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GUIDELINES FOR COMPETENCY BASED POSTGRADUATE TRAINING PROGRAMME FOR DM IN INFECTIOUS DISEASES

GUIDELINES FOR COMPETENCY BASED POSTGRADUATE SUPERSPECIALITY TRAINING PROGRAMME FOR DM IN INFECTIOUS DISEASES

Preamble

The Infectious Diseases DM training programme is designed to train physicians to become competent specialists in the diagnosis and management of infectious diseases. Epidemics caused by emerging and re-emerging organisms frequently pose serious threats to the global population. The world has witnessed outbreak of various public health emergencies of international concern (PHEIC) recently, such as H1N1, poliomyelitis, Zika, Ebola, Nipah and many variants of SARS CoV2. During the recent Covid -19 pandemic, the trained infectious disease specialist served as an important component of the frontline health care workers. The diagnosis and management of existing infectious diseases such as HIV, tuberculosis and particularly the newly emerged SARS CoV2 has seen unprecedented advances in technology for detection of the causative virus, development of treatment strategies and ready response for evidence-based decisions of an unprecedented magnitude from various stakeholders including policy-makers at the highest level. Technology advances also included newer and rapid molecular diagnostic techniques, use of immuno-modulators, reuse of existing drugs to manage the Covid -19 pandemic and also newly emerging drug resistant & highly toxic microorganisms. Today, an increasing number of antibiotics, antiviral, antifungal, antiprotozoal and antituberculosis agents are available for treatment of infectious diseases and appropriate evidence-based decisions with regard to use of these are imperative. Further, the emergence of MDR/ XDR pathogens, nosocomial infections, transplant-related infections, antimicrobial resistance and advances in vaccine development has given newer dimension to the medical management of infectious diseases. It is accepted that a pandemic disease outbreak calls into play all the five roles envisaged for an Indian Medical Graduate viz,. clinician, communicator, leader and member of health care team, professional, life-long learner and committed to excellence, is ethical, responsive and accountable to patients.

The post graduate student specializing in the Infectious Disease DM program thus faces the highly challenging need to acquire wide ranging knowledge, expertise and experience in many disciplines including medicine & intensive care, microbiology including parasitology, virology, drug-drug

interactions and consequent adverse effects, and ability to provide emergency care services to a sick population. This Guideline enunciates the necessary educational requirements for the post graduate student attending the DM training programme in Infectious Diseases. The programme will include necessarily core clinical rotations in various departments viz., Medicine (General Medicine & Pulmonary Medicine), Microbiology, Virology & Parasitology, intensive care and Emergency Medicine, in addition to the core clinical posting in Infectious Diseases.

This dedicated training program will provide an opportunity to acquire experience which is required to pursue an academic career in infectious diseases. This document lists activities that would lead to capacity development, planning, coordination, and communication at various levels that are critical for becoming a successful specialist in Infectious Diseases by specifying, (1) the competencies to be acquired/imparted to the post graduate student in the cognitive, affective & psychomotor domains, (2) detailed syllabus, (3) teaching-learning methods and assessment modalities to be used. This document has been prepared by subject-content specialists of the National Medical Commission. The Expert Group of the National Medical Commission had attempted to render uniformity without compromise to the purpose and content of the document. Compromise in purity of syntax has been made in order to preserve the purpose and content. This has necessitated retention of "domains of learning" under the heading "competencies".

Goal

The goals of the DM in Infectious Diseases post graduate training program are:

(1) To empower the post graduate trainee with required training so that he/she acquires knowledge, skills and attitude for appropriate diagnosis and management of common and emerging infectious diseases.

(2) To empower the post graduate trainee to provide knowledge on the syndromic management of infectious diseases enabling the super-specialist to practice at all levels of the health care system including the outpatient clinics, wards and intensive care units.

(3) To incorporate updated advances and developments in the diagnosis and management of infectious diseases with reference to existing and emerging new infections like Covid -19, infection in immuno-compromised host, infection in transplant patients and their management.

(4) To provide knowledge regarding use of newer therapeutic agents, antimicrobial resistance, antimicrobial stewardship, community acquired infections, travel medicine, health tourism, bioterrorism and vaccination (adult and childhood).

(5) To train the post graduates in the conduct and interpretation of various diagnostic techniques, including molecular diagnostics, point-of-care testing, antimicrobial susceptibility testing, hospital infection control and diagnostic imaging.

(6) To train the post graduates to acquire competencies for educating undergraduates, paramedical professionals and students and be able to provide consultation to various other specialties.

(7) To train the post graduates in investigating the outbreak of infection in community and its management.

(8) To train the post graduates in research methodology, preparation and conduct of research projects.

Eligibility: MD in General Medicine/MD in Pediatrics/MD in Tropical Medicine/MD in Respiratory Medicine/MD in Geriatrics**.**

SUBJECT SPECIFIC LEARNING OBJECTIVES

a. Clinical Skills

The post graduate student should be exposed to an entire range of cases in infectious diseases spanning general medical services like General Medicine, Emergency Medicine, General Surgery, Pediatrics, Orthopaedics, Obstetrics and Gynecology and organ-based specialties, during the DM training programme. PG training should include regularly encountered inpatient and outpatient infections like acute febrile illnesses, tropical diseases and special situations including HIV/AIDS, transplant-associated infections, Hematology-Oncology related infections, other immune-compromised hosts, post-travel syndromes, hospital acquired infections including device related infections, ICU patients with sepsis, and sexually transmitted infections. In addition, the student should be well versed in the principles and practice of epidemiology, critical appraisal of journal articles and appropriate interpretation of diagnostic tests.

