

## UNC Hospitals Inpatient Infectious Diseases Consult Services Curriculum

### I. Description of Rotation

*Site:* UNC Hospitals is an 804 bed tertiary care hospital serving the entire state of North Carolina. There is a 50 bed cancer hospital, Bone Marrow Transplant Unit, a burn unit, and a Level 1 Trauma Center. There are approximately 170 solid organ transplants/year. There are 21 board certified ID Faculty on site supervising fellows. The ID Consult team sees approximately 120 consults/mo, 30% immunocompromised.

*Inpatient Consults:* The Infectious Diseases inpatient consultation activities are divided in 2 to 4 week blocks for a total of 32 weeks for each fellow. Two fellows rotate on the service together along with 1-2 medical students, 1-2 internal medicine residents, a School of Pharmacy faculty member and the ID Consult Attending. The fellows participate in these blocks over a 2 year period. Typically the fellows have approximately 24-30 hours per week in face to face teaching with the ID Attending. From Monday through Friday, the entire team meets in the Clinical Microbiology Laboratory (1<sup>st</sup> floor UNC Hospitals) with senior laboratory staff at 1:30 PM. There, the team reviews any outstanding cultures, and serologic, molecular, or immunologic tests for patients being followed on the service. They also discuss individual patient problems with the microbiology team, exploring additional diagnostic options, the need for holding cultures longer in the lab or processing them differently, and testing for sensitivity to newer antimicrobials. The team then moves to the ID Clinic Conference Room (1<sup>st</sup> floor UNC Hospitals) where they review patients who have been seen previously but are still being followed by the team. The fellow following the patient discusses the results of the workup to-date, the need to narrow or expand antibiotic therapy and whether or not the team should see that patient again that day. (That decision is based on whether the diagnosis is known and whether the patient is improving with the treatment.) Then, the team reviews new consultations seen in the morning by the fellows, residents, or students. Some attendings prefer to hear these presentations at the bedside, and others listen in the conference room and then go with the team later to obtain additional history and examine the patients. Radiology rounds generally occur daily, either en route back from the microbiology lab to the ID Clinic or as the team moves to see new consults. The team also communicates with the primary team in terms of their recommendations. Rounds usually last until 6 PM on weekdays. On Saturdays, the team starts rounds in the ID Clinic between 8-9 AM, seeing all patients being followed on service, whether new to the team or old. Rounds last between 4-6 hours. On Sundays, the attending comes in if there is a new patient who needs to be seen. In the afternoon, the fellow and the attending usually review all the patients who are being actively followed.

*Outpatient Consults:* Outpatients who are too sick to wait for an ID Clinic appointment but not sick enough for admission are seen by the Consult team in the ID Clinic, usually within 24-48 hours. The Fellow works up the patient and presents to the ID Consult Attending who also sees the patients.

*Carolina Consult Service:* This is a service provided by UNC Hospitals to the wider community of physicians and caregivers around the state of North Carolina. Clinicians call a central toll-free number and ask to speak to a physician, usually in a particular specialty. The ID Attending/Fellow are paged immediately and connected to the outside caller. Questions range from simple questions about interpretation of susceptibility

reports to more complicated matters, such as the management of drug-resistant infections among inpatients at other facilities.

*Teaching by the Fellow:* While on the consult service, the fellow will direct the activities of the service and provide direct evaluations of patients. The fellow will be responsible for assisting in the supervision of other learners on the service (Medical students, residents, others) and will be the primary "point-person" for communicating with the service requesting the consultation.

*Evaluation:* For this rotation, there are both informal and formal assessment of the fellows' skills. Informal assessment consists of ongoing feedback from the attending on skills including collection of history of present illness, relevant past medical history, physical examination performance, collection and organization of relevant clinical data, creating a differential diagnosis list, formulating a diagnostic plan, formulating a treatment plan, and creating and implementing a follow-up care plan. The supervising attending communicates this feedback on a daily basis as part of management rounds. Attendings also review, edit, and sign all inpatient and outpatient consult notes of the ID Fellows. The attending communicates feedback at a mid-way point of the rotation to communicate strengths and areas for improvement. A formal assessment is made at the end of the block in all six competencies. These evaluations are reviewed quarterly with the PD and discussed with the fellows individually as well as real time with the faculty member doing the evaluations.

