

# Fleming Fund Online Learning

---

**Tackling Antimicrobial Resistance  
Courses**



## Overview

*Tackling antimicrobial resistance* comprises 25 online modules and include videos, diagrams, reflective activities, self-assessment questions and quizzes. Each module should take up to 6 hours to complete, but you can work through them at your own pace.

You do not need to study every module to complete the course. The modules that you chose to study, and the order that you chose to study them in, will depend on your role, the activities that you undertake and your personal learning goals.

In each module there are numerous opportunities to check your learning, including interactive quizzes and activities to reflect on your learning. You will also be encouraged to reflect on how your learning on this course relates to your work.

At the end of each of the modules in this course (apart from the first one) you will be awarded a digital badge. Digital badges are like a certificate: they demonstrate that you have gained a skill and are evidence of your work and achievement on the module. You can download them and share them on your social media profiles on Facebook, Twitter or LinkedIn.

**For those interested in receiving a full statement of participation, you must complete a pathway. Pathways consist of several modules and are based upon skills relevant to key clinical, laboratory and leadership roles.**

1

Choose relevant modules or select a pathway according to your professional expertise

2

Complete the first course module to identify your learning & professional development goals

3

Complete a module and earn a digital course badge. Complete all modules a



The Fleming Fund



UKaid  
from the British people



The Open University

# Pathways



The Fleming Fund



# Pathways

Choose one of 10 pathways to earn a course badge

## Laboratory Scientist

Laboratory Professional in Human Health

Senior Laboratory Professional in Human Health

Laboratory Professional in Animal Health

Senior Laboratory Professional in Animal Health

## Clinical Practitioner

Clinical Practitioner in Human Health

Senior Clinical Practitioner in Human Health

Veterinary Service Professional

Senior Veterinary Management

## Policy Maker

## Data Scientist & Epidemiologist

### Laboratory Professionals

This pathway is aimed at laboratory technicians or assistants, technologists and laboratory scientists in the human health sector. In the modules of this pathway, you will learn about good laboratory practice and management, the One Health approach to tackling AMR, surveillance in AMR, and the processing, analysing and use of AMR data. This course has 13 modules:

- [A] AMR Surveillance & You
- [B] The Problem of AMR
- [C] Introducing AMR
- [E] Isolating & Identifying Bacteria
- [F] Antimicrobial Susceptibility Testing
- [G] Testing for Mechanisms of Resistance
- [H] Quality Assurance & AMR Surveillance
- [I] Introducing a One Health Approach to AMR
- [J] An Introduction to AMR Surveillance
- [K] Introducing AMR Surveillance Systems
- [P] Legal & Ethical Considerations in AMR
- [Q] Fundamentals of Data for AMR
- [S] Processing & Analysing AMR data

### Senior Laboratory Professionals

This pathway is aimed at Heads or manager of a laboratory or head of unit in the human health sector. In the modules of this pathway, you will learn about good laboratory practice and management, the One Health approach to tackling AMR, surveillance in AMR including national surveillance systems, and the processing, analysing and use of AMR data and antibiotic stewardship in the human health sector. This course has 17 modules:

- [A] AMR Surveillance & You
- [B] The Problem of AMR
- [C] Introducing AMR
- [E] Isolating & Identifying Bacteria
- [F] Antimicrobial Susceptibility Testing
- [G] Testing for Mechanisms of Resistance
- [H] Quality Assurance & AMR Surveillance
- [I] Introducing a One Health Approach to AMR
- [J] An Introduction to AMR Surveillance
- [K] Introducing AMR Surveillance Systems
- [N] An Overview of National AMR Surveillance
- [O] Communicating AMR Data
- [P] Legal & Ethical Considerations in AMR
- [Q] Fundamentals of Data for AMR
- [S] Processing & Analysing AMR data
- [T] Summarising & Presenting AMR data
- [V] Diagnostic Stewardship in Clinical Practice

### Laboratory Professionals

This pathway is aimed at laboratory technicians or assistants, technologists and laboratory scientists in the animal health sector. In the modules of this pathway, you will learn about good laboratory practice and management, the One Health approach to tackling AMR, surveillance in AMR, the processing, analysing and use of AMR data and antibiotic stewardship in the animal sector. There are 15 modules in this course:

- [A] AMR Surveillance & You
- [B] The Problem of AMR
- [C] Introducing AMR
- [D] AMR in Animals
- [E] Isolating & Identifying Bacteria
- [F] Antimicrobial Susceptibility Testing
- [G] Testing for Mechanisms of Resistance
- [H] Quality Assurance & AMR Surveillance
- [I] Introducing a One Health Approach to AMR
- [J] An Introduction to AMR Surveillance
- [L] AMR Surveillance in Animals
- [P] Legal & Ethical Considerations in AMR
- [Q] Fundamentals of Data for AMR
- [S] Processing & Analysing AMR data
- [W] Antimicrobial Stewardship in Animal Health

### Senior Laboratory Professionals

This pathway is aimed at Heads or manager of a laboratory or head of unit in the animal health sector. In the modules of this pathway, you will learn about good laboratory practice and management, the One Health approach to tackling AMR, surveillance in AMR including national surveillance systems, and the processing, analysing and use of AMR data and antibiotic stewardship in the animal health sector. There are 19 modules in this course:

- [A] AMR Surveillance & You
- [B] The Problem of AMR
- [C] Introducing AMR
- [D] AMR in Animals
- [E] Isolating & Identifying Bacteria
- [F] Antimicrobial Susceptibility Testing
- [G] Testing for Mechanisms of Resistance
- [H] Quality Assurance & AMR Surveillance
- [I] Introducing a One Health Approach to AMR
- [J] An Introduction to AMR Surveillance
- [K] Introducing AMR Surveillance Systems
- [L] AMR Surveillance in Animals
- [O] Communicating AMR data
- [P] Legal & Ethical Considerations in AMR
- [Q] Fundamentals of Data for AMR
- [R] Using AMR Data for Policy Making
- [S] Processing & Analysing AMR data
- [T] Summarising & Presenting AMR data
- [W] Antimicrobial Stewardship in Animal Health



### Clinical Professionals

This pathway is aimed at clinicians, nurses, pharmacists and clinical officers. In the modules of this pathway, you will learn about the One Health approach to tackling AMR, surveillance in AMR, the processing, analysing, summarising, presenting and use of AMR data and antibiotic stewardship in clinical services. This course has 14 modules:

- [A] AMR Surveillance & You
- [B] The Problem of AMR
- [C] Introducing AMR
- [H] Quality Assurance & AMR Surveillance
- [I] Introducing a One Health Approach to AMR
- [K] Introducing AMR Surveillance Systems
- [M] Sampling
- [P] Legal & Ethical Considerations in AMR
- [Q] Fundamentals of Data for AMR
- [R] Using AMR data for Policy Making
- [S] Processing & Analysing AMR Data
- [T] Summarising & Presenting AMR data
- [U] Antimicrobial Stewardship in Practice
- [V] Diagnostic Stewardship in Clinical Practice

### Senior Clinical Professionals

This pathway is aimed at Heads of hospitals, chairs of IPU committees/drugs and therapeutics/resources and superintendents. In the modules of this pathway, you will learn about the One Health approach to tackling AMR, surveillance in AMR including national surveillance systems, the handling and communication of AMR data and antibiotic stewardship in clinical services. There are 15 modules in this course:

- [A] AMR Surveillance & You
- [B] The Problem of AMR
- [I] Introducing a One Health Approach to AMR
- [J] An Introduction to AMR Surveillance
- [K] Introducing AMR Surveillance Systems
- [M] Sampling
- [N] An Overview of National AMR Surveillance
- [O] Communicating AMR Data
- [P] Legal & Ethical Considerations in AMR
- [Q] Fundamentals of Data for AMR
- [R] Using AMR data for Policy Making
- [S] Processing & Analysing AMR Data
- [T] Summarising & Presenting AMR Data
- [U] Antimicrobial Stewardship in Clinical Practice
- [V] Diagnostic Stewardship in Clinical Practice

## Veterinary Service Professionals

This pathway is aimed at veterinarians, para-veterinarians, farmers, field/veterinarian officers and veterinarian pharmacists. In the modules of this pathway, you will learn about good laboratory practice and management, the One Health approach to tackling AMR, surveillance in AMR, the fundamentals of AMR data management and its use for communication and antibiotic stewardship in the animal health sector. There are 15 modules in this course:

- [A] AMR Surveillance & You
- [B] The Problem of AMR
- [C] Introducing AMR
- [D] AMR in Animals
- [E] Isolating & Identifying Bacteria
- [F] Antimicrobial Susceptibility Testing
- [I] Introducing a One Health Approach to AMR
- [J] An Introduction to AMR Surveillance
- [K] Introducing AMR surveillance systems
- [L] AMR Surveillance in Animals
- [M] Sampling
- [O] Communicating AMR Data
- [P] Legal & Ethical Considerations in AMR
- [Q] Fundamentals of Data for AMR
- [W] Antimicrobial Stewardship in Animal Health

## Senior Veterinary Management

This pathway is aimed at Directors or deputy directors of veterinary services. In the modules of this pathway, you will learn about good laboratory practice and management, the One Health approach to tackling AMR, surveillance in AMR including national surveillance systems, the handling and communication of AMR data and antibiotic stewardship in the veterinary sector. There are 18 modules in this course:

- [A] AMR Surveillance & You
- [B] The Problem of AMR
- [C] Introducing AMR
- [D] AMR in Animals
- [E] Isolating & Identifying Bacteria
- [F] Antimicrobial Susceptibility Testing
- [I] Introducing a One Health Approach to AMR
- [J] An Introduction to AMR Surveillance
- [K] Introducing AMR Surveillance Systems
- [L] AMR Surveillance in Animals
- [M] Sampling
- [O] Communicating AMR data
- [P] Legal & Ethical Considerations in AMR
- [Q] Fundamentals of Data for AMR
- [R] Using AMR Data for Policy Making
- [S] Processing & Analysing AMR Data
- [T] Summarising & Presenting AMR Data
- [W] Antimicrobial Stewardship in Animal Health





## Policy Makers

This pathway is aimed at members of the AMR Secretariat, government departments of health/agriculture/livestock/fisheries, and representatives from the WHO, FAO, OIE. In the modules of this pathway, you will learn about the One Health approach to tackling AMR, surveillance in AMR including national surveillance systems, the processing, analysing, summarising, presenting of AMR data and its use for communication and policy making. There are 16 modules in this course:

- [A] AMR Surveillance & You
- [B] The Problem of AMR
- [C] Introducing AMR
- [D] AMR in Animals
- [I] Introducing a One Health Approach to AMR
- [J] An Introduction to AMR Surveillance
- [K] Introducing AMR Surveillance Systems
- [L] AMR Surveillance in Animals
- [N] An Overview of National AMR Surveillance
- [O] Communicating AMR data
- [P] Legal & Ethical Considerations in AMR
- [Q] Fundamentals of Data for AMR
- [R] Using AMR Data for Policy Making
- [S] Processing & Analysing AMR data
- [T] Summarising & Presenting AMR data
- [W] Antimicrobial Stewardship in Animal Health

## Data Scientists & Epidemiologists

This pathway is aimed at Data scientists and epidemiologists. In the modules of this pathway, you will learn about good laboratory practice and management, the One Health approach to tackling AMR, surveillance in AMR including national surveillance systems, the processing, analysing, summarising, presenting of AMR data and its use for communication and policy making. There are 18 modules in this course:

- [A] AMR Surveillance & You
- [B] The Problem of AMR
- [C] Introducing AMR
- [D] AMR in Animals
- [E] Isolating & Identifying Bacteria
- [F] Antimicrobial Susceptibility Testing
- [I] Introducing a One Health Approach to AMR
- [J] An Introduction to AMR Surveillance
- [K] Introducing AMR Surveillance Systems
- [L] AMR Surveillance in Animals
- [M] Sampling
- [N] An Overview of National AMR Surveillance
- [O] Communicating AMR Data
- [P] Legal & Ethical Considerations in AMR
- [Q] Fundamentals of Data for AMR
- [R] Using AMR Data for Policy Making
- [S] Processing & Analysing AMR data
- [T] Summarising & Presenting AMR data



The Fleming Fund



UKaid  
from the British people



The Open University

# Modules



The Fleming Fund



UKaid  
from the British people



MOTT  
MACDONALD



The Open  
University

## **[A] AMR SURVEILLANCE & YOU** **AVAILABLE**

This module supports learners to identify the AMR skills needed for their role and to support them to identify the modules they need to study. It brings together reflective, practice-based learning from across the module in a learning journal. Learning outcomes include:

- Describe how antibiotic resistance relates to your work
- Know what AMR knowledge and skills are required for your role
- Identify areas where your knowledge and skills require development and plan a strategy to address these skills gaps
- Reflect on how your learning has changed your working practice relating to AMR