The post graduate student should be able to perform the following:

- meticulous history taking,
- thorough clinical examination,
- order diagnostic tests,
- make diagnostic and therapeutic decisions,
- interpret results provided by the Microbiology Laboratory including molecular methods and antimicrobial resistance, and therapeutic drug monitoring provided by the Clinical Pharmacology department,
- perform required diagnostic and therapeutic procedures,
- counsel and manage patients and their relatives in routine and critical cases,
- use antimicrobial therapeutic agents appropriately and rationally and work with other departments to provide patient-focused care.

b. Teaching Skills

The post graduate student should be exposed to teaching methods and develop competence in teaching medical, paramedical and nursing students at the undergraduate and post graduate levels.

c. Research Skills

The students should gain basic skills and knowledge to function as independent investigators and be exposed to state-of-the-art basic, translational, clinical and epidemiological research. They should acquire/be able to:

- scientific knowledge and problem solving capabilities & critically evaluate relevant literature,
- knowledge of statistics, and clinical epidemiologic principles like appropriate study designs,
- evaluate data management critically and do data analysis,
- design experiments and interpret the results thereof,
- prepare research proposals for funding by national and international funding agencies,
- confidently communicate recent advances and research results in formal and informal settings.

Scientific professionalism will be stressed in each activity.

d. Group Approach

The post graduate students would be required to interact with various departments to provide patient centered holistic care, be able to lead a team of health care workers and provide expertise to public health authorities during an outbreak of infectious diseases or natural calamities.

SPECIFIC LEARNING OBJECTIVES

A. Predominant in Cognitive Domain (knowledge domain)

The post graduate student should learn a broad range of problems in infectious diseases care of the individual patient and the larger community through patient care in a variety of settings, conferences, lectures, and appropriate use of the medical literature. The students will have appropriately supervised primary responsibility for applying their knowledge to the solution of problems in differential diagnosis and complex disease management in the inpatient as well as outpatient settings. They will learn to manage challenges unique to the treatment of Infectious Diseases including antimicrobial resistance, from the individual patient to the environment; loss of useful antimicrobial agents and recognition of new diseases. The students will become experts in using current medical literature to support evidence-based decision-making. They will learn to appraise the medical literature critically and perfect their clinical skills. They will maintain a record of the cases for grand rounds and possible publication of case reports.

At the end of the DM course in Infectious Diseases, the post graduate student should acquire the following competencies in the cognitive domain:

1. Knowledge necessary to obtain a meticulous history of patients suspected of having an infection.
2. Knowledge necessary to perform a thorough physical examination of patients with infectious problems.
3. Knowledge necessary to generate a relevant and appropriate differential diagnosis compatible with a particular clinical syndrome and be able to identify the microorganism/s contributing to the same.
4. Knowledge to order appropriate tests.

5. Knowledge to recognize a possible need for specialist consultation for performance of procedures and interpret the results.
6. Knowledge of the common infectious diseases with regard to the etiologic agent/s, clinical manifestations, and be able to generate a differential diagnosis.
7. Ability to develop appropriate therapeutic approach, depending on the patient's clinical condition and recommend conduct of therapeutic procedures appropriate to the patient's condition.
8. Knowledge of mechanism of action, indications, contra-indications, dosing schedule, efficacy, cost, side effects, and pharmacokinetics and pharmacodynamics of antimicrobials and biological products including monoclonal antibodies.
9. Ability to choose the right antimicrobial treatment modality, where required.
10. Knowledge of rational combination of antibiotics, where required keeping in mind the clinical syndrome, tissue penetration and therapeutic drug monitoring.
11. Knowledge of drugs of choice for most microorganisms and chemoprophylaxis, when required.
12. Knowledge of indications and contraindications for active and passive immunization of infectious diseases including comprehensive knowledge of the National Immunization Programme and travel related immunization schedule.
13. Knowledge of global and local epidemiology, geographical habitat, reservoirs for infective agents and modes of transmission of different infective agents of public health importance and suggest preventive measures.
14. Knowledge of reportable infectious diseases as per the Infectious Diseases Surveillance Programme and the proper documentation and procedures required for reporting them.
15. Knowledge of the basic principles of nosocomial infectious diseases in various institutional settings, especially catheter-associated urinary tract infections, nosocomial pneumonia, and sepsis associated with intravascular devices and therapy (to include long term care setting).
16. Knowledge, for the purposes of referral & patient education, indications, success rates and complications of common surgical procedures in the management of infectious diseases problems.

17. Knowledge of the National Infectious Diseases programmes like Revised National Tuberculosis Control Programme, National Vector Borne Disease Control Programme, and National AIDS Control programme.
18. Knowledge of how to evaluate and assess an immuno-compromised patient (those on immunosuppressives, chemotherapy for hematological and solid malignancies and post-peripheral blood stem cell transplant and solid organ transplant) – those on biologic response modifiers, immunosuppressive agents, JAK inhibitors, monoclonal antibodies etc.

