

Antimicrobial Resistance



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INTRODUCTION

Medicines play an important role in healthcare delivery, and when used correctly, they can help treat diseases, relieve symptoms, and alleviate patient pain. The rational use of medicines demands that patients receive medications that are suitable to their health needs, in doses that satisfy their own specific requirements, over an adequate period of time, and at the lowest possible cost to them and their community (2). Nonetheless, irrational medicine use is a significant concern in many countries.

According to WHO, more than half of all medication are prescribed, dispensed, or marketed incorrectly, and half of all patients do not take them correctly. Medicine overuse, underuse, or misuse wastes scarce resources and poses widespread health risks. One of the most common irrational use of medicines is the inappropriate use of antimicrobials, that further leads to antimicrobial resistance (AMR).

AMR emerges as bacteria, viruses, fungi, and parasites adapt to antibiotics, resulting in drug inefficiency and persistent infections, as well as an increase in the risk of serious illness and transmission. AMR is a huge global threat to people's health, jeopardizing the ability to prevent and treat a variety of infectious diseases. In the eastern Mediterranean region, AMR is being exacerbated due to a lack of laboratory capability, antimicrobial stewardship, and good data.

The health workforce is vital to providing high-quality health care. The capacity of health systems to perform well and respond effectively to health challenges such as AMR is based on a health workforce that is trained, effective, empowered, adequately qualified, and well-managed. The Global Strategy on Human Resources for Health: Workforce 2030 has stressed the critical importance of identifying health workforce challenges through effective training and education. Recognizing this need, IAPH has developed training curriculum on AMR-related issues targeting the health care professionals.

Short Courses: There are 13 courses under three programs:

Basic Antimicrobial Resistance

Course 1: Introduction to Public Health
Course 2: Antimicrobial Stewardship-Level 1
Course 3: Antimicrobial Resistance-Level 1
Course 4: Infection Control-Level 1

Antimicrobial Resistance Surveillance

Course 5: Basic Epidemiology
Course 6: Antimicrobial Resistance
-Level 2
Course 7: Antimicrobial Stewardship
-Level 2
Course 8: Applied Research in
Anti-Microbial Resistance

Advanced Antimicrobial Resistance

Course 9: Multidrug Resistance
Course 10: Infection Control-Level 2
Course 11: Antimicrobial Stewardship-Level 3
Course 12: Management and Leadership
Course 13: Scientific Writing

Each training course is delivered in (30) Learning Hours. These courses can be taken as part of the three-month programs for a Technical Diploma, or as stand-alone courses. Upon meeting the course requirements, the participant will be awarded a Successful Completion Certificate by the International Academy of Public Health (IAPH) and accredited by the Agency for Public Health Education Accreditation (APHEA).

Training Delivery Methods:

- In-class method
- Online method

2 Antimicrobial Stewardship-Level 1

Duration: 30 Learning Hours
25 CPD Points

Course Outline

- Basics of Antimicrobial Drugs
- Mechanisms of Antimicrobial Drugs
- Spectrum of Antimicrobial Activity
- Pharmacodynamics of Antimicrobial
- Introduction to Antimicrobial Stewardship
- Introduction to Antibiograms
- Rational Use of Antimicrobial Agents
- Guidelines to Effective Antimicrobial Treatment

Description

Antimicrobial resistance is driven by the overuse of antimicrobials and inappropriate prescribing. The increase in resistance is making antimicrobial agents less effective and contributing to infections that are hard to treat. Antimicrobial stewardship initiatives aim to improve the prescribing of all agents, whether they target bacterial, viral, fungal, mycobacterium or protozoal infections.

Educating the public and health care professionals in the prudent use of antimicrobials as part of an antimicrobial stewardship program is of paramount importance to preserve these crucial treatments and to help control resistance. Therefore, it is imperative that candidates be equipped with knowledge and skills on antimicrobial stewardship.



