

Guidelines  
for  
Competency Based Training Programme  
in  
**FNB- Infectious Diseases**



**NATIONAL BOARD OF EXAMINATIONS**

Medical Enclave, Ansari Nagar, New Delhi-110029, INDIA  
Email: [mail@natboard.edu.in](mailto:mail@natboard.edu.in) Phone: 011 45593000

# CONTENTS

- I. OBJECTIVES OF THE PROGRAMME
  - I. Programme goal
  - II. Programme objective
- II. ELIGIBILITY CRITERIA FOR ADMISSION
- III. TEACHING AND TRAINING ACTIVITIES
- IV. SYLLABUS
- V. COMPETENCIES
- VI. LOG BOOK
- VII. NBE LEAVE GUIDELINES
- VIII. EXAMINATION –
  - I. FORMATIVE ASSESSMENT
  - II. FINAL THEORY & PRACTICAL
- IX. RECOMMENDED TEXT BOOKS AND JOURNALS

## Programme Goals

1. The super specialty training programme in Infectious Disease (ID) is designed to enhance the knowledge in prevention, detection, diagnosis and treatment of common, complex and emerging infectious diseases. Several changes and advances have occurred that have a major impact on clinical practices such as : antimicrobial resistance, newer antibiotics, antiviral and antifungal therapies; antimicrobial stewardship, hospital epidemiology and infection control; zoonotic infections and parasitology; non tuberculosis mycobacteria , infections including opportunistic, in immuno compromised host, HIV/AIDS; ambulatory management of sexually transmitted diseases; vaccinations and globalization of health care with its implication on travel health and medical tourism.
2. The spectrum of emergencies in ID is changing. Early inpatient consultation sought by other broad and super specialties requires a comprehensive knowledge especially when managing the critically ill in the intensive care, Obstetric and Gynecological infection, neurosurgical burn units and infections in patients on immune modulatory therapy.
3. Furthermore, ID consultations are often sought in solid organ transplant, cardiac surgery and implant placement procedures, including maintenance of indwelling catheters prosthesis and cardiac valves.
4. Besides the common infectious diseases, there are challenging rare and emerging infectious diseases, such as Ebola, MERS, Influenza which have pandemic potential for which a specific training in preparedness to prevent and treat affected individuals is essential.
5. The availability and emergence of new diagnostic techniques, including molecular biology necessitate essential knowledge in microbial detection method. Antibiotic susceptibility testing requires an increase in knowledge of laboratory performance to improve patient outcome through relevant training and continuous professional development.
6. Specialists need to keep pace with biomedical investigation of diagnostic imaging which includes CT/MRI/PET Scan, Ultrasound, nuclear scanning etc.
7. Furthermore they should develop skills in formulating, conducting, analyzing and reporting clinical and laboratory research projects so as to enable the comprehensive application of current and future discoveries to patient care.
8. Besides cognitive knowledge, clinical decision making skills in antibiotic usage, selecting and utilizing the newer diagnostic tests that impact patient safety, quality of care reduced health care costs are needed.

## Specific Goals

### a. Patient Care

- Be capable of accurate, comprehensive patient evaluations, including history, physical examination and data review
- Ensure that clinical decisions are made on available evidence, sound judgment, and individual patient factors

Fellows will provide patient care that is competent, compassionate, appropriate and effective for the treatment of health problems and the promotion of health.

### b. Medical Knowledge

- Acquire an advanced understanding of host defense mechanisms and immune responses to infectious agents
- Acquire an advanced understanding of the etiology, pathogenesis, diagnosis and therapy of patients with infectious diseases
- Acquire an advanced understanding of infections in immunosuppressed hosts
- Acquire advanced expertise in anti-infective therapy including mechanism of action, resistance mechanisms, pharmacokinetics and pharmacodynamics

Fellows will demonstrate knowledge about established and evolving pathophysiological, biomedical, clinical, and cognate (e.g. epidemiological and social-behavioral) sciences and the application of this knowledge to patient care.

### c. Practice Based Learning and Improvement

- Develop skills in problem based learning and improvement
- Effectively utilize feedback to improve patient care and decision making
- Demonstrate progressive improvement in performance based on review of practice pattern
- Incorporate new practice information and recommendations to guide improvement of clinical care

Fellows must be able to investigate and evaluate their patient care practices, appraise and assimilate scientific evidence, and improve their patient care practices based on constant self-evaluation and lifelong learning.

### d. Intrapersonal and Communication Skills

- Demonstrate accurate and concise communication with patients, family, attending physicians, and hospital personnel
- Demonstrate prompt and appropriate communication with home care and clinic personnel for outpatient follow-up, including accurate documentation in the medical record
- Demonstrate the ability to work with the entire inpatient care team (attending physician, post-graduate physicians, medical students, hospital personnel, and home care coordinators)

Fellows must demonstrate interpersonal and communication skills that result in effective information exchange and comprehensive team work with patients, patients' families, and professional associates and trainees.

- e. Professionalism
  - Develop and maintain appropriate levels of ethical, moral, and professional behavior
  - Demonstrate appropriate respect and behavior to all patients and families

Fellows will demonstrate a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to adverse patient population and staff.

## **Programme Objectives**

The Training Programme in Infectious Diseases aims to produce practitioners who:

1. by appropriate use of history, clinical examination and investigation can perform the core assessments required as an Infectious Diseases specialist;
2. are able to establish a differential diagnosis of patients presenting with clinical features of infectious diseases;
3. are able to apply sufficient knowledge and skill in diagnosis and management to ensure safe independent practice in Infectious Diseases;
4. are able to apply knowledge of the appropriate basic sciences relevant to Infectious Diseases, obtain an understanding of microbiological techniques and their interpretation in Infectious Diseases and to understand the processes and constraints around the microbiological report in communications with the clinical microbiology laboratory;
5. can develop management plans for the "whole patient" and have a sound knowledge of appropriate treatments including health promotion, disease prevention and long term management;
6. fully appreciate and know how to use the multi-disciplinary team approach to the management of infection within the hospital and community, including a recognition and understanding of public health management;
7. have achieved a firm grasp of basic research methodology and are able to participate in and initiate research activity and can critically appraise evidence and undertake studies to participate in clinical or laboratory based research, formulate hypothesis for the selected research proposal, develop methods specific to the research plan, including assessment of the necessary laboratory tests, groups of animals, or number of patients using statistical methods;
8. can understand procedures for obtaining Institutional Review Board approval by human studies committee if applicable, become proficient in laboratory assays required in the research proposal needed in a clinical trial to determine for instance, efficacy of vaccination or treatment. In the case of laboratory research, this would include determination of groups of animals or in- vitro laboratory tests needed to explore the validity of a primary hypotheses, analyze the data including computer programs, statistical methods, and tabular and illustrative

- graphs, formulate the analyzed data into abstract or manuscript form for presentation and publication in a peer research journal;
9. understand ethical issues of human and animal research;
  10. acquire skills necessary to carry out the methods of procedure in an understandable format in writing in a format acceptable for grant applications;
  11. can be an effective teacher, to prepare and teach subspecialty residents (residents in infectious disease)
  12. are able to manage time and resources to the benefit of their patients and colleagues;
  13. exhibit appropriate attitudes and communication skills in dealing with colleagues and patients, and
  14. work effectively as a member of a team and display leadership skills

## **Specific objectives**

- To obtain clinical competence at a consultant's level in the assessment, investigation, control, diagnosis and management of community and hospital acquired infections of the prevention of the spread of infection in both community and health care settings.
- To obtain clinical competence at a consultant's level in the management of immune-compromised patients, including those with HIV/AIDS advanced understanding of the etiology, pathogenesis, diagnosis and therapy of patients with human immunodeficiency virus infections and associated opportunistic infections.
- The management of antibiotic use.
- Acquire an advanced understanding of host defense mechanisms and immune responses in relation to infectious diseases.
- Acquire an advanced understanding of the etiology, pathogenesis, diagnosis, and therapy of patients with the following infectious diseases problems:
  1. fever of unknown origin
  2. fever associated with skin rash
  3. eye infections
  4. upper respiratory tract infections
  5. lower respiratory tract infections
  6. urinary tract infections
  7. intra-abdominal infections
  8. infective endocarditic and intravascular infections
  9. central nervous system infections
  10. gastrointestinal infections
  11. bone and joint infections
  12. sexually transmitted diseases and diseases of the reproductive tract
  13. HIV/AIDS
  14. hepatitis
  15. skin and soft tissue infections
  16. sepsis and shock syndromes
  17. Common bacterial, viral, fungal and other infectious agents and their relationship to clinical infectious syndromes