B. Predominant in Affective Domain

The post graduate student should:

1. Be able to function as a part of a team, develop an attitude of cooperation with colleagues, and interact with the patient and the clinician or other colleagues to provide the best possible diagnosis or opinion.
2. Always adopt ethical principles and maintain proper etiquette in dealing with patients, relatives and other health personnel and to respect the rights of the patient including the right to information and second opinion.
3. Develop communication skills to word reports and professional opinion as well as to interact with patients, relatives, peers and paramedical staff, and for effective teaching.

Professionalism

1. Accept personal responsibility for care of patients with genetic disorder, consistent with good work ethics and empathy.
2. Demonstrate appropriate truthfulness and honesty with colleagues.
3. Recognize personal beliefs, prejudices, and limitations, which should not come in the way of providing service.
4. Respect patient confidentiality at all times in verbal and written communication.

Interpersonal and Communication Skills

Human Relationships

1. Demonstrate an effective system for identifying and addressing ethical, cultural, and spiritual issues associated with health care delivery.

2. Demonstrate knowledge or applies an understanding of psychological, social, and economic factors which are pertinent to the delivery of health care.
3. Accurately assess a patient's assumptions in accessing the health care system.
4. Effectively engage the patient and/or family in communication.

a. Be non-judgmental and non-coercive.
b. Be non-directive in genetic counselling.

Attitudes

1. Appreciate the importance of disease prediction and prevention.
2. Respect patients' religious, moral, and ethical beliefs and biases, even if they differ from the student's own beliefs.
3. Present all available options accurately and non-directively.
4. Be aware of both the importance of confidentiality and the difficulties that confidentiality poses when relatives are found to be at risk for a serious and potentially preventable disease/s.
5. Be aware of the advantages and potential hazards of referring patients and families to community or national resources.
6. Recognize the limitations of their own skills and seek consultation when necessary.

C. Predoninant in Psychomotor domain

At the end of the course, the student should acquire the following clinical skills and be able to:

1. Observe and manage patients with wide variety of infectious diseases on both an inpatient (Inpatient Consultation Service, Immunocompromised Consultation Service) and on an ambulatory basis (Infectious Disease Clinics including HIV/AIDS, transplant clinics, hepatitis clinic, travel medicine and adult immunization clinic, fever clinic, Sexually Transmitted Disease clinic etc.). This would help to gain longitudinal experience in a continuum of care to observe the course of illness and the effects of therapy.
2. Learn proper methods of specimen collection, transport, handling and preparation by completing the faculty-supervised microbiology checklist.
3. Prepare, observe and make informed comments on:
    a) Gram Stain of exudates and body fluid from various sources - 5 numbers
    b) Sputum Acid fast stain - 5 numbers

c) Blood smear for malaria parasite - 5 numbers
d) Bone Marrow aspirate and Biopsy - 5 numbers
e) Body fluid aspiration including joints - 10 numbers
f) KOH Stain for Candida - 5 numbers
g) Rapid Diagnostic Tests (for Tropical Fevers/HIV/HBV/HCV) - 10 numbers
h) ELISA for infectious diseases -10 numbers
i) Image guided aspirations -10 numbers
j) Bronchoscopy (lung problems) - 5 numbers
k) Upper GI endoscopy (esophageal infectious conditions) - 5 numbers
l) Colonoscopy (lower GI infectious conditions) - 5 numbers

4. Follow up patients in Infectious Diseases wards during the acute and recovery phases of their illnesses.
5. Provide consultative services to outpatient clinics and inpatient services in other specialties and subspecialties including the management of antibiotic administration in such diverse settings as the hospital, the office, or in conjunction with home-care services.
6. Be able to interpret antibiogram (overall profile of antimicrobial susceptibility) and be able to provide inputs for preparing the institutional antibiotic policy. Be able to interpret the antimicrobial susceptibility testing results and choose the appropriate antibiotics based on the principles of antimicrobial stewardship.
7. Provide specialist clinical input in gaps identified during routine surveillance of hospital acquired or device related infections as well as outbreak investigations both nosocomial and community acquired and design an appropriate intervention package.
8. Design and execute a pandemic preparedness for a health care facility depending on mode of transmission of the organism including aspects of infection prevention, contact tracing, disinfection and sterilization protocols, appropriate personal protective equipment, triaging and treatment protocols.
9. Carry out a research project under the guidance of faculty from the Infectious Disease department including project planning, research design, collection and interpretation of data and publication.

SYLLABUS

Course contents:

A: Cognitive domain

The syllabus will include a study of infectious diseases of bacterial, viral, fungal and parasitic origin occurring in the adults and in the pediatric age group. The student must also have theoretical and practical knowledge of infections encountered in Oncology, Surgery, Obstetrics & Gynaecology, in post-solid organ and bone marrow transplant patients, and in other medical and surgical specialties.

During the training programme, the post graduate student will have formal instruction, obtain hands on clinical experience and other opportunities via seminars, workshops and conferences to gain expertise on the etiology, pathogenesis, epidemiology, clinical presentation, differential diagnosis, management and prevention of the disorders pertaining to various pathogens and organ systems.

The syllabus is based on (a) Syndromic or Systemic and (b) Organism based approach.