Learning Outcomes

By the end of this course, participants will be able to:

- 1- Demonstrate understanding of Essential Medicines List (EML) concept, how EML is developed, explaining its role in promoting rational use of medicines, including antimicrobials.
- 2- Explain the importance of Standard Treatment Guidelines and demonstrate the method of developing it, explaining its role in promoting rational use of medicines, including antimicrobials.
- 3- Demonstrate understanding of the Pharmacy & Therapeutics Committees (PTCs) at hospitals and explain its vital role in rational use of antimicrobials.
- 4- Explain the concept of Hospital formularies and the selection criteria for inclusion of medicines in the hospital formulary depending on different types of health facilities.
- 5- Illustrate the importance of using international nonproprietary name (INN) or generic names in the EML, STG and hospital formulary

Duration: 30 Learning Hours
25 CPD Points



Course Outline

- Pathogenic Microorganisms
- Identification of Microorganism
- Antimicrobial Mode of Action
- Pathogen Isolation and Antimicrobial Sensitivity
- VITEK and PCR Tests
- Antimicrobial and Susceptibility Tests
- Disc Diffusion Method

Description

It is important to recognize that laboratory work and clinical experience must be closely integrated; thus, laboratory-associated clinical duties are an essential component of the training program.

This course aims to provide candidates with a theoretical foundation as well as the practical, technical, clinical, and managerial skills required for health care professionals to detect and manage antimicrobial resistance.

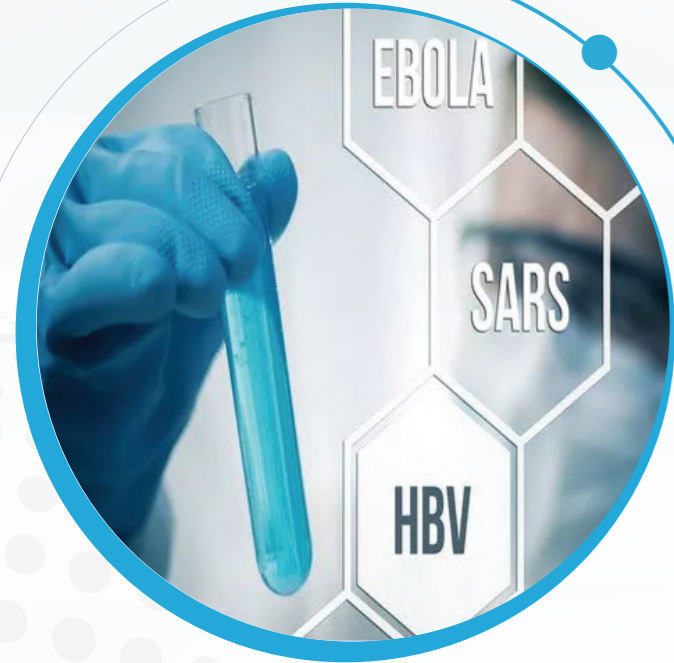


Learning Outcomes

By the end of this course, participants will be able to:

- 1- Describe the basic classification/nomenclature system(s) of microorganisms
- 2- List and compare common methods for isolation, identification and antimicrobial susceptibility testing of microorganisms
- 3- State the basic mechanisms of antimicrobial resistance
- 4- List those pathogenic microorganisms that currently present major treatment challenges due to antimicrobial resistance
- 5- Describe strategies to identify problematic pathogens in a given institution and propose actions to address those challenges to patient care
- 6- List guidelines for assembly of institutional antibiograms and describe potential pitfalls in interpretation of these reports
- 7- Describe and list procedures utilizing antibiogram information to identify and track resistance problems, make appropriate antimicrobial formulary decisions, and to prepare optimal clinical pathways at a given institution

Duration: 30 Learning Hours
25 CPD Points



Course Outline

- Microorganisms and Infection
- Transmissions and Precautions
- Immunization of Healthcare Worker
- Management of Post-Exposure to Pathogens Session

Description

All health care professionals must understand the principles and demonstrate competence in preventing and controlling infections, including those that are associated with healthcare, and apply this knowledge as a routine part of their prescribing practice to protect patients, visitors, their colleagues, and themselves from the risk of antimicrobial-resistant infection.