18. Etiology, incidence and predisposing factors of nosocomial infections including the management and maintenance of indwelling vascular catheters
19. In special hosts (transplant recipients, neutropenic patients and HIV infected patients)
20. Anti-infective therapy including susceptibility testing, resistance mechanisms, pharmacodynamics and pharmacokinetics
21. Toxins and virulence factors of infectious agents
22. The principles and use of vaccines
23. The principles and methods of epidemiology in relationship to infectious diseases
24. Medical ethics in medical practice and research
25. The use of statistics in medical practice and research
26. Infectious agents that have potential use for bioterrorism
27. Training in system-based medical practice
28. Infections in geriatric patients
29. Infections in travelers, imported infection and in the provision of advice in relation to travel medicine.
30. Infections in parenteral drug abusers
31. Imported infections and institute control systems, including postoperative and intensive care related illness.
32. Diagnosis, investigation and management of chronic infections such as tuberculosis and viral hepatitis (B & C)

## **ELIGIBILITY CRITERIA FOR ADMISSIONS TO THE PROGRAMME**

### **FNB Infectious Diseases Course:**

1. Any medical graduate with ***DNB/MD (General Medicine)*** qualification, who has qualified the ***Entrance Examination*** conducted by NBE and fulfill the eligibility criteria for admission to FNB courses at various NBE accredited Medical Colleges/ institutions/Hospitals in India is eligible to participate in the Centralized counseling for allocation of FNB Infectious Diseases seats purely on merit cum choice basis.
2. Admission to 2 years FNB Infectious Diseases course is only through ***Entrance Examination*** conducted by NBE and Centralized Merit Based Counseling conducted by National Board of Examination as per prescribed guidelines.

### **Duration of Course: 2 Years**

Every candidate admitted to the training programme shall pursue a regular course of study (on whole time basis) in the concerned recognized institution under the guidance of recognized post graduate teacher for assigned period of the course.



## TEACHING AND TRAINING ACTIVITIES

The fundamental components of the teaching programme should include:

1. Case presentations & discussion- once a week
2. Seminar – Once a week
3. Journal club- Once a week
4. Grand round presentation (by rotation departments and subspecialties)- once a week
5. Faculty lecture teaching- once a month
6. Clinical Audit-Once a Month
7. A poster and have one oral presentation at least once during their training period in a recognized conference.

The rounds should include bedside sessions, file rounds & documentation of case history and examination, progress notes, round discussions, investigations and management plan) interesting and difficult case unit discussions.

The training program would focus on knowledge, skills and attitudes (behavior), all essential components of education. It is being divided into theoretical, clinical and practical in all aspects of the delivery of the rehabilitative care, including methodology of research and teaching.

**Theoretical:** The theoretical knowledge would be imparted to the candidates through discussions, journal clubs, symposia and seminars. The students are exposed to recent advances through discussions in journal clubs. These are considered necessary in view of an inadequate exposure to the subject in the undergraduate curriculum.

**Symposia:** Trainees would be required to present a minimum of 20 topics based on the curriculum in a period of two years to the combined class of teachers and students. A free discussion would be encouraged in these symposia. The topics of the symposia would be given to the trainees with the dates for presentation.

**Clinical:** The trainee would be attached to a faculty member to be able to pick up methods of history taking, examination, prescription writing and management in rehabilitation practice.

**Bedside:** The trainee would work up cases, learn management of cases by discussion with faculty of the department.

**Journal Clubs:** This would be a weekly academic exercise. A list of suggested Journals is given towards the end of this document. The candidate would summarize and discuss the scientific article critically. A faculty member will suggest the article and moderate the discussion, with participation by other faculty members and resident doctors. The contributions made by the article in furtherance of the scientific knowledge and limitations, if any, will be highlighted.

**Research:** The student would carry out the research project and write a thesis/ dissertation in accordance with NBE guidelines. He/ she would also be given exposure to partake in the research projects going on in the departments to learn their planning, methodology and execution so as to learn various aspects of research.

## 1. Teaching Methods

### A. Microbiology Laboratories

- a. Teaching on this rotation is primarily through case-based learning. The supervising physician will spend 13-15 hours/week in teaching above and beyond the time required merely for the provision of patient care. This may include formal lectures, bedside teaching or both. In addition, 3-5 hours/week will be spent on microbiology rounds, which is largely didactic regarding issues in diagnostic microbiology and systems-based practice issues.
- b. The ID Fellow will rotate through the various laboratory areas (e.g. blood culture, respiratory specimens, mycology, etc.) and will learn techniques taught by the laboratory technologists in each area. In addition, the ID Fellow will participate in daily microbiology rounds with the laboratory and the ID consult teams, which will also incorporate didactic sessions.
- c. Teaching methods include 1) observation of and participation in interventions developed by the hospital epidemiology and infection control teams, including attendance at infection control and antimicrobial committee meetings, 2) attendance at core curriculum conferences focused on infection control, hospital epidemiology, patient safety and quality including training regarding outbreak analysis.

### B. Outpatient Clinic:

- a. Teaching in the outpatient clinic is primarily through case based learning, including both didactic learning centered around the patient's case and through bedside teaching in the clinic exam room. On days where time allows, these methods may be supplemented with more structured lectures.

- History, Physical Exam
- Supervised practice experience
- Case presentations on rounds
- Direct observation
- Clinical Microbiology
- Daily laboratory review
- Clinical Infectious Diseases Conference
- One month rotation in clinical microbiology
- Clinical Infectious Diseases problems
- Textbook reading
- Small group case tutorials
- Topic review
- Discussions on attending rounds
- Web-based information
- Use of antimicrobials

- Lectures
- Anatomic pathology in Infectious Diseases
- Recent literature and Review of Literature
- Current Topics in Infectious Diseases
- Conference
- Clinical Case Conference

# SYLLABUS

## The Clinical Experience:

The clinical experiences afforded to ID fellow trainees include opportunities to observe and manage patients with a wide variety of infectious diseases on both an inpatient and an ambulatory basis. The program requires 24 months minimum of 20 months of supervised clinical rotations and 4 months for thesis/electives.

1. **Inpatient Rotations:** At the completion of the required months of clinical time, the Infectious Disease fellow will have provided consultative services for an average number of inpatients.

a. General ID Consult Service

- i. The ID Fellow will evaluate patients with acute and chronic infectious diseases across the entire spectrum of the specialty.
- ii. The ID Fellow will learn the diagnostic and therapeutic approach to these patients.
- iii. The ID Fellow will learn to communicate recommendations with other health care providers in both written and oral form.
- iv. The ID Fellow will learn to facilitate the provision of care within the health care system and will learn to recognize system problems and methods to improve health care delivery.

b. Clinical Microbiology Rotation

The training experience in clinical microbiology is a 1-month rotation that takes place in the clinical microbiology laboratory. The ID Fellows are expected to be available from Monday through Friday, 8am to 5pm with exceptions for clinic assignments. During this time, ID Fellows will participate in structured rotations at the different benches in the clinical microbiology laboratory including, primary plating, sub culturing, susceptibility testing, blood cultures, respiratory, urines, miscellaneous, anaerobes, mycology, mycobacteriology, parasitology, virology, and

molecular microbiology. They will learn from the medical technologists the basic principles and practices in clinical microbiology and the capabilities of the laboratory. ID Fellows are also expected to participate in daily microbiology laboratory rounds with the laboratory directors and residents and fellows. Current problems, unusual findings, instructive examples are the basis for discussion at laboratory rounds. Laboratory rounds also include a discussion of the integration of the microbiology laboratory into the health care system and the prevention of system errors. Fellows actively contribute to developing solutions and problem-solving in this area. In addition, Fellows should attend the weekly clinical pathology conference. This case-based conference integrates all areas of laboratory medicine.

1. The ID fellow will develop a better understanding of how the clinical microbiology laboratory operates and how to use it effectively to establish a specific etiological diagnosis, select the most effective antimicrobial therapy, and improve delivery of care within the health system.
2. The ID Fellow will develop a competency in interpreting Gram's stains as well as familiarity with interpretation of other special stains (e.g., KOH, AFB) from clinical specimens.
3. The ID Fellow will become familiar with the use of growth media employed in the evaluation of respiratory, urine, wound, genital and stool specimens
4. The ID Fellow will understand methods used to cultivate fungal and acid fast organisms. The ID Fellow will recognize the appearance of common organisms on culture plates (beta hemolytic streptococci, *Streptococcus pneumoniae*, *Haemophilus* species, *Staphylococcus aureus*, *E. coli*, swarming *Proteus* species, *Pseudomonas aeruginosa*).
5. The ID Fellow will become familiar with blood culture methodology.
6. The ID Fellow will become familiar with such automated equipment used in the clinical microbiology laboratory such as the Microscan or Vitek diagnostic systems and the MALDI-TOF.

