



Course Curriculum

Post-Doctoral Certificate Course – Hospital Infection Control Department of Microbiology

All India Institute of Medical Sciences, Nagpur



DEPARTMENT OF MICROBIOLOGY AIIMS, NAGPUR

MISSION

- To develop innovative, competent, and ethical Clinical Microbiologists capable of contributing to the field of Clinical Microbiology towards better patient care and innovative research in the globally competitive environment.

VISION

- To develop a state-of-art Clinical Microbiology laboratory to provide quality patient care services.
- To carry out frontline research in various disciplines of Microbiology.
- To develop and implement ways and means to ensure quality performance of the Clinical Microbiology laboratory.
- To provide up-to-date evidence-based and holistic theoretical and practical training to the undergraduate and postgraduate students focusing on evolving them into globally competent professionals with a value orientation.
- To foster a conducive milieu for the interdisciplinary research practices thereby promoting appropriate collaborative linkages.

Department of Microbiology
All India Institute of Medical Sciences, Nagpur



Goal

To create proficient specialists in the field of **Hospital Infection Prevention and Control** who would be competent in the comprehensive practices related to the control and prevention of various Hospital associated infectious, help in the containment of multi-drug resistant organisms, help in the formulation of Antimicrobial stewardship practices & its implementation, investigate Hospital associated infection outbreaks and ensure continuing medical education to all Healthcare workers on all aspects of Infection control and prevention strategies.

1. Programme

A Post-MD/DNB Microbiology candidate upon successfully completing the **Post Doctoral Certificate Course – Hospital Infection Control** should be able to:

- Have detailed knowledge of Hospital-associated infections
- Perform surveillance of various Hospital-associated infections Catheter-Associated Urinary Tract Infection (CAUTI), Central Line-Associated Bloodstream Infection (CLABSI), Ventilator-Associated Event (VAE) and Surgical Site Infection (SSI)
- Understand and demonstrate competence regarding infection control practices with special reference to the critical care areas
- Have comprehensive understanding and implementing Antimicrobial Stewardship practices including formulation of Antibiotic Policy
- To Investigate, formulate and monitor the protocols during any Healthcare Associated outbreaks/incidences
- Play a vital role in segregation and management of Biomedical waste
- Comprehend sterilization and disinfection policies with special reference to Central sterile supply department (CSSD), Operation theatres, ICUs etc.
- Ensure continuing medical education to all Healthcare workers (HCWs) on all aspects of Infection control and prevention strategies
- To plan, execute, analyze and present the research work in Hospital infection control Conferences
- To acquire various skills for collaborative research with other allied departments

1.1 Eligibility: MD/ DNB (Microbiology)

1.2. Entrance Exams for Selection:

- 25 Marks MCQ Test based on subject concerned.
- 25 MCQs of 1 mark each
- No Negative Marking
- Merit list will be displayed for eligibility

2. Syllabus

PAPER-I: HOSPITAL INFECTION CONTROL

PAPER-II: ANTIMICROBIAL STEWARDSHIP

2.1 Theory

Section I: HOSPITAL INFECTION CONTROL

1. Hospital Infection Control Committee- structure and function
2. HAI (Health care associated infection) (Pathogenesis and Diagnosis)
3. HAI (Health care associated infection) Surveillance
4. HAI (Health care associated infection) prevention/bundle care
5. Standard precautions
 1. Hand hygiene
 2. Personal protective equipment (PPE)
6. Transmission based precautions
7. Biomedical Waste Management
8. Central sterile services department (CSSD)
9. Screening of patients/HCWs for MDROs
10. Environmental surveillance
11. *Clostridium difficile* infection (CDI) prevention
12. Laundry infection control policy
13. Kitchen, and Pest control policy
14. Autopsy- infection control policy while handling dead bodies
15. Disinfection policy including disinfection testing and endoscopes reprocessing, spillage management
16. Staff health issues
 1. Work restriction
 2. Staff Immunization
 3. Needle stick injury management
17. Outbreak investigation
18. Engineering control (e.g: ETP, HVAC etc.)
19. Infection control in Critical care areas like ICUs, Dialysis unit, Transplant unit etc.

