

**THE POSTDOCTORAL FELLOWSHIP IN MICROBIAL  
MEDICINE AND INFECTIONS CONTROL**

**Duration of the Course : ONE YEAR**

**Curriculum:**

The training program will ensure that fellows acquire and demonstrate the necessary factual knowledge, skills (clinical and procedural) and attitudes that characterize the practice of Infectious Diseases.

infective therapy including use of antibacterial, antiviral, antifungal, antimycobacterial, and antiparasitic agents, with regard to:

1. Mechanisms of action
2. Spectra of activity
3. Doses and regimens
4. Drug interactions
5. Mechanisms of resistance
6. Appropriate clinical applications including principles of antimicrobial prophylaxis
7. Adverse effects/toxicities

➤ To develop knowledge, recognition, and understanding of specific infectious diseases including their epidemiology, etiologic pathogens, pathogenesis, clinical manifestations, differential diagnosis, appropriate application and interpretation of diagnostic tests, treatment, and prophylaxis for:

1. Central nervous system infections
2. Ocular infections
3. Ear, nose and throat infections
4. Upper respiratory tract infections

5. Lower respiratory, tracheobronchial and pleuropulmonary infections
6. Cardiovascular infections including endocardial, valvular, pericardial, and endovascular infections
7. Intraabdominal infections
8. Gastrointestinal tract infections
9. Hepatic and biliary infections
10. Foodborne and waterborne infections
11. Bone and joint infections
12. Sexually transmitted infections
13. Urinary and genitourinary infections
14. Skin and soft tissue infections
15. Viral exanthems and enanthems
16. Infections of indwelling venous and arterial catheters and prosthetic devices
17. HIV infection, the acquired immunodeficiency syndrome and its

associated opportunistic infections, malignancies and organ system complications

18. Nosocomial infections
19. Postoperative infections and preoperative antimicrobial prophylaxis
20. Infections in bone marrow and solid organ transplant recipients and other immunocompromised hosts

➤ To develop knowledge and understanding of specific infectious pathogens including their environmental reservoir, epidemiology, pathophysiology, associated disease processes, methods of detection and identification, application of appropriate treatment principles, and methods of prevention for:

1. Viruses
2. Chlamydiae
3. Mycoplasmas
4. Rickettsiae

5. Grampositive, gramnegative, intracellular, and unusual bacteria (including aerobic, anaerobic and facultative bacteria)

6. Spirochetes
7. Mycobacteria
8. Fungi
9. Protozoa and parasites
10. Helminths
11. Ectoparasites
12. Microbial toxins

➤ To develop knowledge and understanding of clinical microbiology laboratory procedures to enable:

1. Discussion of overall diagnostic microbiology laboratory approaches to generating diagnostic laboratory data and reports.
2. Interpretation, clinical correlation, diagnostic consultation, and communication of microbiologic procedures used for evaluation of infectious diseases.
3. Assessment of the value of new tests in the diagnostic clinical microbiology laboratory.

➤ To develop knowledge, understanding and appropriate clinical application of immunization and preventive practices for infectious diseases including:

1. Types of immunogens available and how they are derived.
2. Appropriate timing and administration of immunization.
3. Indications for and efficacy of immunization procedures.
4. Universal Immunization Program (UIP).
5. Use of adjuncts to immunization.
6. Antimicrobial pre exposure and post exposure prophylaxis.

➤ To develop knowledge and understanding of infection control practices as they relate to:

1. Principles of employee health and staff screening for communicable diseases.
2. Principles involved in infectious disease outbreak identification and investigation.
3. Surveillance and improvement of infection control practices to reduce transmission of hospitalacquired organisms.

4. Appropriate application and implementation of procedures for universal/standard precautions and body fluid and blood borne pathogen prevention.
5. Disease specific isolation procedures and body substance isolation.
6. Sterilization, disinfection, and disposal of infectious waste.
7. Principles of improving antibiotic utilization.