7. The ID Fellow will understand methods used for Kirby-Bauer and Microdilution (MIC) susceptibility testing.
8. The ID Fellow will become familiar with parasitology and virology.
9. The ID Fellow will become familiar with flow cytometry studies (CD4 lymphocyte counts) and relevant immunology testing.
10. The ID Fellow will understand aspects and basic principles of molecular biology as they pertain to services offered by a clinical microbiology laboratory (i.e., molecular diagnostic tests).

c. Transplant ID

The patient mix should include patients status post solid organ transplantation, patients listed for consideration for solid organ transplantation, patients with leukemia or lymphoma undergoing chemotherapy, patients undergoing stem cell transplantation and patients with cystic fibrosis. Teaching will take place at attending rounds and will include a review of specified didactic topics. The Fellow is expected to attend all the required divisional conferences and to attend daily microbiology rounds as often as possible. All care is supervised by the attending physician assigned.

The ID Fellow will gain experience in the evaluation and management of the transplant recipient, neutropenic patient, and patients with cystic fibrosis. The Fellow will be made aware of new controversies in the diagnosis and management of opportunistic infections and how immunomodulating medications affect risk of individual infections.

- 1) The ID Fellow will learn to evaluate and manage patients pre- and post-transplant.
- 2) The Fellow will learn the appropriate diagnostic and therapeutic approaches to these patients.

- 3) The ID Fellow will gain an understanding of the organ procurement system in the United States
- 4) The ID Fellow will learn how to work within a broad, multidisciplinary team to facilitate patient care.
- 5) The ID fellow will gain an understanding of those issues unique to transplantation and transplant infectious disease, including, but not limited to:
  - a. Graft rejection
  - b. Graft vs. Host Disease
  - c. Immunosuppressive medications and toxicities
  - d. Diagnosis of Opportunistic Infections
    - i. CMV
    - ii. Invasive fungal disease
    - iii. Respiratory viruses
    - iv. EBV and PTLD
    - v. Other Herpesviruses
    - vi. Polyoma virus
    - vii. Bacterial infections common to the transplant recipient
    - viii. Other Opportunistic infections
  - e. Treatment of Opportunistic Infections as mentioned in i - viii
  - f. Prevention and prophylaxis of Opportunistic Infections



g. Pre-transplantation evaluation

- 6) The ID Fellow will be able to formulate a comprehensive approach to the evaluation of pre-transplant patients, including obtaining a complete and accurate medical history with appropriate details about infectious disease exposures and other screening considerations.

d. HIV Care

The ID Fellow will take care of patients with HIV and admitted for complications related to HIV infection or HIV medications, opportunistic infections or any other acute medical issues. ID Fellows play a significant teaching role on this service. Infection Control

1. All Infectious Disease Fellows will participate in a longitudinal experience designed to introduce the Fellows to the concepts of infection control and prevention and develop the ability to analyze infection outbreaks and design interventions. Fellows are expected to attend infection control and antimicrobial stewardship committee meetings, attend didactic sessions on basic principles of infection control and prevention, participate in an infection control workshop similar to the SHEA course or its equivalent. The ID Fellow will learn the principles of hospital epidemiology and infection control and will be able to apply them appropriately to patients under their care.
2. The ID Fellow will understand antimicrobial stewardship, approaches to changing practice and the consequences of ineffective stewardship.
3. The ID Fellow will understand the roles and responsibilities of the infection control team and the role of the hospital epidemiologist in the management of the effort.
4. The ID Fellow will learn to evaluate and manage patients with latent TB infection or proven or probable active TB infection.
5. The ID Fellow will learn the appropriate diagnostic and therapeutic approaches to these patients.
6. The ID Fellow will learn about public health resources and public health considerations for the tuberculosis-infected patient.

7. The ID Fellow will understand the approach to antimicrobial therapy and the pharmacologic properties of antimicrobial treatment, especially among agents that are commonly used to treat patients with HIV-related opportunistic infections.
8. The ID Fellow will understand the mechanisms of and the approach to antiretroviral therapy, including indications, side effects, resistance and drug interactions
9. The ID Fellow will develop an increased understanding of the pathophysiology of HIV infection and AIDS.
10. The ID Fellow will learn appropriate diagnostic possibilities, laboratory testing, and treatment of infectious diseases among HIV infected inpatients.
11. The ID Fellow will understand the pathophysiology of common opportunistic infections affecting those infected with HIV.

### **Outpatient Clinic**

The ID fellow will be expected to see patients in the outpatient, to manage acute and chronic diseases related to the field of infectious diseases

### **Technical and other skills**

The ID training program provides practical experience or instruction in the cognitive aspects of the following:

- a. Mechanisms of action and adverse reactions of antimicrobial agents; the conduct of pharmacologic studies to determine absorption and excretion of antimicrobial agents; methods of determining antimicrobial activity of a drug; techniques to determine concentration of antimicrobial agents in the blood and other body fluids; the appropriate use and management of antimicrobial agents in a variety of clinical settings, including the hospital, ambulatory practice, and the home.
- b. The utility of procedures for specimen collection relevant to Infectious disease, including but not limited to bronchoscopy, thoracentesis,

arthrocentesis, lumbar puncture, and aspiration of abscess cavities, including soft-tissue infections. The utility of diagnostics tests including traditional microbiologic tests as well as molecular diagnostic tests.

- c. Principles and practice of hospital infection control and healthcare epidemiology [through lectures in the didactic, attendance at hospital infection control meetings and/or the Society for Hospital Epidemiology of America (SHEA Conference)] or Hospital Infectious Control Society or its equivalent.
- d. Principles of chemoprophylaxis and immunoprophylaxis to enhance resistance.
- e. Mechanisms of action of biological products, including monoclonal antibodies, cytokines, interferons, interleukins, and colony-stimulating factors, and their applications in the treatments of infectious diseases or their role in enhancing the immune response.
- f. Interpretation of Gram's stains, other special stains, blood culture methodology, methods of determining susceptibility testing, and basic principles of molecular biology as it relates to services offered by the clinical microbiology laboratory.

### **Additional Formal Instruction**

Additional specific content areas that are included in the formal training program (through the didactic course, clinical and research conferences, and seminars) include:

- a. the factors that determine the outcome between host and parasite, including microbial virulence factors and host defense mechanisms.
- b. basic concepts of immunology.
- c. the epidemiology, clinical course, manifestations, diagnosis, treatment, and prevention of major infectious agents including viruses, chlamydiae, mycoplasma and ureaplasma, rickettsioses, and bacteria including spirochetes and mycobacteria, mycoses, protozoa, and helminths.

- d. bioterrorism and emerging infectious diseases
- e. health outcomes, quality assurance and improvement and cost containment in the clinical practice of infectious diseases.
- f. critical assessment of the medical literature, medical informatics, clinical epidemiology and biostatistics and research methodology
- g. hospital epidemiology and infection control.

Fellows will have the following responsibilities:

- Provision of inpatient consultations for suspected Infectious Diseases in the various medical and surgical disciplines, including some pediatric and geriatric experience,
- Provision of ambulatory Infectious Diseases care and consultation, to include a one half-day per week infectious diseases continuity and consultative clinic, with a panel of HIV-1 infected continuity care patients. There will also be ambulatory experience with a sexually transmissible disease clinic and a travel clinic. New patients for the continuity clinic are not pre-selected by disease type, but consist of a mix of HIV-1 infected continuity patients, home health care patients, patients with sexually transmitted diseases, and patients with general infectious diseases problems. Fellows are assigned new patients and expected to follow these patients during the entire training period. Additionally, fellows will follow patients whom they have seen as inpatients while on the Infectious Diseases consult service. Examples of patients for ambulatory clinic may include but are not limited to patients with osteomyelitis, septic arthritis, infective endocarditis and post surgical infections, among others. The program will assure that there is a gender balance among these patients.
- Rotation in the Microbiology laboratory, inclusion on the Infection Control Committee and involvement in the ongoing program of antibiotic stewardship. The detail of these responsibilities will follow.
- Attendance and participation by each fellow in the weekly clinical case conference and the weekly core curriculum didactic conference, the monthly research conference and journal club. In addition, attendance at the weekly Internal Medicine Grand Rounds is recommended.