SYNDROMIC APPROACH TO INFECTIOUS DISEASES (based on features of the diseases at presentation)

1. Fever
    - Thermoregulation and pathogenesis
    - FUO and Acute febrile illnesses
    - Fever with rash, exanthematous fever of children
2. Upper respiratory tract infections
    - Sinusitis
    - Common cold
    - Pharyngitis, retropharyngeal and parapharyngeal infections
    - Laryngitis and croup
    - Ear infections including otitis and mastoiditis
    - Epiglottitis
    - Manifestations of different systemic infections in oral cavity, neck and head
    - Local infections of neck, oral cavity and head
3. Pleuro- pulmonary and bronchial infections

- Infections associated with COPD and cystic fibrosis
- Bronchiolitis
- Acute bronchitis
- Pneumonia (acute and chronic) including CAP and atypical pneumonia
- Lung abscess
- Pleural effusion and empyema

4. Urinary tract infections
    - Acute pyelonephritis
    - Acute cystitis
    - Acute and Chronic prostatitis
    - Acute urethritis
    - Asymptomatic bacteriuria and candiduria
    - Invasive fungal infections of the urinary tract
5. Intra - abdominal infections
    - Peritonitis and intraperitoneal abscesses
    - Infections of liver and biliary system including liver abscess
    - Pancreatic infections
    - Splenic abscess
    - Acute and chronic appendicitis
    - Diverticulitis, typhlitis
    - Principles and syndromes of enteric infections including acute and chronic diarrhea
    - Enteric fever and other causes of abdominal symptoms with fever
    - Malabsorption syndromes
    - Food poisoning
    - Lower abdominal pain syndromes including Pelvic inflammatory disease and prostatitis
    - H. pylori infection
6. Cardiovascular infections
    - Infections of endocardium, prosthetic valve, non- valvular cardiovascular devices

- Myocarditis, pericarditis
- Mediastinitis

7. CNS infections
    - Approach to a patient with CNS infections
    - Meningitis: acute and chronic
    - CSF shunt infection
    - Encephalitis
    - Infections causing Brain SOLs and abscesses
    - Infections of dural spaces and brain sinuses
    - Skull base osteomyelitis

8. Osteomyelitis: both acute and chronic infections of native joint and prostheses
9. Syndromic approach to STIs
10. Eye infections including endophthalmitis, uveitis and chorioretinitis, orbital apex syndromes
11. Multisystem sepsis syndromes, septic shock and disseminated infections
12. Pyomyositis, skin and soft tissue infections
13. Nosocomial Infections or Medical Device Related Infections
    - Infection prevention for hospital acquired infections -principles and practice
    - Disinfection, sterilization, disposal of hospital waste (awareness of pollution control board norms)
    - Isolation and quarantine principles and precautions
    - Nosocomial UTI (catheter-associated urinary tract infection - CAUTI)
    - Nosocomial Pneumonia (health care—associated pneumonia – HCAP; Ventilator-associated pneumonia - VAP)
    - Catheter related infections (Central Line-Associated Bloodstream Infection - CLABSI)
    - Viral hepatitis & other transfusion- transplantation transmitted infections
    - Outbreak investigation nosocomial and community acquired in a health care setting

14. Infection in special Hosts
    - Immuno-compromised (congenital and acquired) HIV
    - Management of infections in cancer patients including febrile neutropenia
    - Infections in transplant recipients: solid organ, hematopoietic stem cell
    - Spinal cord injury
    - Geriatric population including infections in long term care facilities
    - Infection in asplenic hosts
    - Infection in ICU
    - Surgical and trauma related infection: Bites, Burns, post-operative fever
    - Pediatric and Elderly, those with co-morbidities like Chronic lung, kidney and liver disease
    - HIV and opportunistic infections -approach to fever, respiratory, abdominal and CNS syndromes
15. Appropriate management of all medical co-morbidities like diabetes, hypertension, coronary artery diseases, collagen, vascular and renal diseases; know when specialist management may be required and appropriately refer.

ETIOLOGICAL AGENTS OF INFECTIOUS DISEASES

1. Viral Diseases
    - Arbo-viral illnesses including Dengue, Yellow fever, KFD, Chikungunya, Hantavirus, Nairo virus (CCHF), WNV, JE, Tick borne encephalitis, Syndromes associated with Arboviral infections;
    - Herpes viridae and its infections (HSV 1 and 2, CMV, EBV, HSV6&7, KSAV, VZV), Poxviridae
    - Hepatitis causing viruses including Hepatitis E
    - Corona viruses: SARS, SARS CoV2, MERS (including variants)
    - Mumps, rubella and measles viruses
    - Rhabdoviruses
    - Ebola and Marburg virus and other viral haemorrhagic fevers
    - Adenovirus
    - Papillomavirus, Pox viruses

- JC, BK other polyoma viruses
- Influenza and parainfluenza
- Zoonotic paramyxoviruses like Nipah, Hendra
- RSV
- Polio, Coxsackie, Echo, Enteroviruses
- HTLV 1 & 2
- HIV: history, epidemiology, virology, immunology, HIV testing and counselling, disease spectrum including pulmonary, gastroenterological, dermatological, cardiovascular, renal, bone health, endocrine and metabolic and neurological manifestations of HIV and HIVOI, IRIS malignancy, treatment guidelines including anti-retrovirals, drug toxicity, drug resistance, prevention, future.