### **Detailed Syllabus**

## **I: BASIC PRINCIPLES IN THE DIAGNOSIS AND MANAGEMENT OF INFECTIOUS DISEASES.**

### **A: Microbial Virulence factors**

- Molecular Perspective of Microbial Pathogenicity
- Microbial Adherence
- Toxins

### **B: Host Defense Mechanism**

- Innate (General or Nonspecific) Host Defense Mechanisms
- Human Genetics and Infection
- Antibodies
- Complement
- Granulocytic Phagocytes
- Cell Mediated Defense against Infection
- Nutrition, Immunity and Infection
- Evaluation of the Patient with Suspected Immunodeficiency

### **C: Epidemiology of Infectious Diseases:**

- Epidemiologic Principles
- Emerging and Reemerging Infectious Disease Threats
- Hospital Preparedness for Emerging and Highly Contagious

Infectious Diseases

## **D: Clinical Microbiology**

- The Clinician and the Microbiology Laboratory

## **E: Antilnfective Therapy**

- Principles of Antiinfective Therapy
  - Molecular Mechanisms of Antibiotic Resistance in Bacteria
  - Pharmacokinetics and Pharmacodynamics of Antilnfective Agents
  - Penicillins
  - Cephalosporins
  - Other  $\beta$ lactam Antibiotics
  - BetaLactam Allergy
  - Fusidic Acid
  - Aminoglycosides
  - Tetracycline and Chloramphenicol
  - Rifamycins
  - Metronidazole
  - Macrolides, Clindamycin, and Ketolides
  - Glycopeptides (Vancomycin and Teicoplanin),  
Streptogramins (Quinupristin Dalfopristin), and  
Lipopeptides (Daptomycin)
  - Polymyxins (Polymyxin B and Colistin)
  - Oxazolidinones
  - Sulfonamides and Trimethoprim
  - Quinolones
  - Urinary Tract Agents: Nitrofurantoin, and Methenamine
  - Tropical Antibacterials
  - Antimycobacterial Agents
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- Systemic Antifungal Agents
- Antiviral Drugs (Other than Antiretrovirals)
- Immunomodulators
- Hyperbaric Oxygen
- Agents Active against Parasites
- Complementary and Alternative Medicines for Infectious Diseases
- Antimicrobial Management: Cost and Resistance
- Interpreting the Results of Clinical Trials on Antimicrobial Agents
- Outpatient Parenteral Antimicrobial Therapy

## **II: MAJOR CLINICAL SYNDROMES**

### **A: Fever**

- Temperature Regulation and the Pathogenesis of Fever
- Fever of Unknown Origin
- The Acutely ill patient with Fever and Rash
- Acute undifferentiated febrile illnesses

### **B: Upper Respiratory Tract Infections**

- The Common Cold
- Pharyngitis
- Acute Laryngitis
- Acute Laryngotracheobronchitis (Croup)
- Otitis Externa, Otitis Media, and Mastoiditis
- Sinusitis
- Epiglottitis

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- Infections of the Oral Cavity, Neck and Head

### **C: Pleuro pulmonary and Bronchial Infections**

- Acute Bronchitis
- Chronic Obstructive Pulmonary Disease, Chronic Bronchitis, and Acute Exacerbations
- Bronchiolitis
- Acute Pneumonia
- Pleural Effusion and Empyema
- Lung Abscess
- Chronic Pneumonia
- Cystic Fibrosis

### **D: Urinary Tract Infections**

### **E: Sepsis, severe sepsis and septic shock**

### **F: Intraabdominal Infections**

- Peritonitis and Intraperitoneal Abscesses
- Infections of the Liver and Biliary System
- Pancreatic Infections
- Splenic Abscess
- Appendicitis
- Diverticulitis and Typhilitis

### **G: Cardiovascular Infections**

- Endocarditis and Intravascular Infections
- Infections of Prosthetic Valves and Other Cardiovascular Devices
- Prophylaxis of Infective Endocarditis
- Mediastinitis

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## **H: Central Nervous System Infections**

- Approach to the Patient with Central Nervous System Infection
- Acute Meningitis
- Cerebrospinal Fluid Shunt Infections
- Chronic Meningitis
- Encephalitis, Myelitis, and Neuritis
- Brain Abscess
- Subdural Empyema, Epidural Abscess and Suppurative Intracranial Thrombophlebitis