- Proficiency at procedures commonly utilized as part of the evaluation of patients with Infectious Diseases problems.
- Occasionally trainees may do lumbar punctures, skin biopsies, or aspiration of abscesses; in these procedures, the trainee should be competent.
- Trainees are expected to review Gram stains, histopathology of biopsy specimens, cytology, and pertinent radiographs of the patients whom they are managing or for whom they are providing consultation. Fellows are expected to follow the department's procedure protocols in performing these procedures (see attached protocols).
- Availability for call from home, with a faculty member serving as a back up. Fellow trainees and faculty are expected to respond to calls/messages within 15 minutes, unless exceptional circumstances prevail. All trainees have at least one day in seven (on average) free from clinical duties and without pager call.
- Participation in research is expected for each trainee. The Infectious Disease Section expects preparation of at least one manuscript suitable for publication or submission of at least one abstract to a regional, national, or international meeting prior to completion of the two-year training period.
- Effective communication regarding patient care between faculty and fellows is essential. When complex decisions are addressed, fellows are required to contact faculty in person or by phone. Faculty supervision occurs continuously. At least during the initial half of the first year of training, fellows must review all changes in therapy or recommendations for invasive procedures with the faculty attending prior to making the recommendation to another physician. By the second year of fellowship, assuming that the trainee has made satisfactory progress, fellows are given graduated levels of responsibility enabling them to make recommendations if he/she is comfortable and confident in the recommendation.
- Despite this graduated responsibility, fellow recommendations must be reviewed with the supervising faculty member within 24-hours. Trainees are encouraged to contact the attending physician at any time, day or night. This type of supervision applies to inpatient and outpatient care, home health care management, phone calls from outside physicians or family members. Direct or indirect supervision by a faculty member is expected for all procedures.

**Structure:**

First year:

10-11 months-clinical postings with ID consultants

1-2 months- Microbiology lab rotation

1 month- identification of research protocol

Second year:

6 months-clinical postings with ID consultants

1 month- rotation through a government public health or communicable disease hospital

2 months- elective rotations including transplant and tropical infectious disease, and infection control course

2 month- Microbiology lab rotation with emphasis on a specialized area pertinent to research protocol

1 month- research protocol completion

Basic Principles in the Diagnosis and Management of Infectious Diseases

**1. MICROBIAL PATHOGENESIS**

1. A Molecular Perspective of Microbial Pathogenicity
2. Microbial Adherence
3. Toxins

**2. HOST DEFENSE MECHANISMS**

1. Innate (General or Nonspecific) Host Defense Mechanisms
2. Human Genetics and Infection
3. Antibodies
4. Complement
5. Granulocytic Phagocytes
6. Cell-Mediated Defense against Infection
7. Nutrition, Immunity, and Infection
8. Prebiotics, Probiotics, and Synbiotics
9. Evaluation of the Patient with Suspected Immunodeficiency

### **3. EPIDEMIOLOGY OF INFECTIOUS DISEASES**

1. Epidemiologic Principles
2. Outbreak Investigation
3. Emerging and Reemerging Infectious Disease Threats
4. Hospital Preparedness for Emerging and Highly Contagious Infectious Diseases: Getting Ready for the Next Epidemic or Pandemic

### **4. CLINICAL MICROBIOLOGY**

1. The Clinician and Microbiology

### **5. ANTI-INFECTIVE THERAPY**

1. Principles of Anti-infective Therapy
2. Molecular Mechanisms of Antibiotic Resistance in Bacteria
3. Pharmacokinetics and Pharmacodynamics of Anti-infective Agents
4. Penicillin and  $\beta$ -Lactam Inhibitors
5. Cephalosporins
6. Carbapenems and Monobactams
7.  $\beta$ -Lactam
8. Fusidic Acid
9. Aminoglycosides
10. Tetracyclines and Chloramphenicol
11. Rifamycins
12. Metronidazole
13. Macrolides, Clindamycin, and Ketolides
14. Glycopeptides (Vancomycin and Teicoplanin), Streptogramins (Quinupristin-Dalfopristin), and Lipopeptides (Daptomycin)
15. Polymyxins (Polymyxin B and Colistin)
16. Linezolid and Other Oxazolidinones
17. Sulfonamides and Trimethoprim
18. Quinolones
19. Novel Antibiotics
20. Urinary Tract Agents: Nitrofurantoin and Methenamine
21. Topical Antibacterials
22. Antimycobacterial Agents
23. Systemic Antifungal Agents
24. Antiviral Drugs (Other Than Antiretrovirals)
25. Immunomodulators
26. Hyperbaric Oxygen
27. Agents Active against Parasites and Pneumocystis
28. Alternative Medicines for Infectious Diseases
29. Antimicrobial Stewardship
30. Interpreting the Results of Clinical Trials of Antimicrobial Agents
31. Outpatient Parenteral Antimicrobial Therapy
32. Tables of Antimicrobial Agent Pharmacology
33. Major Clinical syndromes

## **6. FEVER**

1. Temperature Regulation and the Pathogenesis of Fever
2. Fever of Unknown Origin
3. The Acutely Ill Patient with Fever and Rash

## **7. UPPER RESPIRATORY TRACT INFECTIONS**

1. The Common Cold
2. Pharyngitis
3. Acute Laryngitis
4. Acute Laryngotracheobronchitis (Croup)
5. Otitis Externa, Otitis Media, and Mastoiditis
6. Sinusitis
7. Epiglottitis
8. Infections of the Oral Cavity, Neck, and Head

## **8. PLEUROPULMONARY AND BRONCHIAL INFECTIONS**

1. Acute Bronchitis
2. Chronic Obstructive Pulmonary Disease and Acute Exacerbations
3. Bronchiolitis
4. Acute Pneumonia
5. Pleural Effusion and Empyema
6. Bacterial Lung Abscess
7. Chronic Pneumonia
8. Cystic Fibrosis

## **9. URINARY TRACT INFECTIONS**

1. Urinary Tract Infections

## **10. SEPSIS**

1. Sepsis, Severe Sepsis, and Septic Shock

## **11. INTRA-ABDOMINAL INFECTION**

1. Peritonitis and Intra-abdominal Abscesses
2. Infections of the Liver and Biliary System
3. Pancreatic Infection
4. Splenic Abscess
5. Appendicitis
6. Diverticulitis and Typhlitis



## **12. CARDIOVASCULAR INFECTIONS**

1. Endocarditis and Intravascular Infections
2. Prosthetic Valve Endocarditis
3. Infections of Nonvalvular Cardiovascular Devices
4. Prevention of Infective Endocarditis
5. Myocarditis and Pericarditis
6. Mediastinitis

## **13. CENTRAL NERVOUS SYSTEM INFECTIONS**

1. Approach to the Patient with Central Nervous System Infection
2. System Infection
3. Acute Meningitis
4. Cerebrospinal Fluid Shunt Infections
5. Chronic Meningitis
6. Encephalitis
7. Brain Abscess
8. Subdural Empyema, Epidural Abscess, and
9. Suppurative Intracranial thrombophlebitis

## **14. SKIN AND SOFT TISSUE INFECTIONS**

1. Cellulitis, Necrotizing Fasciitis, and Subcutaneous Tissue Infections
2. Myositis and Myonecrosis
3. Lymphadenitis and Lymphangitis

## **15. GASTROINTESTINAL INFECTIONS AND FOOD POISONING**

1. Principles and Syndromes of Enteric Infection
2. Esophagitis
3. Nausea, Vomiting, and Noninflammatory Diarrhea
4. Antibiotic-Associated Colitis
5. Inflammatory Enteritides
6. Enteric Fever and Other Causes of Abdominal Symptoms with Fever
7. Foodborne Disease
8. Tropical Sprue: Enteropathy
9. Whipple's Disease

## **16. BONE AND JOINT INFECTIONS**

1. Infectious Arthritis of Native Joints
2. Osteomyelitis
3. Infections with Prostheses in Bones and Joints

## **17. DISEASES OF THE REPRODUCTIVE ORGANS AND SEXUALLY TRANSMITTED DISEASES**

1. Genital Skin and Mucous Membrane Lesions
2. Urethritis
3. Vulvovaginitis and Cervicitis
4. Infections of the Female Pelvis
5. Prostatitis, Epididymitis, and Orchitis

## **18. EYE INFECTIONS**

1. Microbial Conjunctivitis
2. Microbial Keratitis
3. Endophthalmitis
4. Infectious Causes of Uveitis
5. Periocular Infections

## **19. HEPATITIS**

1. Acute Viral Hepatitis
2. Chronic Viral Hepatitis

## **20. ACQUIRED IMMUNODEFICIENCY SYNDROME**

1. Global Perspectives on Human Immunodeficiency Virus Infection and Acquired Immunodeficiency Syndrome
2. Epidemiology and Prevention of Acquired Immunodeficiency Syndrome and Human
3. Immunodeficiency Virus Infection
4. Diagnosis of Human Immunodeficiency Virus Infection
5. The Immunology of Human Immunodeficiency Virus Infection
6. General Clinical Manifestations of Human Immunodeficiency Virus Infection (Including the Acute Retroviral Syndrome and Oral, Cutaneous, Renal, Ocular, metabolic, and Cardiac Diseases)
7. Pulmonary Manifestations of Human Immunodeficiency Virus Infection
8. Gastrointestinal and Hepatobiliary Manifestations of Human Immunodeficiency Virus Infection
9. Neurologic Diseases Caused by Human Immunodeficiency Virus Type 1 and Opportunistic Infections
10. Malignant Diseases in Human Immunodeficiency Virus Infection
11. Human Immunodeficiency Virus Infection in Women
12. Pediatric Human Immunodeficiency Virus infection
13. Antiretroviral Therapy for Human Immunodeficiency Virus Infection

