to transfer the experiences learned in specific instances to future experiences.
- To demonstrate ability to teach principles of infectious diseases to other health professionals, including medical students.
- To learn the art of consultation, including the discussion of the consultant's opinions with the primary care team.
- To understand the importance of coordination of care, discharge planning and follow-up of patients with complicated infections.

Second Year ID Residents:

- To gain an advanced understanding of pathophysiology, differential diagnosis, and therapy of major and unusual infectious diseases encountered in the tertiary care system.
- To be able to competently and efficiently provide sophisticated infectious disease consultation independently.
- To regularly read and critically assess the primary infectious disease literature, become familiar with published practice guidelines and apply this knowledge to patient care.
- To be able to impart sophisticated and detailed information regarding infectious diseases to peers and those less experienced.

Rationale/Value

Patients in a tertiary/quaternary-care setting often pose unique problems of complexity, and of unusual or refractory infections. These infections may present unusual issues in diagnosis and treatment. The evaluation of such complex patients requires differentiation among unusual and common infections as well as among non-infectious illnesses that may masquerade as infections.

ACGME Competencies

Patient care

First Year ID residents:

- Demonstrate care that is compassionate, appropriate, and effective for the treatment of health problems related to infectious diseases and the promotion of health and prevention of infection.
- Perform detailed history and physical exam appropriate to medical, surgical, critically ill and other patient populations in searching for an infectious disease.
- Learn to evaluate complex patients in a tertiary/quaternary-care setting who often pose unique problems of complexity, and of unusual or refractory infections.

Second year ID residents:

- Demonstrate care that is compassionate, appropriate, and effective for the treatment of health problems related to infectious diseases and the promotion of health and prevention of infection, at a more sophisticated and independent level compared to first year ID residents.
- Able to formulate a focused infectious disease differential diagnosis and diagnostic and therapeutic plan.
- Able to independently and efficiently formulate a focused infectious disease differential diagnosis and diagnostic and therapeutic plan for complex tertiary-care setting patients.

Medical knowledge

First year ID residents:

- Demonstrate knowledge about established and evolving biomedical, clinical and cognate (epidemiology and socio/behavioral) sciences in the field of infectious diseases and the application of knowledge to patient care.
- Demonstrate knowledge of the most prominent disease mix encountered in this experience: Fever of unknown origin; pneumonia (community-acquired and nosocomial); skin and soft tissue infections, including surgical wound infections and intraabdominal infections; STDs; bone and joint infections, central nervous system (including post-neurosurgical) infections, central line related infections, endocarditis with an emphasis on patients with immunosuppression, multisystem disease, infections caused by antibiotic-resistant bacteria, and unusual fungi and viruses. Transplantation ID is an important component of the program and is discussed separately (see "Transplant ID" curriculum).
- Understand the use of empiric and specifically targeted antimicrobial therapy, including optimal timing, dose schedules and dosage adjustment
- Understand drug interactions and toxicities, efficacies of antimicrobials and use of alternative therapies
- Understand appropriate use of preventive therapies, especially antimicrobial prophylaxis and the use of vaccines.
- Recognize and differentiate unusual manifestations of common infections vs. unusual infections vs. non-infectious conditions masquerading as infections

- Demonstrate knowledge of the following:

Expertise including but not limited to the following:

- Host defense mechanisms and defects
- Patients with host defense defects due to neutropenia
- Patients with host defense defects due to leukemia, lymphoma, and other malignancies
- Epidemiology of community acquired and nosocomial infections
- Anti-infective therapy
- Clinical microbiology

Recognition, natural history, differential diagnosis, specific diagnosis and management of:

- Fever
- Upper respiratory tract infections
- Pleuropulmonary and bronchial infections
- Urinary tract infections
- Sepsis syndrome
- Cardiovascular infections
- Central nervous system infections
- Skin and soft tissue infections
- Gastrointestinal tract infections
- Intraabdominal infections
- Hepatitis A, B, C
- Bone and joint infections
- Prosthetic Device infections
- Reproductive organ infections
- Perinatal infections
- Sexually transmitted diseases
- Urinary tract infections in normal and immunocompromised hosts
- Ocular infections
- HIV disease including