Section II: ANTIMICROBIAL STEWARDSHIP PROGRAMME (AMSP)

Sub section 1: General concepts in Antimicrobial Stewardship (AMSP)

1. Antimicrobial Stewardship Programme –necessity and global scenario
2. Role of Microbiology in implementing AMSP
 1. Automation
 2. Biomarkers
 3. Biofire and other rapid diagnostic methods
3. Methods of implementation of AMSP
 1. Front end strategy (Restrictive strategy and antimicrobial cycling)
 2. Back-end strategy (Prospective audit and feedback)
4. Monitoring of AMSP
5. Antimicrobial Agents and their PK/PD
6. Syndromic approach for empirical therapy
7. Antimicrobial susceptibility testing (AST)

Sub section 2: Antimicrobial Stewardship Programme Audit

1. Antimicrobial Stewardship Programme in Medical unit
2. Antimicrobial Stewardship Programme in Surgical unit
3. Antimicrobial Stewardship Programme in Medical Oncology unit

2.2 Practical Skills

- Should be able to train HCWs on all aspects of Infection control and prevention strategies
- Should be able to implement Hospital Infection control and prevention strategies
- Should be able to perform and analyse surveillance of various Hospital-associated infections (CAUTI, CLABSI, VAE & SSI)
- Prevention and Management of Occupational exposure to infectious diseases (eg: Needle stick injuries, Splash injury etc.)
- Biomedical waste management
- Preparation and validation of antibiogram.

3. PDCC Activity Programme

1. Topic Seminar*
2. Journal club*
3. Tutorial*
4. Case based discussion*
5. Microteaching – once during entire tenure
6. HIC/AMS rounds (ICU/Ward rounds) – first half of everyday

Note*: Above mentioned activities will be done twice a month as per schedule

4. Rotational Posting

A. HIC/AMS rounds in first half of the day in various clinical departments:

Sr. No.	Clinical / ICU Posting	Duration	Learning Objectives
1	Medical and allied wards/ ICU	3 Months	A. Understanding Infection control practices in various areas of hospital including critical care areas – implementation, surveillance and analysis B. Perform and analyze surveillance of various HAIs in respective clinical posting C. Participation in IPC training activities D. Implementation of Antimicrobial Stewardship practices and monitor antibiotic consumption E. Monitoring adherence to Antibigram F. Outbreak investigation
2	Surgical and allied wards/ ICU	3 Months	
3	Pediatric wards/ ICU	2 Months	
4	Obstetrics and Gynecology HDU	2 Months	

B. Postings in the second half of the day

Sr. No.	Clinical / ICU Posting	Duration	Learning Objectives
1	Microbiology	8 Months	A. Reporting of samples received in Hospital infection control lab unit e.g. Surveillance samples (air, water, surface swabs) endotoxin assay, disinfectant testing etc. B. Diagnostic Stewardship practices C. Preparing and monitoring of Antibioqram
2	Pharmacology	15 days	A. Prescription audit for use of antimicrobial agents B. To understand PK/PD of antimicrobial agents C. Pharmacovigilance of antimicrobials
3	CSSD and Laundry	15 days	A. To monitor various parameters in decontamination, clean and sterile area – disinfection, sterilization in CSSD B. To understand various techniques of sterilization and disinfection used in CSSD C. To understand Risk associated with handling of contaminated linen D. Monitor laundry process-storage and transport of linen
4	Immunization clinic	15 days	A. To understand and monitor Immunization dosage, administration & schedule B. To participate in vaccination drive of healthcare workers
5	Kitchen	15 days	To monitor implementation of IPC practices

5. Project Work

The PDCC student should complete a short project work on relevant subject before appearing for the professional exam.

6. Assessment Plan

6.1 Formative Assessment

A	Theory	50 marks	MCQs = 20 x 1 = 20 marks Short Notes – 4 x 5 = 20 marks LAQ – 1 x 10 = 10 marks
B	Practical	50 marks	Case presentation – 1 x 20 = 20 marks OSPE – 15 marks VIVA – 15 marks

6.2 Eligibility for Professional Assessment:

- Candidate should secure a minimum of 40% marks in Theory and Practical separately in formative assessment, in order to be eligible to appear for Professional Examination
- 75% attendance is mandatory
- Progress report at the end of six months should be satisfactory
- Completion of project work is mandatory
- It is desirable that PDCC students should present one poster/ paper presentation at National/State/Regional conference and to submit one research paper (sent/accepted for publication/published) during period of their PDCC course.

6.3 Final Professional Assessment:

A	Theory	50 marks	MCQs = 20 x 1 = 20 marks Short Notes – 4 x 5 = 20 marks LAQ – 1 x 10 = 10 marks
B	Practical	50 marks	Case presentation – 1 x 20 = 20 marks OSPE – 15 marks VIVA – 15 marks

Note:

- For certification the Qualifying marks will be 50% Marks Separately in Theory & Practicals in the Summative exam.
- Repeat Summative Exam in 45 Days after results.