14. Management of Opportunistic Infections Associated with Human Immunodeficiency Virus Infection
15. Vaccines for Human Immunodeficiency Virus-1 Infection

## **21. MISCELLANEOUS SYNDROMES**

1. Chronic Fatigue Syndrome
2. Infectious Diseases and their Etiologic agents

## **22. VIRAL DISEASES**

1. Introduction to Viruses and Viral Diseases
2. Orthopoxviruses: Vaccinia (Smallpox Vaccine), Variola (Smallpox), Monkeypox, and Cowpox
3. Other Poxviruses That Infect Humans: Parapoxviruses, Molluscum Contagiosum, and Yatapoxviruses
4. Introduction to Herpesviridae
5. Varicella-Zoster Virus
6. Cytomegalovirus
7. Epstein-Barr Virus (Infectious Mononucleosis, Epstein-Barr Virus–Associated Malignant Diseases, and Other Diseases)
8. Human Herpesvirus Types 6 and 7
9. Kaposi's Sarcoma–Associated Herpesvirus (Human Herpesvirus Type 8)
10. Herpes B Virus
11. Adenoviruses
12. Papillomaviruses
13. JC, BK, and Other Polyomaviruses: Progressive Multifocal Leukoencephalopathy
14. Hepatitis B Virus and Hepatitis Delta Virus
15. Human Parvoviruses, Including Parvovirus B19 and Human Bocavirus
16. Orthoreoviruses and Orbiviruses
17. Coltiviruses and Seadornaviruses
18. Rotaviruses
19. Alphaviruses
20. Rubella Virus (German Measles)
21. Flaviviruses (Yellow Fever, Dengue, Dengue Hemorrhagic Fever, Japanese Encephalitis, West Nile Encephalitis, St. Louis Encephalitis, Tick-Borne Encephalitis)
22. Hepatitis C
23. Coronaviruses, Including Severe Acute Respiratory Syndrome (SARS)–Associated Coronavirus
24. Parainfluenza Viruses
25. Mumps Virus
26. Respiratory Syncytial Virus
27. Human Metapneumovirus
28. Measles Virus (Rubeola)
29. Zoonotic Paramyxoviruses: Nipah, Hendra, and Menangle Viruses
30. Vesicular Stomatitis Virus and Related Vesiculoviruses
31. Rhabdoviruses
32. Marburg and Ebola Virus Hemorrhagic Fevers

33. Influenza Viruses, Including Avian Influenza and Swine Influenza
34. California Encephalitis, Hantavirus Pulmonary Syndrome, and Bunyavirid Hemorrhagic Fevers
35. Lymphocytic Choriomeningitis Virus, Lassa Virus, and the South American Hemorrhagic Fevers
36. Human T-Cell Lymphotropic Virus Types I and II
37. Human Immunodeficiency Viruses
38. Introduction to the Enteroviruses and Parechoviruses
39. Poliovirus
40. Coxsackieviruses, Echoviruses, Newer Enteroviruses, and Parechoviruses
41. Hepatitis A Virus
42. Rhinovirus
43. Noroviruses and Other Caliciviruses
44. Astroviruses and
45. Hepatitis E Virus

### **23. PRION DISEASES**

1. Prions and Prion Diseases of the Central Nervous System (Transmissible Neurodegenerative Diseases)

### **24. CHLAMYDIAL DISEASES**

1. Introduction to Chlamydia and Chlamydophila
2. Chlamydia trachomatis (Trachoma, Perinatal Infections, Lymphogranuloma Venereum, and Other Genital Infections)
3. Chlamydophila (Chlamydia) psittaci (Psittacosis)
4. Chlamydophila (Chlamydia) pneumoniae

### **25. MYCOPLASMA DISEASES**

1. Introduction to Mycoplasma and Ureaplasma
2. Mycoplasma pneumoniae and Atypical Pneumonia
3. Genital Mycoplasmas: Mycoplasma genitalium, Mycoplasma hominis, and Ureaplasma Species

### **26. RICKETTSIOSES, EHRLICHIOSES, AND ANAPLASMOSIS**

1. Introduction to Rickettsioses, Ehrlichioses, and Anaplasmosis
2. Rickettsia rickettsii and Other Spotted Fever Group Rickettsiae (Rocky Mountain Spotted Fever and Other Spotted Fevers)
3. Rickettsia akari (Rickettsialpox)
4. Coxiella burnetii (Q Fever)
5. Rickettsia prowazekii (Epidemic or Louse-Borne Typhus)
6. Rickettsia typhi (Murine Typhus)
7. Orientia tsutsugamushi (Scrub Typhus)

8. *Ehrlichia chaffeensis* (Human Monocytotropic Ehrlichiosis), *Anaplasma phagocytophilum* (Human Granulocytotropic Anaplasmosis), and Other Anaplasmataceae

## 27. BACTERIAL DISEASES

1. Introduction to Bacteria and Bacterial Diseases
2. *Staphylococcus aureus* (Including Staphylococcal Toxic Shock)
3. *Staphylococcus epidermidis* and Other Coagulase-Negative Staphylococci
4. Classification of Streptococci
5. *Streptococcus pyogenes*
6. Nonsuppurative Poststreptococcal Sequelae: Rheumatic Fever and Glomerulonephritis
7. *Streptococcus pneumoniae*
8. Enterococcus Species, *Streptococcus bovis* Group, and *Leuconostoc* Species
9. *Streptococcus agalactiae* (Group B Streptococcus)
10. Viridans Streptococci, Groups C and G Streptococci, and *Gemella* Species
11. *Streptococcus anginosus* Group
12. *Corynebacterium diphtheriae*
13. *Listeria monocytogenes*
14. *Bacillus anthracis* (Anthrax)
15. *Bacillus* Species and Related Genera Other than *Bacillus anthracis*
16. *Erysipelothrix rhusiopathiae*
17. *Neisseria meningitidis*
18. *Neisseria gonorrhoeae*
19. *Moraxella catarrhalis*, *Kingella*, and Other Gram-Negative Cocci
20. *Vibrio cholerae*
21. Other Pathogenic Vibrios
22. *Campylobacter jejuni* and Related Species
23. *Helicobacter pylori* and Other Gastric *Helicobacter* Species
24. Enterobacteriaceae
25. *Pseudomonas aeruginosa*
26. *Stenotrophomonas maltophilia* and *Burkholderia cepacia* Complex
27. *Burkholderia pseudomallei* and *Burkholderia mallei*: Melioidosis and Glanders
28. *Acinetobacter* Species
29. *Salmonella* Species, Including *Salmonella* Typhi
30. *Shigella* Species (Bacillary Dysentery)
31. *Haemophilus* Species (Including *H. influenzae* and Chancroid)
32. *Brucella* Species
33. *Francisella tularensis* (Tularemia)
34. *Pasteurella* Species
35. *Yersinia* Species, Including Plague
36. *Bordetella pertussis*
37. Rat-Bite Fever: *Streptobacillus moniliformis* and *Spirillum minus*
38. *Legionella*
39. Other *Legionella* Species
40. *Capnocytophaga*
41. *Bartonella*, Including Cat-Scratch Disease

42. *Klebsiella granulomatis* (Donovanosis, Granuloma Inguinale)
43. Other Gram-Negative and Gram-Variable Bacilli
44. *Treponema pallidum* (Syphilis)
45. Endemic Treponematoses
46. *Leptospira* Species (Leptospirosis)
47. *Borrelia* Species (Relapsing Fever)
48. *Borrelia burgdorferi* (Lyme Disease, Lyme Borreliosis)
49. Anaerobic Infections: General Concepts
50. *Clostridium tetani* (Tetanus)
51. *Clostridium botulinum* (Botulism)
52. Gas Gangrene and Other *Clostridium*-Associated Diseases
53. *Bacteroides*, *Prevotella*, *Porphyromonas*, and *Fusobacterium* Species (and Other Medically Important Anaerobic Gram-Negative Bacilli)
54. Anaerobic Cocci
55. Anaerobic Gram-Positive Nonsporulating Bacilli
56. *Mycobacterium tuberculosis*
57. *Mycobacterium leprae*
58. *Mycobacterium avium* Complex
59. Infections Due to Nontuberculous *Mycobacteria* Other than *Mycobacterium avium-intracellulare*
60. *Nocardia* Species
61. Agents of Actinomycosis