## **I: Skin and Soft Tissue Infections**

- Cellulitis and Subcutaneous Tissue Infections
- Myositis
- Lymphadenitis and Lymphangitis

## **J: Gastrointestinal Infections and Food Poisoning**

- Principles and Syndromes of Enteric Infection
- Esophagitis
- Nausea, Vomiting, and Noninflammatory Diarrhea
- Antibiotic-Associated Colitis
- Inflammatory Enteritides
- Enteric Fever and Other Causes of Abdominal Symptoms with Fever
- Foodborne Diseases
- Tropical Sprue/Enteropathy
- Whipple's Disease



## **K: Bone and Joint Infections**

- Infectious Arthritis of Native Joints
- Osteomyelitis
- Infections with Prostheses in Bones and Joints

## **L: Diseases of the Reproductive Organs and Sexually Transmitted Diseases**

- Genital Skin and Mucous Membrane Lesions
- Urethritis
- Vulvovaginitis and Cervicitis
- Infections of the Female Pelvis
- Prostatitis, Epididymitis, and Orchitis

## **M: Eye Infections**

- Microbial Conjunctivitis
- Microbial Keratitis
- Endophthalmitis
- Infectious Causes of Uveitis
- Periocular Infections

## **N: Hepatitis**

- Acute Viral Hepatitis
- Chronic Viral Hepatitis

## **O: Acquired Immunodeficiency Syndrome**

- Epidemiology and Prevention of Acquired Immunodeficiency Syndrome and Human Immunodeficiency Virus Infection
- Diagnosis of Human Immunodeficiency Virus Infection

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- The Immunology of Human Immunodeficiency Virus Infection
  - General Clinical Manifestations of Human Immunodeficiency Virus Infection (Including the Acute Retroviral Syndromes and Oral, Cutaneous, Renal, Ocular, and Cardiac Diseases)
  - Pulmonary Manifestations of Human Immunodeficiency Virus Infection
  - Gastrointestinal and Hepatobilliary Manifestations of Human Immunodeficiency Virus Infection
  - Neurologic Diseases Caused by Human Immunodeficiency Virus<sup>1</sup> and Opportunistic Infections
  - Malignancies in Human Immunodeficiency Virus Infection
  - Human Immunodeficiency Virus Infection in Women
  - Pediatric Human Immunodeficiency Virus Infection
  - Antiretroviral Therapy for Human Immunodeficiency Virus Infection
  - Management of Opportunistic Infections Associated with Human Immunodeficiency Virus Infection
  - Vaccines for Human Immunodeficiency Virus<sup>1</sup> Infection

### **III: INFECTIONS , DISEASES AND THEIR ETIOLOGIC AGENTS**

#### **A: Viral Diseases**

- Introduction to Viruses and Viral Diseases

#### **DNA Viruses**

##### **Poxviridae**

- Orthopoxviruses: Vaccinia (Smallpox Vaccine), Variola (Smallpox), Monkeypox, and Cowpox

- Other Poxviruses That Infect Humans;

Parapoxviruses, Molluscum Contagiosum, and Tanapox

### Herpesviridae

- Introduction to Herpesviridae
- Herpes Simplex Virus
- VaricellaZoster Virus
- Cytomegalovirus
- EpsteinBarr Virus (Infectious Mononucleosis)
- Human Herpesvirus Types 6 and 7
- Kaposi's SarcomaAssociated Herpes Virus (Human Herpesvirus Type 8)
- Herpes B Virus

### Adenoviridae

- Adenovirus

### Papovaviridae

- Papillomaviruses
- JC, BK, and Other Polyomaviruses;  
Progressive Multifocal  
Leukoencephalopathy

### Hepadnaviridae

- Hepatitis B Virus and Hepatitis Delta Virus

### Parvoviridae

- Parvovirus

## **RNA Viruses**

### Reoviridae

- Orthoreoviruses and Orbiviruses

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- Coltiviruses and Seadornaviruses (Colorado Tick Fever)
  - Rotaviruses

### Togaviridae

- Alphaviruses
- Rubella Virus (German Measles)

### Flaviviruses

- Falviviruses (Yellow Fever, Dengue Hemorrhagic Fever, Japanese Encephalitis, West Nile Encephalitis, St. Louis Encephalitis, Tick Borne Encephalitis)
- Hepatitis C
- Hepatitis G Virus and TT Virus

