



The University of Zambia
School of Veterinary Medicine

ANTIMICROBIAL STEWARDSHIP MODULE FOR VETERINARIANS





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UNIVERSITY OF ZAMBIA SCHOOL OF VETERINARY MEDICINE

The Samora Machel School of Veterinary Medicine is situated at the University of Zambia (UNZA) in Lusaka at Great East Road campus. The School has four teaching Departments supported by diagnostic and research laboratories, Small and Large-animal clinics, as well as field stations in Shibuyunji district and Liempe in Chongwe district, to facilitate student practical training.

The vision and mission for UNZA are:

Vision: “To be a renowned University with a global appeal that is driven by the pursuit of knowledge, research, innovation, and responsiveness to societal needs.”

Mission: “To provide quality and relevant higher education, research, and innovation that shape the future of society.”

In line with UNZA's vision and mission, the School produces skilled veterinary professionals who are competent to play a key role in the improvement of livestock health, increase livestock production, and enhance livestock disease control, surveillance, and research.

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ABBREVIATIONS AND ACRONYMS

AMC	Antimicrobial Consumption
AMR	Antimicrobial Resistance
AMRCC	Antimicrobial Resistance Coordinating Committee
AMS	Antimicrobial Stewardship
AMU	Antimicrobial Use
AWaRe	Access, Watch, Reserve
CIDRZ	Center for Infectious Disease Research in Zambia
CVRI	Central Veterinary Research Institute
DVS	Department of Veterinary Services
FAO	Food and Agriculture Organisation of the United Nations
MFL	Ministry of Fisheries and Livestock
OH	One Health
PVS	Performance of Veterinary Services
TEVETA	Technical Education, Vocational and Entrepreneurship Training Authority
UNZA	University of Zambia
VAZ	Veterinary Association of Zambia
VCZ	Veterinary Council of Zambia
WOAH	World Organisation for Animal Health
ZIAH	Zambia Institute of Animal Health
ZNPHI	Zambia National Public Health Institute

FOREWORD

Zambia has made progress against antimicrobial resistance (AMR) through implementing the 2017 - 2027 Multi-sectoral National Action Plan on Antimicrobial Resistance (NAP), however, challenges remain. One of the areas earmarked during the NAP implementation was the need for a standardized effective approach for professional development as pertains antimicrobial stewardship (AMS) among veterinarians. This standardised training method has proved to be an effective approach for professional development in other professional fields.

To ensure a successful training program, the Ministry of Fisheries and Livestock through the Department of Veterinary Services, with support from its various cooperating partners, has developed this module to provide a systematic and structured approach of administering training and increased AMS awareness among veterinarians.

Antimicrobials have been used in humans and animals since their discovery. However, the benefits of antimicrobials are increasingly threatened by AMR, which poses a global public health and economic threat involving humans, animals and the environment. As AMR continues to jeopardize public health, significant attention has been directed toward the use of antimicrobials in food animals, as many of the antimicrobials used in animals are also administered in human healthcare.

With the livestock industry accounting for around 42% of the agricultural sector's Gross Domestic Product (GDP) and 50% in employment for rural areas. It plays an important role as a provider of food, nutrition security, manure, raw materials for industries, employment and income generation. With the development of this module, progress will be made towards improving awareness and understanding of AMR through effective communication, education and training among veterinary professionals.

It is my sincere hope that this training module in Antimicrobial Stewardship for veterinarians in Zambia will improve the quality and uniformity of veterinary care and treatment and promote antimicrobial stewardship.

Dr. Max Choombe
PERMANENT SECRETARY
MINISTRY OF FISHERIES AND LIVESTOCK

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1.0 RATIONALE

Antimicrobials have been used in humans and animals since their discovery. However, the benefits of antimicrobials are increasingly threatened by the development of antimicrobial resistance (AMR) in pathogens, which poses a global public health and economic threat involving humans, animals, and the environment. As AMR continues to jeopardize public health, significant attention has been directed toward the use of antimicrobials in food animals, as many of them used in animals are also administered in human healthcare.

In 2017, Zambia developed its Multisectoral National Action Plan (NAP) on AMR based on the global AMR strategy and has made progress in its implementation (Government of the Republic of Zambia, 2017). Nonetheless, challenges persist, including limited resources and the imprudent use of antimicrobials, highlighting the urgent need for antimicrobial stewardship (AMS).

Antimicrobial Stewardship principles focus on the responsible and prudent use of antimicrobials in the animal and agricultural sectors. While the increasing resistance to antimicrobials among viruses, fungi, and parasites is of equal concern, this module will primarily address the public health challenges posed by bacterial resistance to antibiotics.