## **[B] THE PROBLEM OF AMR** **AVAILABLE**

This module introduces the problem of AMR in a global, One Health context. It introduces the scale and scope of the problem and the factors that contribute to AMR. Learning outcomes include:

- Define the term antibiotic and give examples
- Describe the importance of antibiotics in modern health care
- Discuss the consequences of a future without antibiotics
- Describe the scale and nature of antibiotic resistance worldwide
- Explain how the overuse and misuse of antibiotics contribute to bacterial resistance
- Reflect on your own role and those of your colleagues in tackling the AMR crisis

## **[C] INTRODUCING ANTIMICROBIAL RESISTANCE** **AVAILABLE**

This module introduces how antibiotics work and how bacteria acquire and transmit resistance. It highlights examples of resistance mechanisms and pathogen-antimicrobial combinations from animal or human health. Learning outcomes include:

- Explain how antibiotics work to stop infections from spreading and kill bacteria.
- State what is meant by the term 'antibiotic resistance'
- Describe and exemplify the three main mechanisms of resistance that bacteria have developed to counteract the action of antibiotics
- Explain how genetic mutations can give rise to antibiotic resistance that can be inherited
- Explain that antibiotic resistance evolved to protect bacteria
- Apply scientific terminology when explaining how changes to antibiotic resistance relate to your current work

## **[D] AMR IN ANIMALS** **AVAILABLE**

The module introduces the uses of antimicrobials in animals to protect animal health and welfare, contribute to food safety and protect public health. Learning outcomes include:

- Describe the ways in which antimicrobials are used in animals
- Describe the main mechanisms by which emergence of AMR in animals may influence the occurrence of resistance in humans
- Explain the consequences of AMR in animals for animal health, food production and human health
- Explain why monitoring AMR in animals (including healthy animals) is critical for tackling the AMR crisis
- Illustrate the interconnectivity and links between animal health, human health and the environment in animal production systems in relation to AMR
- Apply scientific terminology related to AMR in animals when explaining your current work



The Fleming Fund



UKaid  
from the British people



MOTT  
MACDONALD



The Open  
University

## **[E] ISOLATING AND IDENTIFYING BACTERIA – different versions for Animal & Human Health** **AVAILABLE**

The module covers basic microbiology techniques for identifying bacteria (Gram stain, selective media, biochemical identification, serological typing, immunological reactivity) focusing on WHO priority pathogens and pathogens subject to surveillance and monitoring. There are two versions of this module, one for human health and the other for animal health professionals. Learning outcomes include:

- Know where samples are obtained from and reflect on the process by which bacterial samples are processed in your workplace
- Describe the principles of laboratory tests used to isolate and identify key bacterial pathogens in human/animal health
- Understand the basic concepts of advanced pathogen testing such as mass spectrometry and genomic methods
- Identify key pathogen-antimicrobial combinations related to your work

## **[F] ANTIMICROBIAL SUSCEPTIBILITY TESTING** **AVAILABLE**

This module covers disk diffusion tests and gives an overview of MICs and breakpoints. It introduces data reporting and the importance of quality assurance in this process. Example pathogen-microbe combinations are relevant to human and animal health. Learning outcomes include:

- Describe the principles of antimicrobial susceptibility testing
- Understand the process of disk diffusion testing and the relevant quality measures needed
- Understand the principles of other phenotypic methods, including automated methods
- Understand the concept of MICs and breakpoints
- Be aware of the relevant international guidelines, know where to find them and when to use them

## **[G] TESTING FOR MECHANISMS OF RESISTANCE** **AVAILABLE**

This module covers phenotypic and genotypic laboratory techniques that are used to test for common mechanisms of resistance. It emphasises the importance of good quality data and practices. Learning outcomes include:

- Give examples of the resistance patterns/resistant organisms causing global concern and of those encountered in your work
- Understand the difference between screening and confirmatory testing
- Describe some of the phenotypic methods commonly used for screening and confirmation of resistance mechanism
- Understand how genotypic methods can be used, and the advantages / disadvantages of genotypic versus phenotypic methods
- Understand how more data from detailed testing for resistance mechanisms / genes contributes to AMR surveillance
- Apply your knowledge of these laboratory tests to interpret data relevant to your work

