

ANTIMICROBIAL RESISTANCE COURSES



IAPH
International Academy
of Public Health

TABLE OF CONTENTS



A person in a white lab coat and gloves is holding a petri dish containing a bacterial culture. A pipette is visible in the foreground, pointing towards the petri dish. The background is slightly blurred, showing other lab equipment and a yellow biohazard sign.

INTRODUCTION	4
COURSE 1: INTRODUCTION TO PUBLIC HEALTH	6
COURSE 2: ANTIMICROBIAL STEWARDSHIP-LEVEL 1	8
COURSE 3: ANTIMICROBIAL RESISTANCE-LEVEL 1	10
COURSE 4: INFECTION CONTROL-LEVEL 1	12
COURSE 5: BASIC EPIDEMIOLOGY	14
COURSE 6: APPLIED RESEARCH IN ANTIMICROBIAL RESISTANCE	16
COURSE 7: ANTIMICROBIAL RESISTANCE-LEVEL 2	18
COURSE 8: ANTIMICROBIAL STEWARDSHIP-LEVEL 2	20
COURSE 9: MULTIDRUG RESISTANCE	22
COURSE 10: INFECTION CONTROL-LEVEL 2	24
COURSE 11: ANTIMICROBIAL STEWARDSHIP-LEVEL 2	26
COURSE 12: MANAGEMENT AND LEADERSHIP	28
COURSE 13: SCIENTIFIC WRITING	30

INTRODUCTION

Rational medicine use requires that patients receive medications appropriate to their clinical needs, in doses that meet their individual requirements, for an adequate period, and at the lowest cost to them and their community. However, irrational medicine use is a widespread and persistent problem. The World Health Organization (WHO) estimates that as much as 50 percent of global medicine use is inappropriate. Poor medicine use can harm individual patients through treatment failure, for example, or can harm society, through the promotion of antimicrobial resistance (AMR).

AMR is a steadily growing global health crisis that leaves established, first-line treatments ineffective at managing several significant infectious diseases, such as malaria, tuberculosis, HIV and gonorrhoea. Alert to this crisis, the May 2015 World Health Assembly adopted global action on antimicrobial resistance, which outlines five objectives:

1. To improve awareness and understanding of AMR through education and training
2. To strengthen knowledge and evidence base through surveillance and research
3. To reduce the incidence of infection through effective hygiene and IPC measures
4. To optimize the use of antimicrobial medicines in human and animal health
5. To ensure sustainable investment through research and development

AMR, and therefore, poor medicine use, requires an urgent and concerted response towards irrational medicine use from health workers at every level and across many disciplines. Health professionals must receive training on AMR to gain the knowledge and skills to contain its development and spread. Recognizing this need, IAPH has developed training curriculum on AMR-related issues targeting the health care professionals.

Short Courses: There are 13 courses in 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: Applied Research in Antimicrobial Resistance
Course 7: Antimicrobial Resistance-Level 2
Course 8: Antimicrobial Stewardship-Level 2

Advanced Antimicrobial Resistance

Course 9: Multidrug Resistance
Course 10: Infection Control-Level 2
Course 11: Antimicrobial Stewardship-Level 2
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 Post Graduate Diploma Certificate, or as stand-alone course. Upon meeting the course requirements, the participant will be awarded a Certificate of Successful Completion by the International Academy of Public Health (IAPH) and accredited by the Agency for Public Health Education Accreditation (APHEA).

Duration: 30 Learning Hours

Description

This course is designed to promote the application of public health sciences to a wide range of common problems and issues. It will portray the philosophy, history, underlying principles of public health, methods used in the assessment of public health problems, and current solutions to these problems. Objectives of the course are directed towards the basic knowledge of the New Public Health in order to understand and adopt the core public health competencies and essential public health skills.

Learning Outcomes

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

1. Evaluate a range of public health definitions and their relative advantages
2. Explain the phases in the development of this discipline and make a difference between traditional and New Public Health
3. Assess the benefit of a framework for essential public health functions
4. Recognize the basic fields of public health research together with quantitative and qualitative methods used in the investigation of public health problems
5. Analyze the comprehensive system of public health within the current threats and challenges at national and regional levels

Course Outline

1. Definitions and principles of public health
2. History and phases of public health practice, especially the New Public Health
3. Achievements of public health
4. Essential public health functions and services
5. Public health competencies
6. Regional challenges of public health
7. Methodological approaches in public health
8. Principles and limitations of evidence-based public health action
9. Health systems reforms
10. Principles of the assessment of the health status of populations
11. The right to health and population health ethics
12. Public health law
13. The Sustainable Development Goals (SDG) and Universal Health Coverage (UHC)
14. Main areas of public health research

Training Delivery Methods

- In-class method
- Online method

Duration: 30 Learning Hours

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 and 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 types of health facilities
5. Illustrate the importance of using International Non-proprietary Name (INN) or generic names in the EML, STG and hospital formulary