## 28. MYCOSES

1. Introduction to Mycoses
2. *Candida* Species
3. *Aspergillus* Species
4. Agents of Mucormycosis and Entomophthoromycosis
5. *Sporothrix schenckii*
6. Agents of Chromoblastomycosis
7. Agents of Mycetoma
8. *Cryptococcus neoformans*
9. *Histoplasma capsulatum*
10. *Blastomyces dermatitidis*
11. *Coccidioides* Species Dermatophytosis and Other Superficial Mycoses
12. *Paracoccidioides brasiliensis*
13. Uncommon Fungi and Prototheca
14. *Pneumocystis* Species
15. Microsporidiosis

## 29. PROTOZOAL DISEASES

1. Introduction to Protozoal
2. *Entamoeba* Species, Including Amebiasis
3. Free-Living Amebas
4. *Plasmodium* Species (Malaria)

5. Leishmania Species: Visceral (Kala-Azar), Cutaneous, and Mucosal Leishmaniasis
6. Trypanosoma Species (American Trypanosomiasis, Chagas' Disease): Biology of Trypanosomes
7. Agents of African Trypanosomiasis (Sleeping Sickness)
8. Toxoplasma gondii
9. Giardia lamblia
10. Trichomonas vaginalis
11. Babesia Species
12. Cryptosporidium Species
13. Cyclospora cayetanensis, Isospora belli, Sarcocystis Species, Balantidium coli, and Blastocystis hominis

### **30. DISEASES DUE TO TOXIC ALGAE**

1. Human Illnesses Associated with Harmful Algal Blooms

### **31. DISEASES DUE TO HELMINTHS**

1. Introduction to Helminth Infections
2. Intestinal Nematodes (Roundworms)
3. Tissue Nematodes, Including Trichinellosis, Dracunculiasis, and the Filariases
4. Trematodes (Schistosomes and Other Flukes)
5. Cestodes (Tapeworms)
6. Visceral Larva Migrans and Other Unusual Helminth Infections

### **32. ECTOPARASITIC DISEASES**

1. Introduction to Ectoparasitic Diseases
2. Lice (Pediculosis)
3. Scabies
4. Myiasis and Tungiasis
5. Mites, Including Chiggers
6. Ticks, Including Tick Paralysis

### **33. DISEASES OF UNKNOWN ETIOLOGY**

1. Kawasaki Syndrome
2. Special problems

### **34. NOSOCOMIAL INFECTIONS**

1. Organization for Infection Control
2. Isolation
3. Disinfection, Sterilization, and Control of Hospital Waste
4. Infections Caused by Percutaneous Intravascular Devices

5. Nosocomial Pneumonia
6. Nosocomial Urinary Tract Infections
7. Nosocomial Hepatitis and Other Transfusion- and Transplantation-Transmitted Infections
8. Human Immunodeficiency Virus in Health Care Settings
9. Nosocomial Herpesvirus Infections

### **35. INFECTIONS IN SPECIAL HOSTS**

1. Infections in the Immunocompromised Host: General Principles
2. Prophylaxis and Empirical Therapy of Infection in Cancer Patients
3. Risk Factors and Approaches to Infections in Transplant Recipients
4. Infections in Recipients of Hematopoietic Cell Transplantation
5. Infections in Solid Organ Transplant Recipients
6. Infections in Patients with Spinal Cord Injury
7. Infections in the Elderly
8. Infections in Asplenic Patients
9. Infections in Injection Drug Users

### **36. SURGICAL AND TRAUMA-RELATED INFECTIONS**

1. Surgical Site Infections and Antimicrobial Prophylaxis
2. Burns
3. Bites

### **37. IMMUNIZATION**

1. Immunization

### **38. BIODEFENSE**

1. Bioterrorism: An Overview
2. Plague as a Bioterrorism Weapon
3. *Francisella tularensis* (Tularemia) as an Agent of Bioterrorism
4. Smallpox as an Agent of Bioterrorism
5. Anthrax as an Agent of Bioterrorism
6. Botulinum Toxin as a Biological Weapon
7. Viral Hemorrhagic Fevers as Agents of Bioterrorism

### **39. ZOOSES**

1. Zoonoses



## 40. PROTECTION OF TRAVELERS

1. Protection of Travelers
2. Infections in Returning Travelers

## 41. Antimicrobials:

1. Beta lactams
2. Carbapenems
3. Other antibacterial agents
4. Antifungal agents
5. Antiviral agents
6. Antiparasitic agents (protozoa, metazoa)
7. Microbiologic techniques (blood cultures, etc.)
8. Components of human immunity to microbes
9. Fever, thermoregulation, FUO
10. Staphylococcus sp., infections related thereto
11. Streptococcus sp., infections related thereto
12. Other Gram positive organisms, infections
13. Gram negative organisms; anaerobic organisms and their infections
14. Miscellaneous bacteria (Legionella sp., Actinomycetales)
15. Mycobacteria sp.
16. Fungal infections (systemic, cutaneous; normal and compromised hosts)
17. Viral infections
18. RNA
19. DNA
20. Chronic Fatigue Syndrome/p>
21. HIV-1 infection, pathogenesis, complications
22. Prion diseases
23. Mycoplasma, Chlamydial infections
24. Rickettsioses
25. Spirochetal infections (syphilis, Lyme disease, etc.)
26. Protozoa
27. Metazoa
28. Health Care-associated Infections
29. Infections in compromised hosts (transplant, neutropenia)
30. Travel Medicine; bioterrorism
31. STDs - ulcerative, vaginitis
32. Prostatitis, epididymitis, orchitis
33. Systemic Inflammatory Response Syndrome (SIRS) due to infection (sepsis)
34. Infective endocarditis and intra-vascular infections
35. Ophthalmologic, ENT infections and URIs
36. Bronchitis, community-acquired pneumonias (CAP), and pleural infections
  
37. Hepatitis (A to G)
38. Abdominal infections (biliary, abscesses, peritonitis)
39. Diarrhea, food poisoning, C difficile infection, Whipple's Disease
40. Urinary tract infections (upper and lower tract)
41. Encephalitis, meningitis, brain abscess, CSF shunt infections
42. Cellulitis, soft tissue infections
43. Osteomyelitis, septic arthritis
44. OB/GYN infections

45. Pediatric infections
46. Immunizations
47. Antibiotic prophylaxis

**42. Other areas in which knowledge is to be acquired:**

1. Biostatistics, Research Methodology and Clinical Epidemiology
2. Ethics
3. Medico legal aspects relevant to the discipline
4. Health Policy issues as may be applicable to the discipline

## Competencies

Fellows are expected to gain a broad experience in the evaluation and management of hospitalized adult patients with a comprehensive array of acute and chronic infectious diseases problems. This rotation will enhance the ability of the trainee to develop competency in the compassionate care of patients with a wide variety of infectious diseases related problems including patients with complex medical problems being managed at a tertiary care referral center.

Fellows are expected to develop an increased understanding of the pathophysiology of common infectious diseases in hospitalized adult patients and the epidemiology and evolution of infectious diseases. The ID Fellow is expected to learn how known and evolving data influences and informs clinical practice.

The ID fellow is expected to demonstrate

1. compassion, integrity and respect for others, respect for patient privacy and autonomy and sensitivity and responsiveness to a diverse patient population, including but not limited to diversity in age, gender, culture, race, religion, disabilities and sexual orientation.
2. communicate effectively with patients and families across a broad range of socioeconomic and cultural backgrounds,
3. communicate effectively with physicians, other health professionals and health related agencies,
4. act in a consultative role to other physicians and health professionals, and maintain comprehensive, timely and legible medical records.
5. work effectively in the health care delivery setting and system,
6. coordinate patient care within the health care system,
7. participate in identifying systems errors and in implementing potential system solutions.
8. locate, appraise and assimilate evidence for scientific studies related to their
9. patients' health problems,
10. use information technology to optimize learning and participate in the education of patients, families, students, residents and other health professionals
11. expected to learn the basic laboratory diagnostic techniques and enhance his/her knowledge of clinical microbiology.
12. will participate in identifying systems errors and in implementing potential systems solutions.
13. will identify strengths, deficiencies and limits in one's knowledge and expertise and will identify and perform appropriate learning activities.
14. will be able to formulate a basic approach to the evaluation of immunocompromised patients including an evaluation and diagnostic and therapeutic plan.
15. expected to develop an increased understanding of the patho-physiology of common infectious diseases in hospitalized transplant, pre-transplant and neutropenic patients. The Fellow is expected to learn how known and evolving data influences and informs clinical practice.