## **[H] QUALITY ASSURANCE & AMR SURVEILLANCE** **AVAILABLE**

In this module, you will learn about the key principles underlying laboratory quality and the processes a laboratory puts in place to ensure it operates to a consistently high standard and generates good quality data. You will probably be familiar with many of the terms used in the context of quality, and many of them sound similar, for example, quality control, quality assurance, and quality management system. Learning outcomes include:

- Explain the importance of data integrity and quality in laboratory practice in the AMR surveillance context
- Describe the key components of laboratory practice that underpin quality testing and analysis of antibiotic resistance data
- Reflect on the different components of a quality management system and how these are applied in your workplace, and what improvements could be made



The Fleming Fund



UKaid  
from the British people



MOTT  
MACDONALD



The Open  
University

## **[I] INTRODUCING A ONE HEALTH APPROACH TO AMR** **AVAILABLE**

This module introduces the concept of One Health and explains the importance of a One Health approach in tackling the AMR crisis. It emphasises how a complex mix of factors involving humans, animals, aquatic species, plants and the environment contribute to the spread of antimicrobial resistance (AMR) within and between sectors. It introduces the World Health Organisation (WHO), the Food and Agriculture Organisation (FAO) and the World Animal Health Organisation (OIE) individually and collectively as the Tripartite, describing their joint role in developing a One Health approach to tackling AMR. Learning outcomes include:

- Give examples of measures that can be implemented by different sectors in a One Health approach to controlling an AMR problem.
- Identify the international and national organisational frameworks that support global and national management of AMR.

## **[J] AN INTRODUCTION TO AMR SURVEILLANCE** **AVAILABLE**

The aim of this module is to introduce the principles of surveillance, with particular emphasis on AMR surveillance. Learning outcomes include:

- Define key terms related to surveillance
- Understand the purpose of surveillance in tackling the global AMR crisis
- Describe the characteristics of different surveillance methods and how they can be applied to specific questions
- Describe where surveillance information related to your role comes from

## **[K] INTRODUCING AMR SURVEILLANCE SYSTEMS** **AVAILABLE**

This module introduces you to AMR surveillance systems and the One Health approach to AMR surveillance, and provides an overview of the relationships between AMR surveillance systems in humans, animals and the environment. It also introduces local, national and global AMR surveillance networks and covers the functions of these networks, the types of data that are collected and the uses of this data. Finally, it takes you through surveillance system design using examples. Learning outcomes include:

- Describe the One Health approach to AMR surveillance
- Outline the differences between AMR and AMU/C surveillance
- Outline the requirements of a national AMR surveillance network or system

## **[L] AMR SURVEILLANCE IN ANIMALS** **AVAILABLE**

This module describes the approaches to surveillance that take place in an animal health context. It explains the concepts of AMR, AMU and AMC and what data are obtained in each category. It also discusses antimicrobial residues and the importance of maintaining surveillance of these products. Learning outcomes include:

- Explain the differences between AMR, AMU, AMC and residues data and their importance when tackling the AMR challenge
- Describe and identify the main types of surveillance systems
- Reflect on how your role fits within local and national AMR surveillance networks, and explain the roles of the different stakeholders within the surveillance networks
- Explain the purpose of AMR-related surveillance and monitoring in animals and the importance of conducting surveillance in different groups of animals



## **[M] SAMPLING – Animal & Human Health Versions** **AVAILABLE**

This module introduces the concept of 'sampling' and how a 'sample size' is determined, including statistical and non-statistical considerations. It focuses on sampling methodologies for AMR in human health, but draws comparisons to animal health, where relevant, to emphasise the importance of One Health approaches in tackling AMR. Learning outcomes include:

- Describe the purpose of sampling individuals or livestock/aquatic species for AMR
- Explain what factors need to be considered when choosing which samples to take
- Be aware of the lists of priority pathogens suggested for sampling in individuals or livestock and aquatic species
- List the steps involved in sampling individuals or livestock/aquatic species for AMR
- Explain the common problems associated with identifying sampling frames and how they can be addressed

## **[N] AN OVERVIEW OF NATIONAL AMR SURVEILLANCE** **AVAILABLE**

The aim of this module is to explore and understand national AMR surveillance systems. It builds on the concepts and learnings from the module '*Introducing AMR surveillance systems*'. Learning outcomes include:

- Outline the role and objectives of national AMR surveillance systems in the context of the WHO GLASS approach
- Describe the structure, function and core components of a national surveillance system
- Identify the key features of the Global Action Plan on AMR
- Identify the key roles of national action plans and national surveillance strategies, the AMRCC, technical working groups, and similar bodies
- Describe the relationship between surveillance and national action plans

## **[O] COMMUNICATING AMR DATA** **AVAILABLE**

This module focuses on effectively communicating AMR data to a variety of stakeholders. Learning outcomes include:

- See the bigger picture and make the most of AMR (and AMU and AMC) data
- Identify "AMR networks" and stakeholders locally, nationally, and globally
- Recognise different target audiences and effectively match your communication strategies to each audience
- Use a range of communication platforms
- Measure how effective your communication strategies are and reflect on how to increase your impact

## **[P] LEGAL AND ETHICAL CONSIDERATIONS IN AMR DATA** **AVAILABLE**

This module introduces key concepts in medical, public health and animal ethics and shows how they relate to AMR. It then introduces the role of international legal frameworks and governance mechanisms that are relevant to AMR, highlighting that this is an emerging area of research and practice. Learning outcomes include:

- Define the four key principles of medical ethics
- Identify key ethical issues relevant to AMR
- Describe guidelines for ethics in healthcare, health research and public health and how they are relevant to AMR
- Describe guidelines and key concepts in animal ethics relevant to AMR
- Describe the current and potential role of international legal frameworks in supporting action on AMR



The Fleming Fund



UKaid  
from the British people



MOTT  
MACDONALD



The Open  
University

## **[Q] FUNDAMENTALS OF DATA FOR AMR** AVAILABLE

This module introduces the basic concepts, definitions and sources of data related to antimicrobial resistance. It reviews why we need to collect, analyse and report on AMR data, as well as data on antimicrobial use (AMU) and antimicrobial consumption (AMC). You will be introduced to important concepts related to error and bias, and how they affect the interpretation and use of AMR, AMU and AMC data. Learning outcomes include:

- Explain why it is important to measure AMR and AMU/AMC data
- Identify different types of AMR and AMU/AMC data
- Explain how data becomes useful and leads to informed decision-making in the AMR response
- Identify and explain potential sources of error and bias that affect the quality and reliability of AMR and AMU/AMC data

## **[S] PROCESSING AND ANALYSING AMR DATA** AVAILABLE

This module looks at how AMR data is transformed into information, locally and nationally. It provides an overview of the stages from data collection, to data management and data analysis. It introduces the core concepts, approaches and methods for analysing data, including descriptive and inferential statistics, and how they lend themselves to answering important questions about AMR. Sources of error and bias will also be reviewed. Learning outcomes include:

- List and explain principles of best practice for data management & collection
- Explain the difference between descriptive and inferential statistics
- Calculate measures of central tendency
- Understand concepts related to hypothesis testing
- Critically interpret reported findings from a hypothesis test, including strength of statistical evidence, and potential sources of error and bias

## **[T] SUMMARISING AND PRESENTING AMR DATA** AVAILABLE

This module introduces common ways to summarise data visually, reviews the strengths and limitations of each approach, and discusses the use of visual summaries to enhance the analysis of AMR-related data. The module explores the effectiveness of visual summaries in communicating important information to a wide range of people. Learners will have the opportunity to reflect on the most appropriate ways to visualise AMR-related data to look for patterns and trends and identify errors in data.

Learning outcomes include:

- Describe the different ways to represent data visually
- Explain why visual summaries of data are an essential part of AMR data analysis
- Review the strengths and limitations of each visual presentation
- Make a simple graph and map using AMR data

## **[V] DIAGNOSTIC STEWARDSHIP IN CLINICAL PRACTICE** AVAILABLE

This module explains basic laboratory methods at a level that can be understood by non-laboratory personnel. The module introduces pre-analytical, analytical and post analytical laboratory processes, and discusses factors that contribute to the optimum performance of tests, using the most cost effective approach. Learning outcomes include:

- Describe the role of clinical microbiologists in diagnostic stewardship programs
- Understand the principles of taking appropriate clinical samples in the context of AMR
- Understand how the microbiology laboratory can be used effectively in patient management and in understanding the epidemiology of infectious diseases