2. Prion Diseases: Creutzfeldt Jacob, Kuru, Bovine spongiform encephalitis
3. Bacterial Diseases
    - Gram positive organisms; Gram negative organisms; Gram variable
    - Anaerobic infections
    - Mycobacteria: Tuberculosis: primary, secondary, pulmonary, extrapulmonary (as per anatomical structures), MDR and XDR TB
    - Leprosy, non-tuberculous Mycobacteria
    - Brucellosis, Chlamydial diseases, Mycoplasma
    - Rickettsial diseases
    - Syphilis, Leptospirosis other spirochetes; Nocardia; Actinomycosis
4. Mycoses
    - Superficial mycoses; Subcutaneous mycoses
    - Deep mycoses (invasive fungal infections) including endemic systemic mycoses
5. Protozoal diseases
    - Entamoeba and free living amoeba associated infections; Malaria, Babesiosis; Leishmaniasis; Toxoplasmosis; Trypanosomiasis; Giardiasis; Trichomoniasis; Cryptosporidium and other HIV associated protozoans
6. Helminthic infections:
    - Geohelminths; tissue and blood nematodes; Cestodes; Trematodes
7. Ectoparasitic diseases:

- Lice (pediculosis); scabies; myasis; mites including Chiggers; Ticks

8. Diseases associated with toxic algae:
    - Prototheca

9. Zoonosis

GENERAL

- Immunisation: Pediatric age group, adult, travelers
- Travel Medicine
- Bioterrorism
- Outbreak investigation in Hospital and Community
- National Health Programmes related to Communicable Diseases
- Pharmaco-therapeutics in Infectious Diseases
- Non-infectious mimics of Infectious Diseases
- Neglected Tropical Diseases
- Critical Care Syndromes and Exotic infections
- Global epidemiology

B: Psychomotor domain

The post graduate student during the training period:

1. Must do independently the following:

a. Proper clinical examination in case of infectious diseases
b. Documentation in cases of PUO HIV disease
c. Counselling patients with HIV disease
d. Counselling patients and relatives on Intensive / Terminal care
e. Central Vein cannulation
f. BLS, ALS/ATLS
g. Gram Stain of exudates and body fluid from various sources
h. Sputum Acid fast stain
i. Malaria parasite detection
j. Bone Marrow aspirate and Biopsy
k. KOH Stain for fungus

l. Rapid Diagnostic Tests / Point of care Tests
(Tropical Fevers/HIV/HBV/HCV)

2. **Must learn the following procedures learnt and is desirable to do (independently / perform under supervision)**

    a. Point of Care Ultrasonography
    b. Body fluid aspiration including joints
    c. ELISA for infectious diseases
    d. Image guided aspirations
    e. Bronchoscopy
    f. Upper GI endoscopy (esophageal infectious conditions)
    g. Colonoscopy (lower GI infectious conditions)

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3. **The following procedures are nice to perform under supervision / to observe:**

    a. Real Time PCR for viruses, bacteria
    b. Gene sequencing studies

TEACHING AND LEARNING METHODS

General principles

Acquisition of competencies being the keystone of doctoral medical education, such training should be skills oriented. Learning in the program, essentially autonomous and self-directed, and emanating from academic and clinical work, shall also include assisted learning. The formal sessions are meant to supplement this core effort.

All students joining the post graduate superspeciality (DM) course shall work as full-time (senior) residents during the period of training, attending not less than 80% of the training activity during the calendar year, and participating in all assignments and facets of the educational process. They shall maintain a log book for recording the training they have undergone, and details of the procedures done during laboratory and clinical postings in real time.

A. Lectures: Didactic lectures should be used sparingly. A minimum of 10 lectures per year in the concerned PG department is suggested. Topics to be selected as per subject requirements All postgraduate superspeciality trainees will be required to attend these lectures. Lectures can cover topics such as:

1. Subject related important topics as per specialty requirement
2. Recent advances
3. Research methodology and biostatistics
4. **Salient features of** Undergraduate/Postgraduate medical curriculum
5. Teaching and assessment methodology.

Topic numbers 3, 4, 5 can be done during research methodology/biostatistics and medical education workshops in the institute.

B. Journal club: Minimum of once in 1-2 weeks is suggested.

Topics will include presentation and critical appraisal of original research papers published in peer reviewed indexed journals. The presenter(s) shall be assessed by faculty and grades recorded in the logbook.

C. Student Seminar: Minimum of once every 1-2 weeks is suggested.

Important topics should be selected as per subject requirements and allotted for in-depth study by a postgraduate superspeciality student. A teacher should be allocated for each seminar as faculty moderator to help the student prepare the topic well. It should aim at comprehensive evidence-based review of the topic. The student should be graded by the faculty and peers.

D. Student Symposium: Minimum of once every 3 months.

A broad topic of significance should be selected, and each part shall be dealt by one postgraduate super-speciality student. A teacher moderator should be allocated for each symposium and moderator should track the growth of students. The symposium should aim at an evidence-based exhaustive review of the topic. All participating postgraduates should be graded by the faculty and peers.

E. Bedside clinics / Laboratory work: Minimum - once every 1-2 weeks.

Clinics/bedside teaching / Laboratory work should be coordinated and guided by faculty from the department. Various methods like DOAP (Demonstrate, Observe, Assist, Perform), simulations in skill lab, and case-based discussions etc. are to be used. Faculty from the department should participate in moderating the teaching-learning sessions during clinical rounds.

E.1 Case Presentations (minimum 30 times in a year with record in log book) with input from Microbiology, Virology, Parasitology and various related specialties

E.2 Morbidity and Mortality Conference once a month

E.3 Emergency situation: Emergency duty by rotation among the post graduates with faculty cover.