7. Eligibility Criteria for Appearing in Professional Exam

Sr. No.	Parameters	Criteria
1	Internal Assessment marks	40% Marks in formative exam separately in Theory & Practical
2	Project work	Successful completion
3	Attendance	$\geq 75\%$
4	Poster & Paper presentation in conference	Minimum 1 poster (&/or) paper presentation
5	Peer reviewed Indexed Publication	Minimum one (Accepted / published /sent for publication)
6	Progress Report (at the end of 6 months)	Satisfactory Progress Report

8. Recommended Reading

- Manual of Infection Prevention and Control. 4th Edition. Nizam Damani.
- Essentials of Hospital Infection control. 1st Edition. Apurba S Sastry.
- Hospital Acquired Infections Prevention & Control. 1st Edition. Purva Mathur.
- Essentials of Antimicrobial Stewardship. 1st Edition. Apurba S Sastry.
- A guide to infection control in the hospital, 5th Ed. Brewer, Timothy F.; Butzler, Jean- Paul; Wenzel, Richard Putnam.
- Infection prevention and control general principles and role of microbiology laboratory. Mohamed Khalid.
- Case Studies in Infection Control. Chand, Meera; Holton, John.
- Infection Prevention and Control: Perceptions and Perspectives. Paul Elliott, Julie Storr, Annette Jeanes.
- Infection control for advanced practice professionals. Korniewicz, Denise M.
- Fundamentals of Infection Prevention and Control: Theory and Practice. Debbie Weston
- Hospital Epidemiology and Infection Control. Glen Mayhall (Editor) Lippincott Williams & Wilkins. 4th edition.

List of Journals

- American journal of infection control (ISSN: 0196-6553)
- Annals of clinical microbiology and antimicrobials (ISSN: 1476-0711)
- Antimicrobial resistance and infection control (ISSN: 2047-2994)
- Canadian journal of infection control (ISSN: 1183-5702.)
- GMS Hygiene and infection control (ISSN: 2196-5226)
- Infection control & hospital epidemiology (ISSN: 0899-823X)
- International journal of infection control (ISSN: 1996-9783.)

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All India Institute of Medical Sciences Nagpur

An Institute of National Importance
"Passion for Excellence"



LOG BOOK

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Department of Microbiology



Certificate by the Head of Department

This is to certify that the performance of Dr. _____, during the period _____ to _____, has been **satisfactory/ average / unsatisfactory.**

Overall Grading:_____

Date:_____

Name and Signature of HOD:

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Department of Microbiology



Certificate by the PDCC Guide

This is to certify that project entitled _____

_____ is a project carried out
by Dr. _____ PDCC student in the Department of Microbiology
admitted in the session _____ under my guidance
and supervision at All India Institute of Medical Sciences (AIIMS), Nagpur in
fulfilment of the requirement for the PDCC in Infection Control in the Department of
Microbiology by All India Institute of Medical Sciences (AIIMS), Nagpur.

He / She has an attendance of _____%, during the period _____ to _____.

Overall Grading: _____

Date: _____

**Name and Signature of PDCC
Guide:**

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ALL INDIA INSTITUTE OF MEDICAL SCIENCES, NAGPUR



PDCC Course Hospital Infection Control

SECTION I

Name of the PDCC student: _____

Department: _____

Admitted in (Month and Year): _____

Name of the PDCC Guide: _____

Attendance: _____ days out of _____ days (__ %)

SECTION II

1. Case Presentations:

Sr. No.	Title of case	Date	Faculty I/C	Marks (10 Marks)

2. Tutorials

Sr. No.	Topic	Date	Faculty I/C	Marks (10 Marks)

3. Seminars:

Sr. No.	Title of presentation	Date	Faculty I/C	Marks (10 Marks)

4. Journal Clubs:

Sr. No.	Article presented in Vancouver style	Date	Faculty I/C	Marks (10 Marks)

5. Marks obtained in formative test:

Sr. No.	Date	Theory (100 M)	Practical (100 M)	Marks obtained (out of 200 Marks)

6. Any other academic activity conducted: _____

SECTION III

1. Papers presented

Sr. No.	Title of Paper	Authors	Event	Date

2. Posters presented

Sr. No.	Title of Poster	Authors	Event	Date

3. Publications

(Note: Mention only those publications that are published or are accepted for publication during the said period only)

Sr. No.	Title of Paper	Authors	Journal	Year/Vol/ Issue	Page Nos	Index/ Non- Indexed	Status

SECTION IV

Any other significant achievement:



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Model Question Paper

Total Questions: 20
Marks: 1 X 20 = 20 Marks

- 1) Contact precaution is required in which of the following cases?
 - a) Tuberculosis
 - b) Measles
 - c) *Clostridioides difficile* infection
 - d) Influenza
- 2) Which of the following interventions is recommended to prevent CAUTI?
 - a) Changing the urinary catheter every 48 hours
 - b) Avoiding the use of catheters whenever possible
 - c) Administering prophylactic antibiotics to all catheterized patients
 - d) Maintaining the catheter bag at the level of the patient's bladder
- 3) Which is the most important factor in preventing surgical site infections (SSIs) in the operating room?
 - a) Administering antibiotics postoperatively
 - b) Ensuring appropriate surgical hand-scrubbing techniques
 - c) Cleaning the wound with alcohol before closing
 - d) Isolating the patient after surgery
- 4) What is the primary mode of transmission for most hospital-acquired infections (HAIs)?
 - a) Airborne transmission
 - b) Contact transmission
 - c) Vector-borne transmission
 - d) Droplet transmission
- 5) Standard precautions include all the following except:
 - a) Hand hygiene
 - b) Respiratory hygiene
 - c) Use of gloves
 - d) Isolation rooms for all patients
- 6) Which of the following isolation precautions is required for patients with tuberculosis?
 - a) Contact precautions
 - b) Droplet precautions
 - c) Airborne precautions
 - d) Protective environment
- 7) The 5 Moments of Hand Hygiene' does **NOT** include:
 - a) Before patient contact
 - b) Before body fluid exposure risk
 - c) After patient contact
 - d) After contact with the patient surroundings
- 8) Surgical masks are designed to protect against:
 - a) Airborne pathogens
 - b) Droplet infections
 - c) Radiation exposure
 - d) Chemical exposure
- 9) For how long can biomedical waste be stored at a healthcare facility before disposal?
 - a) 8 hours
 - b) 24 hours
 - c) 48 hours
 - d) 72 hours
- 10) What is the main reason for the rise of multidrug-resistant organisms (MDROs) in hospital settings?
 - a) Misuse of personal protective equipment
 - b) Lack of patient isolation
 - c) Excessive use of antibiotics
 - d) Insufficient staffing
- 11) What is the primary purpose of a care bundle in the context of IPC?
 - a) Improve patient comfort and compliance

- b) Standardize evidence-based practices
- c) Provide medication to patients
- d) Increase hospital revenue

12) In what order PPE be taken off

- a) Gloves, Gown, eyewear, mask
- b) Mask, Gown, eye ware, gloves
- c) Eyewear, gloves mask, gown
- d) Gown, Gloves, mask, eye ware

13) Needle with fixed syringe should be discarded in

- a) Yellow BMW bin
- b) Red BMW bin
- c) White puncture proof container
- d) Blue BMW bin

14) What are benefits of performance alcohol based hand rub when hands are not visible soiled? Select all that apply

- a) Takes less time
- b) Removes all bacteria and viruses
- c) More effective than soap and water when hands are not visible soiled
- d) Less drying to hands

15) Which of the following is not major risk for developing C difficile associated diarrhea?

- a. Age >65
- b. Use of clindamycin
- c. Nasogastric intubation
- d. Use of probiotics

16) Which of the following type of β lactamase dose not confers resistance to carbapenems?

- a. OXA class
- b. NDM

- c. VIM
- d. Amp C

17) During which of the following procedures use of non sterile gloves is indicated?

- a. Giving epidural
- b. Invasive radiological procedure
- c. Preparing TPN and chemo agents
- d. Per vaginal examination

18) A, 34 year old SR got a finger prick from a HBSAg positive patient. SR has taken 2 full course of HBV vaccine already but his anti HBV titre remained <10m/u/ml. what will be your net line of M/N?

- a. Give HBIG x 0.06mL/kg1m (single dose)
- b. Reinitiate HBV vaccine
- c. 2 doses of HBIG to be given
- d. Both A and B

19) Which type of ICP is advised for a TB patient?

- a. All
- b. Airborne
- c. Contact
- d. Droplet

20) The anti-Hbs titer of HCW comes to be <10mIU/mL after 1month of last dose of HB vaccination. What should be the next step?

- a. HCW is already protected, no further action.
- b. Take one more booster dose.
- c. Repeat whole vaccination series.
- d. Classify HCW as non-responder.

Short Answer Questions (5 X 4 = 20 marks)

1. Discuss various methods to assess quality of air in OR
2. Define CLABSI. Discuss preventive strategies for CLABSI
3. Define outbreak. How investigate outbreak of MESA in NICU.
4. Discuss Diagnostic Stewardship

Long Answer Questions (10 X 1 = 10 marks)

1. Define HAI. Discuss transmission based precautions with suitable examples.