16. expected to develop an increased understanding of policies and procedures required to practice hospital epidemiology and infection control.
17. expected to gain a broad experience in the evaluation and management of HIV-infected outpatients. ID Fellows will also gain experience in the evaluation of outpatients with a broad variety of other infectious diseases, including recently hospitalized patients requiring follow-up for active infectious disease issues.
18. expected to develop an increased understanding of the pathophysiology, epidemiology, diagnosis and treatment including antiretroviral management of HIV infection. Fellows are expected to gain an understanding of the diagnosis and treatment of opportunistic infections common in HIV-infected patients, and other common infectious diseases treated in the outpatient setting.
19. expected to gain a broad experience in the evaluation and management of pre-travel patients and returning travelers.
20. expected to develop an increased understanding of the pathophysiology, epidemiology, diagnosis and treatment of diseases common to the returning traveler and those disease that are endemic in immigrants from countries outside the United States.
21. expected to develop an increased understanding of the issues unique to transplantation including transplant-associated opportunistic infections, issues pertaining to immunosuppressive medications and non-infectious complications of transplantation.
22. expected to gain experience in the evaluation and management of patients with suspicion of latent or active TB infection.
  
23. Fellows are expected to develop an increased understanding of the epidemiology, pathophysiology, and treatment of tuberculosis.
24. The ID Fellow will obtain a comprehensive and accurate medical history using all available sources.
25. The ID Fellow will perform a comprehensive and accurate physical examination with added elements pertinent to the individual's differential diagnosis.
26. The ID Fellow will review ancillary materials including radiology, pathology, laboratory data, and microbiology data with appropriate consultation with experts in these areas.
27. The ID Fellow will follow the patient's hospital course and will adjust the management plan accordingly.
28. 2nd year ID Fellows, in addition to the above, will create more independent diagnostic and therapeutic plans and will revise those plans as the patient's course evolves.
29. The ID Fellow will recognize and treat common infectious disease problems requiring hospitalization including pneumonia, osteomyelitis, skin/soft tissue infections, endovascular infections, osteomyelitis/septic arthritis, central nervous system infections, intra abdominal and genitourinary infections. In addition, they will acquire additional competency and expertise in the care of patients with post-surgical infectious diseases related complications as well as the care of immune compromised patients with infectious diseases related problems.

30. The ID Fellow will recognize indications, side effects and drug interactions of diverse classes of antimicrobials utilized to treat hospitalized adult patients.
31. The ID Fellow will understand the influence that socio-behavioral factors have in the development of and treatment of infectious diseases.
32. 2nd year ID fellows, in addition to the above, will be aware of the latest literature about the pathophysiology, epidemiology, diagnosis and therapy of infectious processes they are evaluating and will develop a broader differential diagnosis, incorporating less common infectious etiologies of disease.
33. The ID Fellow will educate the patient and patient's family about the diagnosis or the approach to reach the diagnosis, the management plan and the expected clinical outcome in a way that is both culturally appropriate and comprehensible to the patient and his/her family.
34. ID Fellows will gain a working knowledge of immunosuppressive regimens in the transplant patient, including common side effects and drug interactions.
35. ID Fellows will attend daily microbiology rounds conducted by the microbiology laboratory directors and staff and will contribute to the discussion of causes related to the transplant service.
36. The ID Fellows will understand both prophylactic and preemptive approaches to preventing infection in the transplant recipient, especially as pertaining to CMV and fungal infections (Candida, PCP, aspergillus).
37. The ID Fellow will develop an understanding of isolation policies, application to specific diseases, and the patho-physiology which drives the appropriate isolation technique.
38. The ID Fellow will understand the common nosocomial infections that present in inpatients, the risk factors that can increase the likelihood of these complications, and the data supporting various prevention techniques.
39. The ID Fellow will understand the various bioterrorism agents, the risks of transmission, and emergency preparedness programs.
40. As part of the infection control and prevention team, the ID Fellow will communicate effectively with other physicians, hospital administrators and coworkers regarding isolation, appropriate infection control procedures, and other policies

## LOG BOOK

A candidate shall maintain a log book of operations (assisted / performed) during the training period, certified by the concerned post graduate teacher / Head of the department / senior consultant.

This log book shall be made available to the board of examiners for their perusal at the time of the final examination.

The log book should show evidence that the before mentioned subjects were covered (with dates and the name of teacher(s) The candidate will maintain the record of all academic activities undertaken by him/her in log book .

1. Personal profile of the candidate
2. Educational qualification/Professional data
3. Record of case histories
4. Procedures learnt
5. Record of case Demonstration/Presentations
6. Every candidate, at the time of practical examination, will be required to produce performance record (log book) containing details of the work done by him/her during the entire period of training as per requirements of the log book. It should be duly certified by the supervisor as work done by the candidate and countersigned by the administrative Head of the Institution.
7. In the absence of production of log book, the result will not be declared.

## Leave Rules

1. FNB Trainees are entitled to leave during the course of FNB training as per the Leave Rules prescribed by NBE.
2. FNB candidate can avail a maximum of 20 days of leave in a year excluding regular duty off/ Gazetted holidays as per Hospital/Institute calendar/policy.
3. MATERNITY / PATERNITY LEAVE:
  - a. There is no provision of maternity or paternity leave during the FNB tenure. However, if a FNB trainee avails maternity (90 days) or paternity (7 days) leave during the FNB tenure, her or his tenure will be extended by an equal number of days.
  - b. FNB trainees are required to complete their training by a prescribed cut off date (as per information bulletin of Exit exam) for being eligible to FNB Exit examination. Trainees whose FNB tenure is extended beyond this cut off date only due to the maternity/paternity leave availed by them shall be permitted to take exit examination, if otherwise eligible, with other registered candidates of same session.
4. No kind of study leave is permissible to FNB candidates. However, candidates may be allowed an academic leave of 10 days across the entire duration of training program to attend the conferences/CMEs/Academic programs/Examination purposes.
5. Under normal circumstances, leave of one year should not be carry forward to next year, however, in exceptional cases like prolonged illness or any meritorious ground the leave across the training program may be clubbed together with prior approval of NBE.
6. Any other leave which is beyond the above stated leave is not permissible and shall lead to extension/cancellation of FNB course.
7. Any extension of FNB training for more than 2 months beyond scheduled completion date of training is permissible only under extra-ordinary circumstances with prior approval of NBE. Such extension is neither automatic nor shall be granted as a matter of routine

8. Unauthorized absence from FNB training for more than 7 days may lead to cancellation of registration and discontinuation of the FNB training and rejoining shall not be permitted.

9. MEDICAL LEAVE

- a. Leave on medical grounds is permissible only for genuine medical reasons and NBE should be informed by the concerned Institute/hospital about the same immediately after the candidate proceeds on leave on medical grounds.
- b. The supporting medical documents have to be certified by the Head of the Institute/hospital where the candidate is undergoing FNB training and have to be sent to NBE.
- c. The medical treatment should be taken from the Institute/hospital where the candidate is undergoing FNB training. Any deviation from this shall be supported with valid grounds and documentation.
- d. In case of medical treatment being sought from some other Institute/hospital, the medical documents have to be certified by the Head of the Institute/hospital where the candidate is undergoing FNB training.
- e. NBE reserves its rights to verify the authenticity of the documents furnished by the candidate and the Institute/hospital regarding Medical illness of the candidate and to take a final decision in such matters.

10.

- a. Total leave period which can be availed by FNB candidates is  $40+10 = 50$  days. This includes all kinds of eligible leave including academic leave. Any kind of leave including medical leave exceeding the aforementioned limit shall lead to extension of FNB training. It is clarified that prior approval of NBE is necessary for availing any such leave.
- b. The eligibility for Fellowship Exit Examination shall be determined strictly in accordance with the criteria prescribed in the respective information bulletin.

Eg:- Candidate joining FNB 2 year course in 2017 admission session on 15th April, 2017 shall be completing his/her FNB training on 14th April, 2019 under normal circumstances wherein there is no extension of training. If his/her training



is extended due to leave on medical grounds or any other reason for 3 months after adjusting eligible leave available in the entire duration of FNB training, the training shall be completing on 14th July, 2019. If as per the Information Bulletin for Final Examination December 2018, the cutoff date for completion of training is 30th June. 2019, such candidate shall not be eligible for December 2018 Final Examination.

Important: Extension of training due to maternity leave shall not be affected while deciding the cutoff date of FNB training.

# EXAMINATION

## FORMATIVE ASSESSMENT

Formative assessment includes various formal and informal assessment procedures by which evaluation of student's learning, comprehension, and academic progress is done by the teachers/ faculty to improve student attainment. Formative assessment test (FAT) is called as "Formative "as it informs the in process teaching and learning modifications. FAT is an integral part of the effective teaching .The goal of the FAT is to collect information which can be used to improve the student learning process.

Formative assessment is essentially positive in intent, directed towards promoting learning; it is therefore part of teaching. Validity and usefulness are paramount in formative assessment and should take precedence over concerns for reliability. The assessment scheme consists of Three Parts which has to be essentially completed by the candidates.