### Coronaviridae

- Cornoviruses, Including Severe Acute Respiratory Syndrome (SARS) – Associated Coronavirus

### Paramyxoviridae

- Parainfluenza Viruses
- Mumps Virus,
- Respiratory Syncytial Virus
- Human Metapneumovirus
- Measles Virus (Rubeola)
- Zoonotic Paramyxoviruses; Hendra, Nipah, and Menangle Viruses

### Rhabdoviridae

- Vesicular Stomatitis Virus and Related Viruses
- Rhabdoviruses



### Filoviridae

- Marburg and Ebola Virus Hemorrhagic Fevers

### Orthomyxoviridae

- Influenza Virus

### Bunyaviridae

- California Encephalitis, Hantavirus Pulmonary Syndrome, and Bunyavirid Hemorrhagic Fevers

### Arenaviridae

- Lymphocytic Choriomeningitis Virus, Lassa Virus, and the South American Hemorrhagic Fevers

### Retroviridae

- Human TCell Lymphotropic Virus Types I and II
- Human Immunodeficiency Viruses

### Picornaviridae

- Introduction to the Enteroviruses
- Poliovirus
- Coxsackieviruses, Echoviruses and Newer Enteroviruses
- Hepatitis A Virus
- Rhinovirus

### Caliciviridae and Other Gastrointestinal Viruses

- Noroviruses and Other Caliciviruses
- Astroviruses and Picobirnaviruses

### Unclassified Viruses

- Hepatitis E Virus

## **B: Prion Diseases**

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

## **C: Chlamydial Diseases**

- Introduction to Chlamydial Diseases
- *Chlamydia trachomatis* (Trachoma, Perinatal Infections, Lymphogranuloma Venereum, and Other Genital Infections)
- *Chlamydophila* (*Chlamydia*) *psittaci* (Psittacosis)
- *Chlamydophila* (*Chlamydia*) *Pneumoniae*

## **D: Mycoplasma Diseases**

- Introduction to *Mycoplasma* Diseases
- *Mycoplasma Pneumoniae* and Atypical Pneumonia
- Genital Mycoplasmas : *Mycoplasma genitalium*, *Mycoplasma hominis*, and *Ureaplasma* Species

## **E: Rickettsioses and Ehrlichioses**

- Introduction to Rickettsioses and Ehrlichioses
- *Rickettsia rickettsii* and Other Spotted Fever Group Rickettsiae (Rocky) Mountain Spotted Fever and Other Spotted Fevers
- *Rickettsia akari* (Rickettsialpox)
- *Coxiella Burnetii* (Q Fever)
- *Rickettsia Prowazekii* (Epidemic or LouseBorne Typhus)
- *Rickettsia typhi* (Murine Typhus)
- Scrub Typhus
- *Ehrlichia Chaffeensis* (Human Monocytotropic Ehrlichiosis),

*Anaplasma phagocytophilum* (Human  
Granulocytotropic Anaplasmosis), and Other  
Ehrlichiae

## **F: Bacterial Diseases**

- Introduction to Bacteria and Bacterial Diseases

### ***Gram -Positive Cocci***

- *Staphylococcus aureus* (Including Staphylococcal Toxic Shock)
- *Staphylococcus epidermidis* and Other Coagulase-Negative Staphylococci
- Classification of Streptococci
- Streptococcus pyogenes
- Nonsuppurative Poststreptococcal Sequelae;  
Rheumatic Fever and Glomerulonephritis
- Streptococcus Pneumoniae
- Enterococcus Species, Streptococcus bovis, and Leuconostoc Species
- *Streptococcus agalactiae* (Group B Streptococcus)
- Viridans Streptococci, Groups C and G Streptococci, and *Gemella morbillorum*
- *Streptococcus anginosus* Group

### ***GramPositive Bacilli***

- *Corynebacterium diphtheria*
- Other Coryneform Bacteria and *Rhodococcus*
- *Listeria monocytogenes*
- *Bacillus anthracis* (Anthrax)
- *Bacillus* Species and Related Genera Other than *Bacillus anthracis*