Course Outline

1. The modes of action of antibiotics and other antimicrobials
2. Knowledge of the spectrum of activity for commonly prescribed antimicrobials
3. Basics of Microbiology and Antimicrobial Pharmacodynamics
4. Introduction to Antimicrobial Stewardship
5. Background readings in Antimicrobial Stewardship
6. The rational use of antimicrobial agents for prophylaxis to minimize the risk of infection and treatment of infections
7. Using local guidelines to initiate prompt effective antimicrobial treatment within one hour of presentation, or as soon as possible, in patients with life-threatening infections

Training Delivery Methods

- In-class method
- Online method

Duration: 30 Learning Hours

Description

It must be appreciated that laboratory work and clinical experience must be closely integrated; therefore, laboratory associated clinical duties are an essential component of the training program. This one-week course aims to provide the candidates with both the theoretical foundation and the practical, technical, clinical and managerial skills necessary for the 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 related 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.

Course Outline

1. Isolation and identification of pathogenic microorganisms from clinical specimens.
2. Test fastidious bacteria and inoculums preparation using Muller Hinton broth and agar in comparison to McFarland No. 0.5 turbidity standards tube
3. Susceptibility testing using Disk Diffusion Methods
4. Determination of most useful antibiotic in treating a bacterial infection in vivo
5. Detection of possible drug resistance in common pathogens for particular infections
6. Reviewing of the results obtained from all drugs tested on an isolated patient before reporting the results
7. Interpret and report results obtained from clinical specimen (Susceptible, susceptible-dose dependent, intermediate, or resistant)

Training Delivery Methods

- In-class method
- Online method

Duration: 30 Learning Hours

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

Course Outline

1. The nature and classification of pathogenic micro-organisms
2. How micro-organisms cause infections in humans, and the importance of understanding the differences between colonization (for example, of venous leg ulceration) and infection
3. How micro-organisms are transmitted in both community and hospital settings
4. The principles and practice of the prevention and control of infection, and the need to have this reflected in individual job descriptions
5. How current vaccines can benefit prescribing practices, including reducing the need for prescribing antimicrobials and decreasing antimicrobial resistant strains.

Training Delivery Methods

- In-class method
- Online method

Duration: 30 Learning Hours

Description

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. Learning topics will include concepts of causality, measurement of geographical and temporal distribution of diseases and their outcomes, risks, biases, and study designs (descriptive, case-control, cohort and intervention studies). 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

Course Outline

1. Epidemiology as an essential tool in public health
2. Epidemiological measurements (i.e. rates, proportions, populations exposed to risk)
3. Descriptive epidemiology (i.e. person, time, place)
4. Direct and indirect standardization of rates
5. Cross-sectional studies, advantages, and limitations
6. Epidemiological study types: case control studies and cohort studies
7. Measures of effect (i.e. absolute and relative risk) and population attributable risk
8. Intervention studies
9. Application of epidemiological methods in the evaluation of preventive measures
10. Population screening and epidemiological analysis of its effects
11. Developing an epidemiological questionnaire along with validating and piloting it
12. Data sources on morbidity and mortality
13. Geographic information systems
14. Preparation of tables and graphs
15. Scholarly presentations of seminar/field work

Training Delivery Methods

- In-class method
- Online method

Duration: 30 Learning Hours

Description

The main purpose of this course is to introduce the candidates to quantitative and qualitative methods for conducting meaningful inquiry and research. They will gain an overview of research intent and design, methodology and technique, format and presentation, and data management and analysis informed by commonly used statistical methods. The course will offer the candidates an opportunity to address current methodological issues as they pertain to their own research interests thereby, providing each with the potential to knowledgeably justify and explain her or his chosen methodology and method.

Learning Outcomes

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

1. Conduct and compose a literature review on antimicrobial resistant genes (ARGs)/ antimicrobial-resistant bacteria (ARB) topics
2. Critically appraise scientific papers related to ARGs/ARB
3. Develop sound research proposals and evaluate their feasibility
4. Measure the effectiveness of AMR programs

Course Outline

1. Process of Conducting Research
2. Research Design
3. Qualitative Research
4. Interpreting Qualitative Data
5. Quantitative Research
6. Study Design
7. Sampling Concepts
8. Descriptive Statistics
9. Inferential Statistics
10. Introduction to Mixed Methods Research
11. Data Mining and finding the patterns and problems in the world of data
12. Writing about quantitative findings
13. Writing about qualitative or mixed methods findings
14. Critically critiquing researchrReports
15. Applying research in the AMR field

Training Delivery Methods

- In-class method
- Online method

Duration: 30 Learning Hours

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

Course Outline

1. International Health Regulation (IHR) core components
2. International standards for laboratory practices
3. Laboratory and biosafety
4. Standard precautions
5. Introduction to AMR surveillance
6. Role of the laboratory in AMR surveillance
7. Steps to establishing AMR surveillance
8. Technical component for AMR surveillance
9. WHO Methodology on Antimicrobial Consumption Monitoring