E.4 Ward rounds: DM students should take history, conduct examination, clinically evaluate and manage inpatients admitted to wards. Ward rounds should be conducted by faculty for appropriate patient care and teaching. This should also cover calls from other specialties and emergency.

E.5 Combined Round/Grand Round: These exercises are to be done once a week or twice a month involving presentation of unusual or difficult cases.

F. Interdepartmental colloquium

Faculty and students must attend monthly meetings between the main Department and other department/s on topics of current/common interest or clinical cases.

G. Rotational clinical / community / institutional postings

Depending on local institutional policy and the subject specialty needs, postgraduate super-speciality trainees may be posted in relevant departments / units / institutions. The aim would be to acquire more in-depth knowledge as applicable to the concerned specialty. Postings would be rotated between various units / departments and details to be included in the specialty-based Guidelines. Suggested rotation posting is given below:

Clinical Rotation

GUIDELINES FOR CLINICAL ROTATION

The student will undergo clinical rotations during the three-year programme *(as given in the section dealing with Teaching and Learning Methods).* The main features of these rotations will

involve history taking and examination of the patients, identifying a clinical syndrome, formulating an appropriate differential diagnoses, recommend relevant investigations, reviewing investigation reports and following up with microbiology, formulating a immunization therapeutic plan, and discussing the case with the primary consultant and the core faculty for the programme. It is recommended that a candidate identify critical management questions related to the case, read the topic from a standard ID textbook and/or web resources like www.uptodate.com etc., literature search to compile a comprehensive review including epidemiology, microbiology, pathology, clinical manifestations, investigative approach, treatment modalities, prognosis and preventive strategies, It is incumbent upon the candidate to be familiar with practice guidelines (Indian and international), systematic reviews (eg., Cochrane review) if any, pertaining to the clinical problem at hand, review existing controversies and identify areas of research where equipoise exists.

i. **First Year posting:** in the parent department with resident duty (in turns) on all days (depending on the number of candidates)

ii. **Second year posting** will include the following:

1. Clinical Microbiology and Laboratory Medicine: 2 months
2. ICU postings- 3 months
   (Medical ICU, Surgical ICU, Pediatric ICU)
3. Emergency medicine: 1 month
4. Hospital Infection Control Unit: 1 month
5. Transplant units: 1 month
6. Community medicine, National programme (ART, NTEP etc.) and vaccination: 1 month
7. Obstetrics and Gynecology: 1 month
8. Electives: The candidate can be considered for elective rotation for a maximum of 2 months outside the institute. The institute where sent and the reason for the postings to be clearly defined.

iii. **Third Year posting:** in the parent department with on call duty on all days (in turn if feasible, depending on the number of candidates).

Every posting should have its defined learning objectives. It is recommended that the departments draw up objectives and guidelines for every posting offered in conjunction with the

collaborating department/s or unit/s. This will ensure that students acquire expected competencies and are not considered as an additional helping hand for the department / unit in which they are posted. The PG student must be tagged along with those of other relevant departments for bedside case discussion/basic science exercises as needed, under the guidance of an assigned faculty.

Opportunities to present and discuss infectious disease cases through bedside discussion and ward/grand rounds with specialists / clinicians in different hospital settings must be scheduled to address antimicrobial resistance issues and strategies to deal with it.

H. Teaching research skills

Writing a thesis/research paper should be used for inculcating research knowledge and skills. All postgraduate super-speciality students shall conduct a research project of sufficient depth to be presented if required by the University as a postgraduate thesis under the supervision of an eligible faculty member of the department as guide and one or more co-guides who may be from the same or other departments.

In addition to the thesis project, every postgraduate super-speciality trainee shall participate in at least one additional research project that may be started or already ongoing in the department. It is preferable that this project will be in an area different from the thesis work. For instance, if a clinical research project is taken up as thesis work, the additional project may deal with community/field/laboratory work. Diversity of knowledge and skills can thereby be reinforced.

I. Training in teaching skills

MEU/DOME should train PG students in education methodologies and assessment techniques. The PG students shall conduct UG classes in various courses and a faculty shall observe and provide feedback on the teaching skills of the student.

J. Log book

During the training period, the post graduate super-speciality student should maintain a log book indicating the duration of the postings/work done in Wards, OPDs, Casualty and other areas of posting. This should indicate the procedures assisted and performed and the teaching sessions attended. The log book entries must be done in real time. The log book is thus a record of various

activities by the student like: (1) Overall participation & performance, (2) attendance, (3) participation in sessions, (4) record of completion of pre-determined activities, and (5) acquisition of selected competencies.

The purpose of the log book is to:

a) help maintain a record of the work done during training,

b) enable faculty/consultants to have direct information about the work done and intervene, if necessary,

c) provide feedback and assess the progress of learning with experience gained periodically.

d) A detailed log book of at least 100 patients with different infectious diseases (minimum twenty of different systems) should be maintained. Grand round cases should also be recorded in log book.

The log book should be used in the internal assessment of the student, should be checked and assessed periodically by the faculty members imparting the training. The PG students will be required to produce completed log book in original at the time of final practical examination. It should be signed by the Head of the Department. A proficiency certificate from the Head of Department regarding the clinical competence and skilful performance of procedures by the student will be submitted by the PG student at the time of the examination.