- *Erysipelothrix rhusiopathiae*



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### ***GramNegative Cocci***

- *Neisseria meningitides*
- *Neisseria gonorrhoeae*
- *Moraxella (Branthamella) catarrhalis* and Other GramNegative Cocci

### ***Gram Negative Bacilli***

- *Vibrio cholera*
- Other Pathogenic Vibrios
- *Campylobacter jejuni* and Related Species
- *Helicobacter Pylori* and Other Gastric *Helicobacter* Species
- Enterobacteriaceae
- *Pseudomonas aeruginosa*
- *Stenotrophomonas maltophilia* and *Burkholderia cepacia*
- *Burkholderia pseudomallei* and *Burkholderia mallei*:  
Meliodosis and Glanders
- *Acinetobacter* Species
- *Salmonella* Species, Including *Salmonella typhi*
- *Shigella* Species (Bacillary Dysentery)
- *Haemophilus* Infections
- *Brucella* Species
- *Francisella tularensis* (Tularemia)
- *Pasteurella* Species
- *Yersinia* Species, Including Plague
- *Bordetella* Species

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- *Streptobacillus moniliformis* (RatBite Fever)
  - *Legionella*
  - Other *Legionella* Species
  - *Capnocytophaga*
  - *Bartonella*, Including CatScratch Disease
  - *Calymmatobacterium granulomatis* (Donovanosis Granuloma Inguinale)
  - Other GramNegative and GramVariable Bacilli

### ***Spirochetes***

- *Treponema pallidum* (*Syphilis*)
- Endemic Treponematoses
- Leptospirosis
- *Borrelia* Species (Relapsing Fever)
- *Borrelia burgdorferi* (Lyme Disease, Lyme Borreliosis)
- *Spirillum minus* (RatBite Fever)

### ***Anaerobic Bacteria***

- Anaerobic Infections: General Concepts
- *Clostridium tetani* (Tetanus)
- *Clostridium botulinum* (Botulism)
- Gas Gangrene and Other *Clostridium* -Associated Diseases
- *Bacteroides*, *Prevotella*, *Porphyromonas*, and *Fusobacterium* Species (and Other Medically Important Anaerobic Gram Negative Bacilli)
- Anaerobic Cocci
- Anaerobic GramPositive Nonsporulating Bacilli

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## ***Mycobacterial Diseases***

- *Mycobacterium tuberculosis*
- *Mycobacterium leprae* (Leprosy, Hansen's Disease)
- *Mycobacterium avium* Complex
- Infections Caused by Nontuberculous Mycobacteria

## ***HigherBacterial Diseases***

### *Nocardia* Species

- Agents of Actinomycosis

## **G: Mycoses**

- Introduction to Mycoses
- *Candida* Species
- Agents of Mucormycosis and Related Species
- *Sporothrix Schenckii*
- Agents of Chromoblastomycosis
- Agents of Mycetoma
- *Cryptococcus neoformans*
- *Histoplasma capsulatum*
- *Blastomyces dermatitidis*
- *Coccidioides* Species
- Dermatophytosis and Other Superficial Mycoses
- *Paracoccidioides brasiliensis*
- Uncommon Fungi
- *Pneumocystis* Species

## **H: Protozoal Diseases**

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- Introduction to Protozoal Diseases
- *Entamoeba histolytica*
- FreeLiving Amebas
- *Plasmodium* Species (Malaria)
- *Leishmania* Species: Visceral (kalaAzar), Cutaneous and Mucocutaneous Leishmaniasis
- *Trypanosoma* Species (American Trypanosomiasis, Chagas' Disease): Biology of Typanosomes
- Agents of African Trypanosomiasis (Sleeping Sickness)
- *Toxoplasma gondii*
- *Giardia lamblia*
- *Trichomonas vaginalis*
- *Babesia* Species
- Cryptosporidiosis (*Cryptosporidium hominis*, *Cryptosporidium parvum*, and Other Species)
- *Cyclospora cayetanensis*, *Isopora belli*, *Sarcocystis* Species, *Balantidium coli* and *Blastocystis hominis*
- Microsporidiosis