This Module on Antimicrobial Stewardship is designed for practicing veterinarians who serve as frontline officers in animal health care and disease management. It addresses a critical gap identified during the expert review workshop and the Performance of Veterinary Services (PVS) assessments conducted by the World Organization for Animal Health (WOAH) in 2023, which revealed inadequate AMS in Zambia's veterinary sector.

The module aims to equip veterinarians with the knowledge and tools necessary to promote AMS in clinical practice. By doing so, the training responds to the global call for capacity building in AMS. Training in AMS is essential, as it encourages the prudent, safe, and rational use of antimicrobials, contributing to the reduction of the growing threat of AMR.

2.0 MODULE PURPOSE

The purpose of this module is to equip veterinarians with the knowledge and tools to promote AMS in veterinary practice.

3.0 MODULE LEVEL DESCRIPTOR

3.1 Foundational Competencies

- Knowledge of veterinary antimicrobials and pharmacology
- Knowledge of disease epidemiology
- Knowledge of infection prevention, control and biosecurity principles
- Knowledge of antimicrobial stewardship principles

3.2 Practical Competencies

- Ability to prevent and control animal diseases
- Ability to manage and treat animal diseases
- Ability to use antimicrobials prudently and effectively

3.3 Reflexive Competencies

- Communicate information on AMR and AMS to farmers and animal health providers
- Exercise professionalism and ethics when conducting AMS-related work
- Supervise sanitary disposal of animal waste

4.0 MODULE LEARNING OUTCOMES

On completion of this module, trainees will be able to:

- 4.1 Prescribe antimicrobials in veterinary clinical practice
- 4.2 Apply AMS principles in the management of animal diseases
- 4.3 Implement disease prevention and control measures
- 4.4 Apply AMS principles in herd health
- 4.5 Dispose of antimicrobials and animal waste according to standard guidelines
- 4.6 Explain relevant policies, regulations, standards, and guidelines related to AMR
- 4.7 Explain information on AMR and AMS to farmers and other relevant stakeholders
- 4.8 Exercise professionalism and ethics when conducting AMS-related work

5.0 PROGRAMME DURATION

The duration of the module is a **total of 40** notional learning hours.

6.0 DELIVERY MODES AND METHODS

6.1 Delivery Mode

- Fulltime (Conventional)
- Fieldwork

6.2 Learning Methods

Learning shall constitute:

- Lectures

- Practical training
- Group discussions
- Case studies
- Demonstrations
- Audiovisual (Simulations, Charts, Video)
- Field visits
- Presentations

6.3 Assessment Methods

- Assignments
- Practicals
- Class exercises
- Tests

MODULE: ANTIMICROBIAL STEWARDSHIP FOR VETERINARY SURGEONS		DURATION: 40 HOURS	CREDITS: 400
MODULE PURPOSE: To equip trainees with knowledge, skills, and appropriate attitudes to apply principles of Antimicrobial Stewardship (AMS).			
LEARNING OUTCOMES On completion of this module, trainees will be able to: 1. Prescribe antimicrobials in veterinary clinical practice. 2. Apply AMS principles in the management of animal diseases. 3. Implement disease prevention and control measures. 4. Apply AMS principles in herd health. 5. Apply correct disposal of antimicrobials and animal waste 6. Describe relevant policies, regulations, standards, and guidelines related to Antimicrobial Use (AMU) and AMS. 7. Explain information on AMR and AMS to farmers and other relevant stakeholders. 8. Exercise professionalism and ethics when conducting AMS-related work.			
Learning Conditions: Trainees must be given access to: • Textbooks and reference materials including pharmacology • Internet and library resources • Laboratory facilities for antimicrobial sensitivity testing (AST)	Values and Attitudes: • Ethical Responsibility: Protecting Public Health and ensuring animal welfare through prudent use of antimicrobials • Attention to Detail: Precision in veterinary clinical diagnosis • Critical Thinking: Evaluating different antimicrobials for therapeutic use	Assessment Methods: • Written exams to test theoretical knowledge. • Practical assignments on veterinary clinical examination and AST • Group projects on specific prudent use of antimicrobials • Oral presentations on innovative or alternative strategies for prudent use of antimicrobials	