The PG students shall be trained to reflect and record their reflections in log book particularly of the critical incidents. Components of good teaching practices must be assessed in all academic activity conducted by the PG student and at least two sessions dedicated for assessment of teaching skills must be conducted every year of the PG program. The teaching faculty are referred to the MCI Logbook Guidelines uploaded on the Website.

K. **Course in Research Methodology**: All post graduate super-speciality students shall complete an online course in Research Methodology within six months of the commencement of the batch and possess the certificate on successful completion of the course. They may be exempted if they have done the course during post-graduation (MD course).

Other aspects:

- The postgraduate super-speciality trainees must participate in the teaching and training program of undergraduate students and interns attending the department.
- Trainees shall attend accredited scientific meetings (CME, symposia, and conferences) at least once a year.
- Department shall encourage e-learning activities.
- The postgraduate super-speciality trainees should undergo training in Basic Cardiac Life Support (BCLS) and Advanced Cardiac Life Support (ACLS).
- The postgraduate super-speciality trainees must undergo training in information technology and use of computers.

During the training program, patient safety is of paramount importance; therefore, relevant clinical skills are to be learnt initially on the models, later to be performed under supervision followed by independent performance. For this purpose, provision of skills laboratories in medical colleges is mandatory.

Teaching strategies

Clinical work includes the following:

- Case discussions during ward rounds, consultations, various seminars, webinars, conferences and workshops with direct observation and hands-on learning
- Rounds in the laboratory trouble-shooting problems and addressing clinical correlation. Reading of textbook and accessing web sources with regard to diagnoses and management of clinical syndromes or diseases
- Diagnosis of bacterial and fungal infections via microscopy, cultures and molecular techniques
- Diagnosis of viral infections via antibody tests e.g., HIV ELISA, Dengue NS-1 and IgM antibody detection, prognostication through a CD4 count and viral loads (Quantitative PCR detection of HCV, HBV, HIV) in PCR lab, antibody tests, Genotyping, resistance testing etc.

Hospital Epidemiology:

Learn how to initiate, implement and maintain a monitoring and surveillance program of hospital acquired infections:

- Learn and apply basic concepts of hospital epidemiology,

- Participate in regular meetings of Hospital Infection Control Committee, Antibiotic Stewardship Committee as well as participate in nosocomial outbreak investigations and design interventions to mitigate increased incidence of HAI.
- Learn how to initiate, implement and maintain an antimicrobial stewardship program, apply stewardship metrics and be familiar with principles, practice and strategies for the same.
- Special project assignments like evaluating new or ongoing problems/nosocomial infections.
- Outbreak investigation training
- Prepare one report on hospital infection epidemiology during the course.

Infectious Disease Epidemiology:

Learn environmental factors in Infectious Diseases

- Emerging and re-emerging diseases like dengue, Ebola. Epidemic alert: Notification and reportable diseases, Recognition of Bioterrorism,
- Control strategies (levels of prevention and modes of intervention, source reduction, vaccination, integrated vector control and diagnosis and treatment) especially with regard to malaria, kala azar, scrub typhus) Public Health measures,
- Be familiar with International Health Regulations and various international disease surveillance networks in addition to WHO regulations and guidelines,
- Research in Infectious Diseases,
- Knowledge of the Geo-sentinel network for detection of travel related diseases,
- Be familiar with the tools of Geographical Information Surveillance of various diseases.

Prevention of Hospital acquired Infections (Infection Control): learn

- Epidemiology and Surveillance
- Cluster investigation
- Create guidelines to prevent transmission and control nosocomial infections
- Disinfection and sterilization
- Isolation practices system
- Regulatory compliances
- Engineering systems to ensure prevention of nosocomial infections

- Investigate outbreaks and initiate measures to prevent future outbreaks
- Training of various categories of health care workers and students with regard to infection control and antimicrobial stewardship
- ICP in community settings

ASSESSMENT

FORMATIVE ASSESSMENT

Formative assessment should be continuous and should assess medical knowledge, patient care, procedural & academic skills, interpersonal skills, professionalism, self-directed learning and ability to practice in the system.

Periodic Evaluation:

Candidates will be evaluated continuously for their performance in all areas such as clinical and investigative work, case presentations, seminars, journal clubs, procedures undertaken/participated in etc. Additional periodic assessment will include theory and practical assessment mimicking the final examination and should be conducted every 6 months. Such an evaluation will help assessing the progress of the trainees and the quality of the training programme. Evaluation will be communicated to trainees and their feedback would be taken into consideration for modifications in training programme.

Internal Assessment should be frequent, cover all domains of learning and used to provide feedback to improve learning; it should also cover professionalism and communication skills.

Quarterly assessment during the DM training should be based on:

1. **Journal based / recent advances learning**
2. **Patient based /Laboratory or Skill based learning**
3. **Self-directed learning and teaching**
4. **Departmental and interdepartmental learning activity**
5. **External and Outreach Activities / CMEs/Workshops/Conferences**
6. **Participation/conduct of research project - desirable**

The student to be assessed periodically as per categories listed in Postgraduate Student Appraisal form (Annexure I).

In **Medical disciplines**, the student should be assessed in all aspects of case management including history taking, physical examination, differential diagnosis, cost effective and appropriate investigations, treatment plan, monitoring and evaluation, patient and family counselling and interaction with all the health workers involved in the care of patients and academic presentations.

Clinical/surgical skills and performance, academic performance and personal attributes shall be graded on a scale of 1 to 5 (5 being the highest). The academic presentations shall be graded at the time of presentation, by the faculty in-charge. Evaluation on clinical/surgical skills shall be done by the unit/department in-charge at the end of every semester.