The principles of infection control are coupled with the science of microbial transmission and reproduction. This course is designated to provide the candidate with the basic knowledge and skill of the most important bacterial, fungal, parasitical, and viral infection to prevent the transmission of organisms in health care settings.

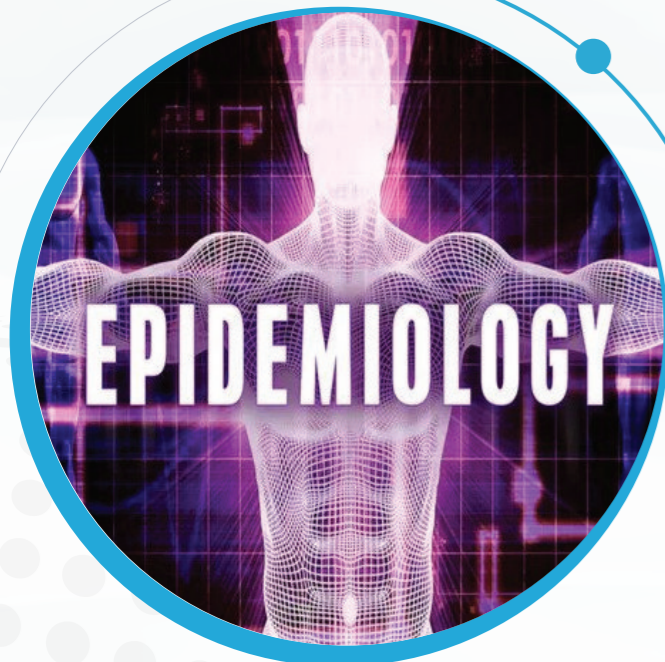


Learning Outcomes

By the end of this course, participants will be able to:

- 1- Describe and explain the infectious disease process (infection chain)
- 2- List type of reservoir of infection in human
- 3- Define carriers and list their types
- 4- Define zoonoses and list examples
- 5- Identify the different modes of transmission of the organisms
- 6- Describe the principle of infection control in hospital and community based setting
- 7- Differentiate between four types of transmission precautions

Duration: 30 Learning Hours
25 CPD Points



Course Outline

- Introduction to Epidemiology
- Descriptive Epidemiology
- Introduction to Biostatistics Part 1
- Introduction to Biostatistics Part 2
- Public Health Surveillance
- Data Analysis and Displaying
- Outbreak Investigation Part 1
- Outbreak Investigation Part 2
- Writing outbreak investigation Report
- Data Quality

Description

Epidemiology, often referred to as the “cornerstone” of public health, is the study of the distribution and determinants of diseases, health conditions, or events in populations, as well as the application of that knowledge to the control of health problems.

This course is designed to introduce participants to basic epidemiological concepts and methods and provide them with core skills in epidemiology, that is with working knowledge of the acquisition, analysis, and interpretation of information about disease occurrence in populations. Participants will gain practical experience in planning epidemiological research studies along with the appraisal of epidemiological literature.



Learning Outcomes

By the end of this course, participants will be able to:

- 1- Discuss the role of epidemiology within the broader field of public health and identify its relationship to the fields of medicine, environmental health, social and behavioural sciences and health policy
- 2- Demonstrate a sound knowledge of basic concepts and methods of epidemiology
- 3- Use descriptive epidemiological concepts such as person, time, and place to describe the distribution of disease
- 4- Calculate and interpret epidemiological measures taught in the course (e.g. incidence, prevalence, risks, odds ratio, etc.)
- 5- Plan and design public health research
- 6- Demonstrate the application of epidemiological research for the formulation, implementation and evaluation of health policies

Duration: 30 Learning Hours
25 CPD Points

Course Outline

- International Standards for Laboratory Practice
- Bio-Safety in Laboratory
- Hazardous Pathogens
- Standard Precautions in Laboratory
- Introduction to Antimicrobial Surveillance
- Sterilization and Disinfection
- Technical Components of AMR Surveillance
- Threats of Antibiotic-Resistant Bacteria Outbreak
- Role of the Lab in Antimicrobial Surveillance
- Antimicrobial Consumption Monitoring

Description

AMR surveillance is the cornerstone for assessing the burden of AMR and for providing the necessary information for action in support of local, national and global strategies.