## **II. Goals of the Rotation**

- The fellows should
- a. Provide care to a broad spectrum of inpatients with infectious complications including bacterial, viral, fungal, and parasitic infections – as well as fevers of unknown origin
  - b. Develop diagnostic and therapeutic skills as related to the infectious complications of patients who have solid organ and bone marrow transplants, HIV/AIDS, neutropenia, and other immunocompromising conditions
  - c. Develop skill selecting and prescribing antimicrobial agents, with special emphasis on their pharmacologic characteristics and drug-drug interactions
  - d. Gain consultative skill through "first-call", evaluation of patients, documentation of findings communication, follow-up of patients, interacting with all other hospital staff and outside referring physicians
  - e. Develop skills in clinical and diagnostic microbiology through daily "plate rounds"
  - f. Develop administrative and management skills through supervision of house-staff and students
  - g. Establish skills in cost-effective patient management and antibiotic utilization
  - h. Establish skills in appropriate isolation procedures
  - i. Establish skills in interactions with professional colleagues in multiple specialties
  - j. Enhance personal knowledge about ID topics and develop teaching skills in the education of students, residents, and attendings about those topics through literature reviews

## **III. Core Competencies**

- a. *Patient Care* Fellows will:
  - a) Gather essential, accurate, comprehensive diagnostic information and carry out patient management plans

- b) Use an evidence-based decision-making process when selecting appropriate antimicrobial therapy including Infectious Diseases Society of America guidelines for anti-infectives
  - c) Use evidence-based guidelines when incorporating elements of prevention into management plans
  - d) Communicate promptly with consulting physicians and their teams and provide evidence-based and clearly outlined recommendations
  - e) Provide patient-focused care when working with all health care professionals, including those from other disciplines
  - f) Make informed decisions about diagnostic and therapeutic interventions based on patient information and preferences, up-to-date scientific evidence, and clinical judgment
- b. *Medical Knowledge* Fellows will:
- a) Demonstrate knowledge of established and evolving biomedical, clinical, epidemiological, and social-behavioral sciences, as well as the application of this knowledge to patient care.
  - b) Demonstrate the scientific method of problem solving and evidence-based decision making,
  - c) Be proficient in the prevention, diagnosis, and management of the following infectious disease areas:
    - (1) bacterial infections
    - (2) fungal infections
    - (3) viral infections, including HIV and hepatitis
    - (4) parasitic infections
    - (5) mycobacterial infections
  - d) Demonstrate the method infectious diseases clinicians take in their approach to the following groups of patients (diagnosis, prevention, management):
    - (1) The febrile hospitalized patient, including FUO
    - (2) Febrile patients with prominent cutaneous manifestations
    - (3) Sepsis syndromes, from SIRS to severe sepsis
    - (4) Skin and soft tissue infections, including cellulitis and necrotizing fasciitis
    - (5) Endocarditis (native and prosthetic valves) and other cardiovascular infections
    - (6) Diagnosis and treatment of CNS infections, including bacterial meningitis, the aseptic meningitis syndrome, and encephalitis
    - (7) Bone and joint infections including septic arthritis (native and prosthetic joints) and osteomyelitis
    - (8) Management of upper and lower respiratory infections including pleuropulmonary infections
    - (9) Diagnosis and treatment of gastrointestinal and intraabdominal infections
    - (10) Management of urinary tract infections
    - (11) Diagnosis and management of sexually transmitted infections in hospitalized patients, including patient counseling, contact tracing, and public health control measures
    - (12) Infections and other complications in patients with HIV/AIDS
    - (13) Infections related to trauma