## **I: Diseases Due to Helminths**

- Introduction to Helminth Infections
- Intestinal Nematodes (Roundworms)
- Tissue Nematodes, Including Trichinosis, Dracunculiasis, and the Filariases
- Trematodes (Schistosomes and Other Flukes)
- Cestodes (Tapeworms)

- Visceral Larva Migrants and Other Unusual Helminth Infections

## **J: Ectoparasitic Diseases**

- Introduction to Ectoparasitic Diseases
- Lice (Pediculosis)
- Scabies
- Myiasis and Tungiasis
- Mites (Including Chiggers)
- Ticks

## **K: Diseases of Unknown Etiology**

- Kawasaki Syndrome

## **IV: SPECIAL PROBLEMS**

### **A: Nosocomial Infections**

- Organization for Infection Control
- Isolation
- Disinfection, Sterilization and Control of Hospital Waste
- Infections Caused by Percutaneous Intravascular Devices
- Nosocomial Respiratory Infections
- Nosocomial Urinary Tract Infections
- Nosocomial Hepatitis and Other Infections Transmitted by Blood and Blood Products
- Human Immunodeficiency Virus in Health Care Settings

- Nosocomial Herpesvirus Infections

## **B: Infections in Special Hosts**

- Infections in the Immunocompromised Host:  
General Principles
- Infections in patients with Hematologic Malignancies
- Prophylaxis and Empirical Therapy for Infection in Cancer Patients
- Infections in Injection Drug Users
- Risk Factors and Approaches to Infections in Transplant Recipients
- Infections in Recipients of Hematopoietic Stem Cell Transplantation
- Infection in Solid Organ Transplant Recipients
- Infections in Patients with Spinal Cord Injury
- Infections in the Elderly
- Infections in Asplenic Patients

## **C: Surgical and TraumaRelated Infections**

- Postoperative Infections and Antimicrobial Prophylaxis
- Burns
- Bites

## **D: Immunization**

## **E: Zoonoses**

## **F: Travel Medicine**

- Protection of Travelers
- Infections Associated with International Travel

Emphasis will be given to national health programs for control and prevention of infectious diseases (e.g., Revised National Tuberculosis Control Program, National AIDS Control Program, UIP etc.) wherever applicable.

The program's educational objectives will be attained through extensive experience in the following areas:

- Inpatient consultations on adults and children,
- Outpatient clinics and consultations,
- Clinical microbiology, virology and parasitology laboratory rotations, conferences,
- Seminars and journal clubs,
- Didactic lectures,
- Infection control committee meetings,
- Antibiotic stewardship subcommittee meetings,
- Biostatistics and research methodology coursework,
- Research projects, and
- Teaching responsibilities.

## **2. Recommended textbooks and journals:**

### **Textbooks**

1. **Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases**, 7th ed. G. L. Mandell, J. E. Bennett & R. Dolin, Eds. Churchill Livingstone, 2009.
2. **Text Book of Tuberculosis**, 2nd Edition. Rom WN, Garay SM, eds. Philadelphia, PA: Lippincott Williams & Wilkins, 2004

3. **Manson's Tropical Diseases**, 22nd Edition. Gordon C. Cook, Alimuddin I. Zumla, eds.
4. **Handbook of Leprosy**. W H Jopling and A C McDougall
5. **Sexually Transmitted Diseases**, 4th ed, edited by King K. Holmes, P. Frederick Sparling, Walter E. Stamm, Peter Piot, Judith N. Wasserheit, Lawrence Corey, Myron S. Cohen, et al, New York, NY, McGrawHill, 2008
6. **Prevention and control of nosocomial infections**, 4<sup>th</sup> Edition, Richard P. Wenzel, Ed. Philadelphia, PA, Lippincott Williams & Wilkins, 2003

### **Journals**

1. Clinical Infectious Diseases
2. Journal of Infectious Diseases
3. Current Opinion in Infectious Diseases
4. AIDS
5. New England Journal of Medicine
6. Lancet
7. British Medical Journal
8. The National Medical Journal of India
9. Journal of Association of Physicians of India
10. Indian Journal of Medical Microbiology
11. Indian journal of Medical Research
12. Journal of Global Infectious Diseases
13. BMC Infectious Diseases

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