One of the five strategic objectives of the global antimicrobial resistance action plan that has been adopted by the sixty-eight World Health Assembly is to strengthen the evidence base through enhanced global surveillance and research.

The goal of this course is to equip the candidate with knowledge and skills that enabling them to collect, analyze and share the data on AMR at a global level, in order to inform decision making, drive local, national and regional action, provide the evidence base for action and advocacy.



Learning Outcomes

By the end of this course, participants will be able to:

- 1- Work with antimicrobial and diagnostic stewardship multidisciplinary teams
- 2- Practice the international standard for laboratory practice
- 3- Conduct monitoring, evaluation and development of AMR Surveillance
- 4- Design AMR surveillance system

7 Antimicrobial Stewardship-Level 2

Duration: 30 Learning Hours
25 CPD Points

Course Outline

- Emergence of Antimicrobial Resistance in Bacteria
- Relevance of Animal Production in the Emergence of Antimicrobial Resistance
- Mechanism of Spread of AMR
- Integrating Rapid Diagnostics into Antimicrobial Stewardship
- Clinical Decision Support Software
- Designing Stewardship Interventions
- One Health Approach in Developing NAP-AMR
- Approach to Multisectoral Systems
- Core Components of NAP-AMR
- Antibiotics Policy and Guideline
- Evidence-Based Good Prescription and Dispensing
- Chain of Infection
- Best Hygiene Practices
- Epidemiology of Health Care Acquired Infections
- Management of Infection Prevention and Control Programs
- AMR Awareness and Educational Campaign

Description

This course addressing issues of antimicrobial resistance and genes through an interdisciplinary "One Health" approach that integrates human, animal and environmental health. It explores how global use and abuse of antimicrobial has profound consequences on the health of human, animal and environment.

The goal of this course is designed to provide the candidates with knowledge, skills and abilities which are critical to implement and promote Antimicrobial Stewardship.



Learning Outcomes

By the end of this course, participants will be able to:

- 1- Compare and analyze diverse viewpoints on controversial issues related to sources of ARGs/ARBs in relationship to humans, animals, and the environment (i.e. One Health)
- 2- List and compare methods for prospectively measuring antimicrobial use in an organized healthcare setting
- 3- Prepare and defend a proposal that cost-justifies the funding of a stewardship program
- 4- Document stewardship interventions and assess their effects
- 5- Provide in-service training on a stewardship program to other health care providers

Applied Research in Anti-Microbial Resistance

Duration: 30 Learning Hours
25 CPD Points

Course Outline

- Materials and Methods, Study Designs
- Study Design Selection, Study Area/Setting
- Study Population and Sampling
- Basics of Sample Size
- Study Variables, and Data Collection Tools and Techniques
- Data Analysis and Presentation
- Potential Errors in Research and Critical Appraisal

Description

This course allows participants to learn and use various concepts in research methods in AMR. The course also contains in-class exercises that allow participants to match learnt concepts to their prospective research projects.

It builds the capacity to correctly frame their samples, calculate the sample size and use suitable tools and techniques to collect the data.