Epidemiology and prevention

Diagnosis

Immunology

Virology

Natural history of infection

Infectious and non-infectious complications

HIV/TB coinfection

HIV/hepatitis C coinfection

Antiretroviral therapy – use and complications

- Familiarity with etiologic agents of infectious diseases
 - Nosocomial infections
 - Infections of specific hosts
 - Surgical infections

- Infections related to trauma
- Infections in travelers
- Sepsis syndromes
- Zoonoses
- Infections in the developing world
- Biowarfare
- Non-infectious syndromes that present as infections

- Learn the following procedures related to infectious disease testing:
 - Performance and interpretation of gram stains
 - Plating, review and interpretation of cultures of bacteria, mycobacteria, fungi, viruses rickettsiae, chlamydiae, and parasites, and interpretation of serological tests.
 - Optimal methods of specimen collection and culture
 - Knowledge of the sensitivity and specificity, risks and benefits of procedures.

Second year ID residents

- Advanced understanding of same

Practice-based learning

First year ID residents:

- Learn the use of primary classical and recent literature in the care of patients with infectious diseases and to transfer the experiences learned in specific instances to future experiences.

Second year ID residents

- Advanced understanding of above
- To regularly read and critically assess the primary infectious disease literature, become familiar with published practice guidelines and apply this knowledge to patient care.

Interpersonal and communication skills

First year ID residents:

- Advise physicians on the optimal usage of antimicrobial agents and their monitoring
- Advise proper response to suspected or diagnosed drug reactions including the use of drug desensitization
- Advise on the appropriateness of a given procedure, such as removal of central venous catheters, abscess drainage and bronchoscopy, in the context of the management or diagnosis of an infectious disease.
- Demonstrate ability to teach principles of infectious diseases to other health professionals, including medical students.

- Learn the art of consultation, including the discussion of the consultant's opinions with the primary care team.
- Discuss microbiology testing with microbiology laboratory technologists
- Effectively communicate with members of an interdisciplinary team regarding medical and administrative tasks.

Second year ID residents:

- Advanced understanding of above
- Demonstrate ability to impart sophisticated and detailed information regarding infectious diseases to peers and those less experienced.

Professionalism

First year ID residents:

- Provide courteous and timely assistance to all callers both intramural and extramural
- Complete documentation completely and in a timely fashion necessary to promote patient care and safety
- Provide expert and compassionate care to a diverse group of patients. There is an immense diversity of patients seen by the resident. They include adults who live in the immediate urban area who present with acute and chronic infectious diseases. They are of varied ethnic, linguistic, racial and socioeconomic backgrounds and ages vary from the late teens to the very aged.

Second year ID residents:

- Advanced understanding of above

Systems-based practice

First year ID residents:

- Participate in Antimicrobial Stewardship to promote conservation of antimicrobial resources, decrease risk of development of resistance, and unnecessary side effects (See Tufts Medical Center Antimicrobial Stewardship Service (AMT))
- Develop understanding of medical care across the spectrum of care:
- Patients are referred to Tufts Medical Center from regional, national and international areas and institutions present for care of infectious diseases or develop infectious complications of their primary problem.
- Contribute to discharge planning efforts and care coordination, including antimicrobial de-escalation, change from parenteral to oral, and facilitation of follow-up particularly for complex patients and patients discharged on parenteral antimicrobial therapy.
- Develop understanding of cost-effective management plans for investigation and treatment.

Second year ID residents:

- Advanced understanding of above

Most Important Educational Content

Types of Clinical Encounters:

The encounters in this curriculum component are in the form of ID consultations. ID residents review historical and laboratory material and interview and examine each patient. During rounds, the ID resident presents the patient's case, with an assessment and diagnostic and therapeutic plan to the attending physician. The attending then sees the patient with the ID resident and demonstrates points in history-taking, physical examination, synthesis and differential diagnosis and development of a cost-effective plan for tests and treatment.

Hospital epidemiology: principles of communicability and isolation are taught systematically in relation to specific patients.

The attending physician personally reviews x-rays, ultrasound studies, radionuclide studies, pathological material, and microbiological materials, with the resident. Patients are followed daily until the infectious disease problem has resolved. The resident also has the expectation that they will teach other team members, including medical residents and medical students, on focused topics relating to infectious disease issues encountered on the service.