- (14) infections in patients with impaired host defenses (neutropenic, HIV, underlying malignancies, solid organ and BM Transplant recipients) in contrast to normal hosts
- (15) infections in patients in intensive care units
- (16) infections in post-surgical patients
- (17) healthcare-associated infections
- (18) infections in travelers
- (19) infections of reproductive organs
- e) Demonstrate knowledge of:
  - (1) Appropriate use of isolation procedures and effective hospital infection control
  - (2) Management of Infectious Disease emergencies (e.g. sepsis)
  - (3) Management of vector-borne illnesses and zoonoses
  - (4) Identification, recognition, and initial management of disease entities which mimic infectious diseases, such as Behçet's disease, Sweet's syndrome, pyoderma gangrenosum, Still's disease, and pulmonary hypersensitivity syndromes
  - (5) Mechanisms of action and adverse reactions to antimicrobial agents; antimicrobial and antiviral resistance; drug-drug interactions between antimicrobial agents and other compounds; the appropriate use and management of antimicrobial agents in a variety of clinical settings (hospital wards, intensive care units, outpatient venues);
  - (6) Appropriate procedures for specimen collection relevant to infectious disease, including but not limited to bronchoscopy, thoracentesis, arthrocentesis, lumbar puncture, and aspiration of abscess cavities;
  - (7) principles of prophylaxis and immunoprophylaxis to enhance resistance to infection
  - (8) characteristics, use, and complications of antiretroviral agents, mechanisms and clinical significance of viral resistance to antiretroviral agents, and recognition and management of opportunistic infections in patients with HIV/AIDS;
  - (9) fundamentals of host defense and mechanisms of microbial pathogenesis
  - (10) Rational use of the clinical microbiology laboratory
  - (11) Immunization recommendations for hospitalized adults

c. *Practice-Based Learning and Improvement Fellows* will

- a.) demonstrate the ability to investigate and evaluate their care of patients, to appraise and assimilate scientific evidence, and to continuously improve patient care based on constant self-evaluation and life-long learning.
- b.) Systematically analyze practice, using quality improvement methods and implement changes with the goal of practice improvement
- c.) Incorporate formative evaluation feedback into daily practice
- d.) Locate, appraise, and assimilate evidence from scientific studies related to their patients' health problems and apply new information to the management and care of their patients
- e.) Use information technology to optimize learning including accessing databases of relevance to the care and management of individuals with infectious diseases and to support patient care decisions and patient education
- f.) Assess the clinical efficacy of current and novel antimicrobial therapies and their appropriate utilization in different patients and clinical settings

- g.) Learn about new immunosuppressive therapies (i.e., TNF alpha antagonists) and the risks for infection that they impart
- d. *Interpersonal and Communication Skills* Fellows will:
  - a.) Demonstrate interpersonal and communication skills that result in the effective exchange of information and collaboration with patients, their families, and health professionals.
  - b.) Communicate effectively with patients, families, and the public, as appropriate, across a broad range of socioeconomic and cultural backgrounds
  - c.) Communicate effectively with physicians, other health professionals, and health related agencies
  - d.) Work effectively as a member or leader of a health care team or other professional group
  - e.) Act in a consultative role to other physicians and health professionals
  - f.) Maintain comprehensive, timely, and clear medical records
  - g.) Inform patients about their diagnoses and outline a proposed treatment strategy
  - h.) Notify public health authorities about reportable diseases such as meningococcal meningitis
  - i.) Counsel patients effectively about the risks of injection drug use to themselves and others, as well as harm reduction strategies to minimize those risks
  - j.) Respond in a knowledgeable fashion when other health professionals request information about antimicrobial use and direct them to appropriate web sites to gather additional information as needed
  - f.) Participate in the education of patients, families, students, fellows and other health professionals
- e. *Professionalism* Fellows will:
  - a.) demonstrate a commitment to carrying out professional responsibilities and an adherence to ethical principles, including
    - (1) Compassion, integrity, and respect for others
    - (2) Responsiveness to patient needs that supersedes self-interest
    - (3) Respect for patient privacy and autonomy
    - (4) Accountability to patients, society, and the profession
    - (5) Sensitivity and responsiveness to a diverse patient population, including but not limited to diversity in gender, age, culture, race, religion, disabilities, and sexual orientation
    - (6) High standards of ethical behavior which includes maintaining appropriate professional boundaries, including relationships with other physicians and conflicts of interest
    - (7) Informing patients about stigmatizing diagnoses without being judgmental or pejorative
    - (8) Willingness to evaluate patients with illnesses such as tuberculosis or SARS that may pose some element of risk to the provider
- f. *Systems-Based Practice* Fellows will:
  - a. 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.
  - b.) Work effectively in various health care delivery settings and systems relevant to infectious diseases