Learning Outcomes

By the end of this course, participants will be able to:

- 1- Define research variables
- 2- Identify study population
- 3- Utilize appropriate sampling techniques
- 4- Identify and differentiate between random sampling error and bias
- 5- Calculate sample size for different study designs
- 6- Use various data collection technique and tools

Duration: 30 Learning Hours
25 CPD Points

Course Outline

- HIV Drug Resistance
- The HIVDR Laboratory Network
- Laboratory Diagnosis of HIVDR
- Control of HIVDR
- Epidemiology of TBDR
- Lab Network for Management of TBMDR
- Rapid Diagnosis of TBDR
- Xpert MTB/RIF
- Multidrug-Resistant Tuberculosis (MDR-TB) Control Strategies
- Challenges to Programmatic Management of Drug-Resistant TB
- Malaria Drug Resistance
- Therapeutic Efficacy Studies

Description

Multidrug Resistance is an antimicrobial resistance demonstrated by a microorganism species to at least one antimicrobial drug in three or more antimicrobial categories. Antimicrobial categories are antimicrobial agent classifications based on mode of action and specificity to target organisms. Resistance to tuberculosis (TB) drugs is a formidable obstacle to effective TB care and prevention globally.

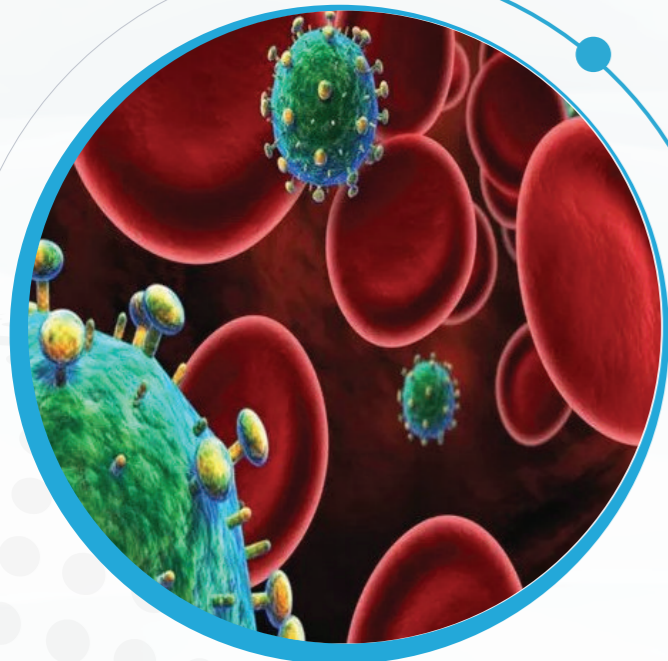
Multidrug-resistant TB (MDR-TB) is multifactorial and fueled by improper treatment of patients, poor management of supply and quality of drugs, and airborne transmission of bacteria in public places. Case management becomes difficult and the challenge is compounded by catastrophic economic and social costs that patients incur while seeking help and spending on treatments.



Learning Outcomes

By the end of this course, participants will be able to:

- 1- Apply interdisciplinary epidemiology approach to study TB, HIV and malaria drug resistant
- 2- Identify factors that influence HIV, TB and malaria drug resistance
- 3- Apply strategies for minimizing development of drug resistance
- 4- Apply strategies for responding to detection of moderate to high levels of drug resistant HIV, TB and malaria



Duration: 30 Learning Hours
25 CPD Points



Course Outline

- Surgical Site Infection
- VAP and CLABSIs
- The CAUTI and Infection Control in Dialysis Unit
- Decontamination
- Effective Hospital Infection Prevention and Control Program
- Surveillance System
- Hand Hygiene Compliance

Description

Infection control practices can greatly reduce hospital associated infections. The goal of infection prevention is to protect the patients, care givers and visitors in a cost-effective manner.

This course is designed to provide participants with an overview of contemporary infection prevention and control practices for a variety of settings. This includes global application to both human and veterinary environments.