Patient Characteristics:

There is an immense diversity of patients seen by the resident. They include adults who live in the immediate urban area who present with acute and chronic infectious diseases. They are of varied ethnic, racial and socioeconomic backgrounds and ages vary from the late teens to the very aged. In addition, patients referred to Tufts Medical Center from regional, national and international areas and institutions present for care of infectious diseases or develop infectious complications of their primary problem.

b) Defined Methods of Teaching

Principal Teaching Methods

Apprenticeship and Socratic methods comprise the principal method of learning. Attending physicians demonstrate skills in focused history-taking, physical examination skills, synthesis of material, differential diagnosis and creation of a management plan each day. Subspecialty residents apply these methods, and refine them according to suggestions from attendings. These methods are supplemented by extensive didactic and basic sciences programs (see separate curricula).

Principal Ancillary Educational Materials

There are rich educational resources available at Tufts Medical Center. These include assigned reading about selected points, "plate rounds" (see "Daily microbiology plate rounds"), reviews of microbiological, radiographic and pathological materials with the supervisor of microbiology laboratory and radiology and pathology attending physicians, presentation of instructive cases, including focused reviews of literature by ID residents, at conference (see " Intercity Conference"). In addition, there are extensive print and electronic resources of the medical literature available through Tufts University School of Medicine, Tufts Medical Center and the Division. Access to the on-line resources is available to each ID resident at numerous locations within the institution and from remote

settings. The Division has an electronic resource center of lecture notes and slides on a shared network drive available to ID residents and attending physicians.

c) Methods of Evaluation

Methods to Evaluate Residents

Direct observation by supervising attendings with written monthly reports based on the six ACGME core competencies of patient care, medical knowledge, practice-based learning, interpersonal and communication skills, professionalism and systems-based practice, supplemented with narrative comments. At least twice yearly, reports from all recent rotations are reviewed with the entire group of attending physicians. A summary report is generated and discussed with the resident by the program director. This discussion provides an opportunity for the resident to respond to criticisms and to provide feedback to the program director on the training experience at Tufts Medical Center. In addition, attending physicians are expected to provide informal verbal feedback and advice to the ID resident during the rotation.

Methods to Evaluate Program Performance

Formal evaluation of program content and impact on professional development of ID residents is carried out by the faculty annually through the Program Evaluation Committee. The ID residents formally review the program by preparing an in-depth collective report of the Tufts Medical Center rotation at the end of each program year. This is supplemented by informal "feedback" from ID residents during the course of their rotation at Tufts Medical Center to the attending physicians and program director. A retrospective gauge of program performance is the success (pass) rate on the infectious disease subspecialty boards.

d) Strengths of Program

These include the wide diversity of patient problems seen at Tufts Medical Center; infectious disease attending preceptors with nationally and internationally recognized expertise in numerous aspects of the subspecialty (ranging from basic microbiology and pathogenesis of infectious diseases, immunology and host defenses to antimicrobial pharmacology and pharmacokinetics of drugs and biologicals used to treat specific groups of diseases); expertise and accessibility of ancillary services (radiology; pathology; microbiology; clinical immunology; pharmacology); and the rich medical information system present at Tufts Medical Center and Tufts University School of Medicine.

e) Limitations of Program

Faculty identify a lack of resources for faculty development.

Ongoing co-ordination of during transitions of care for patients was noted as a deficiency. There is now a robust program for patients being discharged on outpatient intravenous antibiotics (OPAT) to ensure seamless continuity of care.

Challenges in the inpatient setting include maintaining a work-life balance. The program monitors the consult volume on a continual basis and distributes consults to different teams as appropriate. In recent years, caps on the number of patients an ID fellow sees

daily were adjusted downward in recognition of the increasing complexity of patients. Additionally, Massachusetts, like the rest of the nation, struggles heavily with syndemics of opioid use disorders and infectious complications. These combine to create challenging patient populations. A strong partnership with Addiction Medicine helps address all medical issues pertinent to the hospitalization including addiction.

Institutionally, Graduate Medical Education has organized numerous resources to promote wellness and work-life balance.

Infectious Diseases nationally, faces ongoing recruitment and retention issues.