The scheme includes:-

Part I:- Conduction of theory examination

Part-II :- Feedback session on the theory performance

Part-III :- Work place based clinical assessment

### Scheme of Formative assessment

<b>PART – I</b>	<b>CONDUCT OF THEORY EXAMINATION</b>	Candidate has to appear for Theory Exam and it will be held for One day.
<b>PART – II</b>	<b>FEEDBACK SESSION ON THE THEORY PERFORMANCE</b>	Candidate has to appear for his/her Theory Exam Assessment Workshop.
<b>PART – III</b>	<b>WORK PLACE BASED CLINICAL ASSESSMENT</b>	After Theory Examination, Candidate has to appear for Clinical Assessment.

The performance of the resident during the training period should be monitored throughout the course and duly recorded in the log books as evidence of the ability and daily work of the student

#### 1. Personal attributes:

- **Behavior and Emotional Stability:** Dependable, disciplined, dedicated, stable in emergency situations, shows positive approach.
- **Motivation and Initiative:** Takes on responsibility, innovative, enterprising, does not shirk duties or leave any work pending.
- **Honesty and Integrity:** Truthful, admits mistakes, does not cook up information, has ethical conduct, exhibits good moral values, loyal to the institution.
- **Interpersonal Skills and Leadership Quality:** Has compassionate attitude towards patients and attendants, gets on well with colleagues and paramedical staff, is respectful to seniors, has good communication skills.

## 2. Clinical Work:

- **Availability:** Punctual, available continuously on duty, responds promptly on calls and takes proper permission for leave.
- **Diligence:** Dedicated, hardworking, does not shirk duties, leaves no work pending, does not sit idle, competent in clinical case work up and management.
- **Academic ability:** Intelligent, shows sound knowledge and skills, participates adequately in academic activities, and performs well in oral presentation and departmental tests.
- **Clinical Performance:** Proficient in clinical presentations and case discussion during rounds and OPD work up. Preparing Documents of the case history/examination and progress notes in the file (daily notes, round discussion, investigations and management) Skill of performing bed side procedures and handling emergencies.

**3. Academic Activity:** Performance during presentation at Journal club/ Seminar/ Case discussion/Stat meeting and other academic sessions. Proficiency in skills as mentioned in job responsibilities.

## FINAL EXAMINATION

The summative assessment of competence will be done in the form of Fellowship Exit Examination leading to the award of the degree of Fellow of National Board in Minimal Access Surgery. The Fellowship Exit Examination is a two-stage examination comprising the theory and practical part.

### Theory Examination:

1. The Theory examination comprises of one paper with maximum marks of 100.
2. There are 10 short notes of 10 marks each in the Theory paper
3. Maximum time permitted is 3 hours.

### Practical Examination:

1. Maximum marks : 300
  2. Comprises of Clinical Examination and viva
- The candidate has to score a minimum of 50% marks in aggregate i.e. 200 out of total 400 marks (Theory & Practical) with at least 50% marks in theory examination to qualify in the Fellowship Exit Exam.
  - The Theory and Practical of Fellowship Exit Examination shall be conducted at the same examination centre of the concerned specialty.

### **Declaration of Fellowship Exit Results**

1. Fellowship Exit Examination is a qualifying examination.
2. Results of Fellowship Exit Examination (theory & practical) are declared as PASS/FAIL.
3. FNB degree is awarded to a FNB trainee in the convocation of NBE.

## RECOMMENDED TEXT BOOKS AND JOURNALS

### A. Books

1. Mandell, Douglas and Bennett's Principles and Practice of Infectious Diseases (Eighth edition 2015). Authors: John E Bennett, Raphael Dolin and Martin J Blaser. Elsevier.
2. Infectious Diseases (Fourth edition 2016). Authors: Jonathan Cohen William Powderly Steven Opal. Elsevier.
3. Harrison's Infectious Diseases (Second edition 2015). Authors: Dennis L Kasper and Anthony S Fauci. McGraw-Hill.
4. AIDS Therapy (Third Edition 2008). Authors: Raphael Dolin Henry Masur Michael Saag. Elsevier.
5. Tropical Infectious Diseases (Third Edition 2011). Authors: Richard L. Guerrant, MD, David H. Walker, MD and Peter F. Weller. Elsevier.
6. John G. Barlett. Pocket Book of Infectious Disease Therapy. Lippincort Williams & Wilkins, 2005-06 Thirteenth Edition.
7. R Guerrant, Walker DH, Weller PF. Tropical Infectious Diseases: Principles pathogens and practice. 3<sup>rd</sup> Edition, Elsevier Churchill Livingston, 2011
8. Forbes, B., Sahm, D., Weissfeld, A. *Bailey and Scott's Diagnostic Microbiology*, 14th edition, Mosby, St. Louis, 2014
9. Koneman, E.W., Allen, S.D. Janda, W.M., Schreckenberger, P.C., Winn, W.C. *Color Atlas and Textbook of Diagnostic Microbiology*, 7th edition, J.B. Lippincott, Philadelphia 2016.
10. Udawadia FE. Tetanus, Oxford University Press 1994
11. Edited by David A. Warrell , Edited by Timothy M. Cox , Edited by John D. Firth Oxford Textbook of Medicine: Infection. 5<sup>th</sup> Edition, OUP (UK), 2012
12. Murray PR, Baron EJ, Pfaller MA, Tenover FC, Tenover RH. *Manual of Clinical Microbiology*, 11<sup>th</sup> Edition, American Society for Microbiology (ASM Press), 2016.
13. Garcia LS, Bruckner DA. Diagnostic Medical Parasitology, 6<sup>th</sup> Edition, American Society for Microbiology (ASM Press), 2016.
14. Wiedbrauk, D.L., Johnston, S.L.G. *Manual of Clinical Virology*, New York, Raven Press, 1993.

15. Udwadia FE. Tropical eosinophilia. In: Progress in Respiration Research: Pulmonary Eosinophilia, Udwadia, FE (Ed), Karger, New York 1975.
16. Udwadia F E, Udwadia Z F and Kohli A F. Text- Principles of Respiratory Medicine (section on Pulmonary Involvement in Tropical Diseases). OUP, 2011.
17. Mandell, G.L., Bennett, J.E., Dolin, R. *Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases*, 8th ed, 2 vol. Saunders, 2014.
18. Udwadia FE. Principles of Critical Care. 3<sup>rd</sup> ed. Jaypee Medical Ltd, 2014.
19. Turgeon, M.L. *Immunology & Serology in Laboratory Medicine*, 6<sup>th</sup> edition, St. Louis, Mosby, 2017.
20. Prof. Kanai N. Mukharjee. Microbiology Laboratory Procedure Manuals as well as many of these books are available in the Microbiology Lab. They may be used in the lab but may not be removed from the lab. Medical Technology Interns and Residents and Fellows from other disciplines also use these resources in the lab. Vol.1-3, McGraw Hill 2010.
21. Patricia Tille. Bailey & Scott's Diagnostic Microbiology, 14<sup>th</sup> ed, Elsevier, 2017.
22. James H. Jorgensen. Manual of Clinical Microbiology, 2 Vol. ASM press, 2015.
23. *Manoj Jain and Dilip Mathai*. Management of Infectious Disease. Jaypee, 2010
24. WHO publication – Hospital Infection Control

## **B. Journals**

1. Clinical Infectious Diseases
2. Journal of Infectious Diseases
3. New England Journal of Medicine
4. Lancet Infectious Diseases
5. Journal of Global Infectious Diseases
6. Infection Control and Hospital Epidemiology
7. Lancet
8. American Journal of Tropical Medicine and Hygiene
9. Open Forum Infectious Diseases
10. ACS Infectious Diseases
11. Advances in Parasitology
12. AIDS
13. Aids Patient Care And STDs
14. American Journal Of Infection Control

15. BMC Infectious Diseases
16. Clinical Infectious Diseases
17. Clinical Microbiology And Infection
18. Current Opinion In Infectious Diseases
19. Journal Of Hospital Infection
20. Journal Of Infectious Diseases
21. Lancet Infectious Diseases
22. Pediatric Infectious Disease Journal
23. JAMA
24. AIDS Clinical Care
25. Lancet
26. New Engl J Med
27. Annals of Internal Medicine
28. MMWR Weekly
29. British Medical Journal
30. Journal of Infectious Diseases
31. International Journal of Infectious Diseases
32. Paediatric Infectious Diseases Journal
33. BMC Infectious Disease
34. Journal of Microbiology
35. International Journal of Parasitology
36. European Journal of Clinical Microbiology and Infectious Diseases
37. Infection and Immunity
38. Journal of clinical Virology
39. Journal of Infection
40. Journal Global Infectious Disease
41. Journal of the Indian Association of Medical Microbiology
42. Journal of the Association of Physicians of India
43. Infection Control and Hospital Epidemiology
44. Infectious Disease Clinic of North America