- c.) Coordinate patient care within the health care system relevant to clinical management of infectious diseases
- d.) Incorporate considerations of cost awareness and risk-benefit analysis in patient and/or population-based care as appropriate
- e.) Advocate for quality patient care and optimal patient care systems
- f.) Work in interdisciplinary teams to enhance patient safety and improve patient care quality
- g.) Participate in identifying system errors and implementing potential systems solutions
- h.) Understand and participate in the development of appropriate antibiotic utilizations and restriction policies
- i.) Participate in the management of outpatient antibiotic therapy, including interaction with pharmacy, nursing, and other home care services
- j.) Know when to contact public health officials if patients have a reportable communicable disease such as tuberculosis
- k.) Know how to acquire medications from the CDC or other sources to treat infections for which there are no commercially available therapies

#### **IV. Teaching Methods**

- a. Individual interactions with attending
  - All fellows will be working one-on-one with an attending on the consult service and presenting patients with their assessment and plans to him or her, thus providing an opportunity for immediate feedback about clinical reasoning and knowledge base.
  - Opportunities for patient-centered teaching and bedside teaching will be pursued as available.
- b. Interactions with residents and students
  - Interactions with other learners in the context of case discussions will offer opportunities for "second-hand" learning.
  - Fellows incorporate educational information about the syndrome or organism into the assessment and plan component of each new consult note – and follow-up notes if new diagnostic results become available. The goal is for consulting teams to have a clear understanding of what ID's thought process is, and what the reasons are for pursuing the specified workup.
- c. Required reading
  - Fellows will be provided with a copy of Mandell's Textbook of Infectious Diseases and are encouraged to read relevant chapters over the course of the 2 years.
- d. Independent reading
  - It is expected that fellows will perform focused, independent reading from textbooks, the published literature, and IDSA Guidelines on topics and problems manifested by patients seen in consultation.
- e. Clinical conferences
  - Fellows will prepare interesting cases seen on the consult service and present them to the other fellows and faculty at Wednesday Case Conference. A focused literature review on some aspect of those cases will be provided as will teaching points. Through preparation of a presentation, learning issues will be further emphasized.

#### **V. Assessment Method (Fellows)**

- a. Electronic evaluations using the standard ABIM form adapted for infectious diseases will be automatically emailed via EValue to the attending with whom the fellow interacts for each rotation.
- b. Evaluations will be returned electronically and stored in the fellow's housestaff file for their reference and future review as deemed appropriate.
- c. In addition to completing the electronic evaluation form, attending physicians will provide verbal feedback on performance to the fellow at the end of each rotation.

#### **VI. Assessment Method (Program)**

- a. Annual (anonymous) evaluations completed by the fellows and attendings
- b. Performance of the fellows on the Infectious Diseases In Service Training Examination
- c. Performance of the fellows on the ABIM Infectious Diseases Board Examination

#### **VII. Level of Supervision**

- a. Fellows will be directly supervised on the consult service by one of the ID attendings who will evaluate ALL new consults after they have been seen by the fellow.
- b. All individual patient assessments and plans will be discussed personally with the attending who will modify plans as needed.

#### **VIII. Educational Resources**

- a. *Principles and Practice of Infectious Diseases* (Mandell, et al eds.)
- b. *PubMed*
- c. *Inf Dis Society of America Guidelines* [www.idsociety.org](http://www.idsociety.org)
- d. US Public Health Service Guidelines [www.cdc.gov](http://www.cdc.gov)
- e. HIV Treatment Guidelines [www.aidsinfo.nih.gov](http://www.aidsinfo.nih.gov)