Learning Outcomes

By the end of this course, participants will be able to:

- 1- List important components of hospital/clinic based infection prevention and control (IPC) program
- 2- Understand areas of risk to the host such as surgical site, IV and urinary catheters and ways to prevent infection
- 3- Describe the influence of the environment on the risk of infection.
- 4- Design and evaluate surveillance activities in specific settings (veterinary clinic, human hospital, and resource settings)
- 5- Describe the advantages and disadvantages of the various methods for disinfection and sterilization
- 6- Discuss the relationship between IPC practices and prevalence of MDR Organisms.
- 7- Implement Global Patient Safety Program: "CLEAN CLEAR IS SAFER CARE".

**Duration: 30 Learning Hours
25 CPD Points**

Course Outline

- Advanced Pharmacokinetics / Pharmacodynamics
- Indicators to Measure Antimicrobial Prescription
- Global Antimicrobial Resistance Surveillance System
- AMR Data Collection and Reporting
- ASP Costs and Benefits
- Financial Metrics of ASP
- Benchmarking ASPs

Description

This course builds on the advanced course of Antimicrobial Stewardship-Level 2. It addresses similar topics, but in-depth with more elaboration on application of advances in modern practices and methods to diagnose, analyze and conduct quality assurance techniques.

The goal of this course is to provide candidates with advanced knowledge and skills to implement and promote antimicrobial stewardship.



Learning Outcomes

By the end of this course, participants will be able to:

- 1- Apply advances in antimicrobial stewardship
- 2- Apply advances in antimicrobial therapeutics, including new agents, new vaccines and pharmacodynamics principles to patient care at the patient and system levels
- 3- Apply epidemiologic and infection control and susceptibility surveillance methods, including the use of electronic data capture software
- 4- Propose methods for assessing quality improvement through local, national, and international benchmarking techniques



Duration: 30 Learning Hours
25 CPD Points

Course Outline

- Teambuilding
- Leadership Styles and Theories
- Project Management
- Health Program Planning Building Health Programs that work
- Stakeholder Analysis
- Resource Management
- Health Policy
- Organizational Management
- Health Service Delivery
- Change Management
- Interpersonal Communication Skills
- SelfAwareness and SelfAssessment
- Conflict Management
- Problem Analysis
- Manage your time and manage your stress

Description

This course provides participants with basic concepts and principles of health systems, health policy, planning and management. It enables them to analyze the key aspects of health policy in developing health systems and the changing role of governments and ministries of health in health care delivery.

It provides the opportunity to understand and critically analyze issues like health system development and reforms, policy change and centralized versus decentralized health systems.



Learning Outcomes

By the end of this course, participants will be able to:

- 1- Distinguish and apply log frames, results and rights-based approaches in developing health plans
- 2- Identify key principles of policy development, planning, and management of health resources
- 3- Apply management skills and functions according to the principles of organizational management
- 4- Recognize and apply Change Management
- 5- Demonstrate the skills of teamwork and communication skills
- 6- Develop and assess leadership management skills and styles, specifically: delegation, active listening, conflict resolution and time management

Duration: 30 Learning Hours
25 CPD Points

Course Outline

- Research Process and Argument Matrix
- Writing Title Page, Abstract, and Introduction
- Writing the Research Methods
- Writing the Research Results
- Writing Discussion, Conclusion and References
- Good Manuscript Writing

Description

This course is designed to review the steps involved in, peer reviewing, and revising manuscripts for publication. The course participants will refine and demonstrate writing, reading, editing, and reviewing skills through exercises and class discussions.

This course aims to teach the fundamentals of effective scientific writing. Instruction will focus primarily on the process of writing and publishing scientific manuscripts only.

The course will be presented in two segments: part (1) teaches participants how to write effectively, concisely, and clearly and part (2) takes them through the preparation of an actual scientific manuscript.



Learning Outcomes

By the end of this course, participants will be able to:

- 1- write a scientific manuscript effectively, concisely, and clearly in the AMR area
- 2- Identify the publications best suited for their work
- 3- Have greater insight into the needs of readers and reviewers
- 4- Comprehend the purpose of each section in a research paper
- 5- Have a wider repertoire of practical strategies to improve their own research writing
- 6- Make strategic choices about how, where and when to publish their research





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