SUMMATIVE ASSESSMENT

The summative examination would be carried out as per the Rules given in the relevant POSTGRADUATE MEDICAL EDUCATION REGULATIONS.

Essential pre-requisites for appearing for examination include:

1. **Log book** of work done during the training period including rotation postings, departmental presentations, and internal assessment reports should be submitted.

2. At least **two presentations** at national level conference. At least one research paper should be published/ accepted in an indexed journal**. (It is suggested that the local or University Review committee assess the work sent for publication).**

3. Submission of thesis/ research work (desirable: as per PG Regulations)

1. **Theory**: There shall be four theory papers:

   Paper I: Basic Sciences as applied to Infectious Diseases (Immunopathogenesis, applied microbiology and pharmacology of infectious diseases, principles and practice of infection control and antimicrobial stewardship programmes, nosocomial infections and pandemic preparedness)

Paper II: Clinical Syndromes in General Infectious Diseases - approach to diagnosis and Management including principles and practice of adult vaccination

Paper III: Approach to Tropical diseases, pre-travel evaluation, post-travel syndromes and National Infectious Diseases Control programmes

Paper IV: Recent advances in infectious diseases and approach to the management of infections in the immunocompromised subjects (as in bone marrow transplant, solid organ transplant, cancer chemotherapy, elderly, people with comorbidities, Pediatric, HIV)

2. **Practical**: The practical examination should consist of the following and should be spread over two days, if the number of candidates appearing is more than five.

1. One long case: History taking, physical examination, interpretation of clinical findings, differential diagnosis, investigations, prognosis and management.
2. Three short cases from various sections of the speciality.
3. Ten OSCE stations will be kept as part of final practical examination including affective OSCE.

For DM candidates, one session can be inside ICU with focus on ICU care.

3. **Viva-voce Examination:** The viva voce examination should focus on psychomotor and affective domain, for a minimum period of 20 minutes per candidate. This may include a pedagogic session as well. (Interpretation of laboratory results to be included).

Recommended Reading:

Books (latest edition)

1. Mandell, G.L., Bennett, J.E., Dolin, R. *Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases*, Philadelphia, Churchill Livingstone.
2. Oxford Textbook of Infectious Disease Control; Andrew Cliff and Matthew Smallman-Raynor Turgeon, M.L. Oxford University Press.
3. John G. Barlett. Pocket Book of Infectious Disease Therapy. Lippincort Williams & Wilkins.
4. Clinical Infectious Disease Hardcover by David Schlossberg. Cambridge University Press.
5. R Guerrant, Walker DH, Weller PF. Tropical Infectious Diseases. Elsiever Churchill Livingston.
6. Forbes, B., Sahm, D., Weissfeld, A. *Bailey and Scott's Diagnostic Microbiology*, Mosby, St. Louis.

7. Koneman, E.W., Allen, S.D. Janda, W.M., Schreckenberger, P.C., Winn, W.C. *Color Atlas and Textbook of Diagnostic Microbiology*, J.B. Lippincott, Philadelphia.
8. Murray PR, Baron EJ, Pfaller MA, Tenover FC, Yolken RH. *Manual of Clinical Microbiology*, American Society for Microbiology.
9. Garcia LS, Bruckner DA. Diagnostic Medical Parasitology, American Society for Microbiology.
10. *Immunology & Serology in Laboratory Medicine*, St. Louis, Mosby.
11. Fundamentals of HIV Medicine 2021. W. David Hardy and Compiled by The American Academy of HIV Medicine

Journals

03-05 international Journals and 02 national (all indexed) journals

Annexure I

Student appraisal form for DM in Infectious Diseases

	Elements	Less than Satisfactory			Satisfactory			More than satisfactory			Comments
		1	2	3	4	5	6	7	8	9	
1	**Scholastic aptitude and learning**										
1.1	Knowledge appropriate for level of training										
1.2	Participation and contribution to learning activity e.g., Journal Club, Seminars, CME etc)										
1.3	Conduct of research and other scholarly activity assigned (e.g Posters, publications etc)										
1.4	Documentation of acquisition of competence (eg Log book)										
1.5	Performance in work based assessments										
1.6	Self Directed Learning										
2	**Care of the patient**										
2.1	Ability to provide patient care appropriate to level of training										
2.2	Ability to work with other members of the health care team										
2.3	Ability to communicate appropriately and empathetically with patients' families and care givers										
2.4	Ability to do procedures appropriate for the level of training and assigned role										
2.5	Ability to record and document work accurately and appropriate for level of training										
2.6	Participation and contribution to health care quality improvement										
3	**Professional attributes**										

3.1	Responsibility and accountability										
3.2	Contribution to growth of learning of the team										
3.3	Conduct that is ethical appropriate and respectful at all times										
4	**Scholarship**										
4.1	Teaching and mentoring skills appropriate to level of training										
4.2	Ability to formulate research questions, initiate conduct and complete research projects										
4.3	Ability to review and use the published literature appropriately in care of the patient lab or workspace										
4.4	Ability to provide consultations to other specialties as may be required										
5	**Space for additional comments**										
6	**Disposition**										
	Has this assessment been discussed with the trainee?	Yes	No								
	If not explain										
	Name and Signature of the assesse										
	Name and Signature of the assessor										
	Date										

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