Training Delivery Methods

- In-class method
- Online method

Duration: 30 Learning Hours

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

Course Outline

1. Antimicrobial Resistance in animals and agriculture
2. Antimicrobial Stewardship: Beyond the Basics
3. National Antimicrobial Resistance Action Plan
4. Role of the stakeholders (Food, Environment and Animal)
5. Developing antibiotics policy and guideline
6. Evidence-based good prescribing and good dispensing guideline development.
7. Prevention and Infection Control (Standard Precaution)
8. Developing AMR awareness and educational campaigns

Training Delivery Methods

- In-class method
- Online method

Duration: 30 Learning Hours

Description

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

Course Outline

1. Basic concepts of drug resistance in TB, HIV and malaria
2. Global epidemiology of drug resistant TB
3. Laboratory network for the management of drug-resistance TB, HIV and malaria
4. Reliability of drug susceptibility testing and proficiency testing
5. Control strategies of drug resistance TB, HIV and malaria
6. Rapid diagnosis of drug-resistance TB, HIV and malaria utility and limitation
7. Challenges for programmatic management of drug resistant TB, HIV and malaria
8. Strengthening existing relevant programs

Training Delivery Methods

- In-class method
- Online method

Duration: 30 Learning Hours

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. Evaluate surveillance activities in specific settings (veterinary clinic, human hospital, and resource settings)
5. Describe advantages and disadvantages of 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 CARE IS SAFER CARE"

Course Outline

1. Infection Control Programs (definitions and terms, case examples)
2. Criteria for effective IPC program and protection of staff
3. Risk areas in healthcare (surgical sites, urinary catheters, IV catheters, needle sticks)
4. Case study and group project assignment
5. Role of the environment (Case study assessment)
6. Surveillance systems
7. Prevention of health care-associated infection (HCAI) through hand hygiene, patient care practices, isolation, and cohorting
8. Decontamination (Cleaning, disinfection, sterilization, sanitation: Principles, Application, Technologies and Monitoring)
9. Multi-drug resistant organisms (MDRO)
10. Evaluation of IPC Programs
11. Hand hygiene program

Training Delivery Methods

- In-class method
- Online method

Duration: 30 Learning Hours

Description

This course builds on the advanced course of antimicrobial stewardship. 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

Course Outline

1. Advanced pharmacokinetic/pharmacodynamics (PK/PD)
2. Local/National monitoring of antimicrobial prescribing and the rationale for surveillance of antimicrobial use and resistance as an element of antimicrobial stewardship program (ASP)
3. Perform in clinical laboratories susceptibility testing using automated antimicrobial susceptibility test methods (reader devices for broth microdilution susceptibility tests and VITEK 2 compact)
4. Molecular probes to detect resistant gene
5. Antimicrobial level test
6. Electronic Data Capture Systems
7. Local/National initiatives to monitor antimicrobial prescribing and consumption
8. Sources of data, measuring and monitoring of antimicrobial use in communities and hospitals
9. Audit methodology for monitoring the quality of antimicrobial prescriptions
10. Monitoring and reporting on antimicrobial consumption in human and animal health and agriculture, including standards for collection and reporting of data on use in different settings so that trends can be monitored, and the impact of action plans assessed (Framework and tools)
11. Epidemiology for the Stewardship Practitioner/Antimicrobial Stewardship: Measuring the Impact
12. Cost Justification of Antimicrobial Stewardship Programs
13. Benchmarking Antimicrobial Stewardship

Training Delivery Methods

- In-class method
- Online method

Duration: 30 Learning Hours

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

Course Outline

1. Development of health plans, tools and techniques
2. Health policy and policy briefs
3. Health service delivery
4. Resource planning and management
5. Organizational management
6. Change Management and dealing with uncertainty
7. Self-awareness and self-assessment for leadership development
8. Elements of leadership development
9. Communication styles and skills
10. Priority setting and Time management
11. Conflict resolution
12. Teamwork and delegation
13. Project management
14. Problem analysis and problem solving

Training Delivery Methods

- In-class method
- Online method

Duration: 30 Learning Hours

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 students 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. Know how to write a scientific manuscript effectively, concisely, and clearly
2. Identify the publications best suited for their work
3. Have greater insight into the needs of readers and reviewers
4. Understand the purpose of each section in a research paper
5. Have a wider repertoire of practical strategies to improve their own research writing
6. Be able to make strategic choices about how, where and when to publish their research

Course Outline

1. What makes good writing?
2. Editorial Ethics: Who is an author and what else is important?
3. What and how to prepare before you write?
4. Conducting a literature review
5. The anatomy of a well written paper
6. Writing the manuscript sections:
 - Cover letter
 - Title Page
 - Summary/Abstract
 - Introduction
 - Methods
 - Results
 - Discussion
 - Acknowledgment
 - References
 - Tables
 - Figures and Figure Legends
7. Submission of scientific manuscripts
8. Responding to a review
9. Communicating effectively with the media and public
10. How to enhance the publication of the manuscript?

Training Delivery Methods

- In-class method
- Online method



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