The Fleming Fund



UKaid  
from the British people



MOTT  
MACDONALD



The Open  
University

## **[W] ANTIMICROBIAL STEWARDSHIP IN ANIMAL HEALTH** **AVAILABLE**

This module provides an overview of antimicrobial stewardship (AMS) in animal health, including prescribing and using antimicrobials for therapeutic and non-therapeutic purposes and the role of diagnostics in guiding therapeutic decisions in food animal production. Learning outcomes include:

- Define the five principles of AMS in animal health
- Describe how intrinsic and extrinsic factors drive prescribing behaviour
- List and explain the different therapeutic and non-therapeutic uses of antimicrobial agents in food animal production
- Identify the relationship between AMS and animal welfare
- List antimicrobial agents rated as critically important for people that are commonly used in food animal production
- Describe international standards for prudent use of antimicrobials

## [U] ANTIMICROBIAL STEWARDSHIP IN CLINICAL PRACTICE

Release date: July 2021

This module focuses on the principles and practice of antimicrobial stewardship in the clinical context. It discusses prescribing practices and the use of antimicrobials for therapeutic purposes, and the ways in which practices can be improved to mitigate the problem of AMR.

Learning outcomes include:

- Understand the principles and strategy of an Antimicrobial Stewardship (AMS) program.
- Describe how inappropriate, overuse and misuse of antimicrobials impact on the development of resistance
- Be aware of the availability of treatment guidelines
- Describe how infection prevention and control (IPC) measures support AMS
- Explain the role of the laboratory in the AMS process
- Understand how to set up an AMS committee
- Understand the cost effectiveness of implementing antimicrobial stewardship

## [R] USING AMR DATA FOR POLICY MAKING

Release date: July 2021

This module explores how AMR data can be used to develop effective policies and how to communicate science data to policy makers who may not be subject experts. Learning outcomes include:

- Understand how AMR data can influence policy making
- Identify who relevant policy makers are and what they do
- Use an engaging and accessible writing style for people who are not subject matter experts
- Effectively deliver science advice to policy makers
- Recognise barriers to policy making and how to overcome them



The Fleming Fund



UKaid  
from the British people



MOTT  
MACDONALD



The Open  
University

# Requirements for each pathway

Modules	AMR surveillance and you	The problem of AMR	Introducing AMR	AMR in animals	Isolating and identifying bacteria	Antimicrobial susceptibility testing	Testing for mechanisms of resistance	Quality Assurance and AMR surveillance	Introducing a OneHealth approach to AMR	An introduction to AMR surveillance	Introducing AMR surveillance systems	AMR surveillance in animals	Sampling	An overview of national AMR surveillance	Communicating AMR data	Legal and ethical considerations in AMR data	Fundamentals of data for AMR	Using AMR data for policy making	Processing and analysing AMR data	Summarising and presenting AMR data	Antimicrobial stewardship in clinical practice	Diagnostic stewardship in clinical practice	Antimicrobial stewardship in animal health
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W
Laboratory Professionals Human Health	Available	Available	Available		Available	Available	Available	Available	Available	Available	Available					Available	Available		Available				
Laboratory Professionals Animal Health	Available	Available	Available	Available	Available	Available	Available	Available	Available	Available		Available				Available	Available		Available				Available
Senior Laboratory Professionals Human Health	Available	Available	Available		Available	Available	Available	Available	Available	Available	Available			Available	Available	Available	Available		Available	Available		Available	
Senior Laboratory Professionals Animal Health	Available	Available	Available	Available	Available	Available	Available	Available	Available	Available	Available				Available	Available	Available	Available	Available	Available			Available
Clinical Professionals	Available	Available	Available					Available	Available		Available		Available			Available	Available	Available	Available	Available	Available	Available	
Veterinary Service Professionals	Available	Available	Available	Available	Available	Available			Available	Available	Available	Available	Available		Available	Available	Available	Available	Available				Available
Senior Clinical Professionals	Available	Available							Available	Available	Available		Available	Available	Available	Available	Available	Available	Available	Available	Available	Available	
Senior Veterinary Management	Available	Available	Available	Available	Available	Available			Available	Available	Available	Available	Available		Available	Available	Available	Available	Available	Available	Available		Available
Policy Makers	Available	Available	Available	Available					Available	Available	Available	Available		Available	Available	Available	Available	Available	Available	Available			Available
Data scientists & Epidemiologists	Available	Available	Available	Available	Available	Available			Available	Available	Available	Available	Available	Available	Available	Available	Available	Available	Available	Available			Available

Release Dates

Available
  July 2021