• Tools for sample collection • Access to farms or animal facilities for practical experience. • Visual aids • Standard Treatment Guidelines	• Innovation: Adapting to new research and technology in antimicrobial use • Sustainability: Promoting environmentally friendly use of antimicrobials • Sober-minded: Maintaining composure, a clear-headed perspective, and a rational approach to challenges	• Continuous assessment through quizzes and participation in class discussions
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UNIT 1.0: DESCRIBE THE CONCEPT OF ANTIMICROBIAL STEWARDSHIP		DURATION: 6 HOURS	CREDITS: 0.6
Specific Learning Outcomes	Learning Activities	Assessment Criteria	
1.1 Define AMS and explain its importance in animal and public health.	- Interactive lecture with multimedia - Define the concept of AMS - Explain the importance of AMS - Group discussion on AMR impact on humans, animals and the environment in Zambia and globally	- AMS correctly defined - The importance of AMS in animal and public health correctly explained	
1.2 Explain the key principles and core components of AMS programs.	- Case study of a successful AMS program - Interactive matching of AMS components to examples.	Key principles and core components of the AMS program correctly explained	
1.3 Describe the roles and responsibilities of veterinary professionals and paraprofessionals in AMS.	- Brainstorming session and role-play scenarios on antimicrobial use decisions. - Group activity: “What would you do?” Cases.	Roles and responsibilities of veterinary professionals and paraprofessionals in AMS correctly described.	
1.4 Explain how AMS links with One Health and the fight against AMR.	- Explain AMS linkage to One Health. - Explain AMS linkage to fight against AMR - Group activity discussions on One Health linkages (animal, human, plant and environment).	AMS links with One Health and the fight against AMR correctly explained.	
1.5 Discuss challenges and opportunities in implementing AMS in Zambia or similar low-resource settings.	- Group discussion and analysis of the Strengths, Weaknesses, Opportunities and Threats (SWOT). - Facilitated reflection on local experiences	Challenges and opportunities in implementing AMS in Zambia or similar low-resource settings correctly discussed.	

UNIT 2.0: PRESCRIBING ANTIMICROBIALS IN VETERINARY CLINICAL PRACTICE		DURATION: 3 HOURS	CREDITS: 0.3
Specific Learning Outcomes	Learning Activities	Assessment Criteria	
1.1 Apply evidence-based guidelines in selecting appropriate antimicrobials for various infections.	Applying evidence-based guidelines in selecting appropriate antimicrobials for various infections. - Principles of evidence-based antimicrobial selection - Role of clinical guidelines - Hierarchy of evidence in veterinary antimicrobial use - AMS in veterinary practice - Importance of responsible antimicrobial use - Strategies to minimize AMR - Regulatory frameworks and guidelines (WOAH, WHO, FAO, etc.) - Standard Treatment Guidelines and Essential Veterinary medicine list - First line, second line, and last resort antimicrobials - WHO AWaRe classification - Classification based on critical importance - WOAH classification - When to escalate or de-escalate therapy	Evidence-based guidelines in selecting appropriate antimicrobials for various infections are applied correctly.	
1.2 Demonstrate proper prescription writing and compliance with veterinary regulations	Demonstrating proper prescription writing and compliance with veterinary regulations - Fundamentals of Veterinary Prescription Writing - Definition and importance - Legal and ethical responsibilities	Prescription writing and compliance with veterinary regulations demonstrated correctly.	

	• Structure and components of a veterinary prescription ○ Patient and owner information ○ Prescriber information ○ Drug information ○ Dosage and administration instructions ○ Withdrawal periods ○ Special instructions and warnings • Compliance with veterinary regulations and policies ○ Prescription only, pharmacy and General Sales medicines ○ Controlled and restricted antimicrobials	
1.3 Promote AMS by minimizing misuse and preventing resistance development	Promoting AMS by minimizing misuse and preventing resistance development • Principles of Veterinary AMS ○ Definition and importance of antimicrobial stewardship ○ Goals of AMS ○ One Health Approach to AMR	AMS by minimizing misuse and preventing resistance development promoted correctly.

UNIT 3.0: APPLYING AMS PRINCIPLES IN THE MANAGEMENT OF ANIMAL DISEASES		DURATION: 3 HOURS	CREDITS: 0.3
Specific Learning Outcomes	Learning Activities	Assessment Criteria	
2.1 Demonstrate knowledge of clinical signs and diagnostic methods for infections in animals	• Demonstrating knowledge of clinical signs and diagnostic methods for infections in animals. • General signs of infection • System-specific signs of infection ○ Respiratory infections ○ Gastrointestinal infections ○ Urinary tract infections ○ Integumentary system infections ○ Musculoskeletal system infections ○ Reproductive infections ○ Neurological infections ○ Cardiovascular system infections ○ Lymphatic system infections ○ Eye and ear infections ○ Endocrine system infections • History taking, Clinical Examination and sampling • Patient history and predisposing factors • Physical examination and lesion assessment • Sample collection techniques (swabs, aspirates, blood, urine), packaging and transportation • Laboratory Diagnostic Methods • Hematology and Biochemistry • White blood cell (WBC) count, Markers of inflammation (e.g., C-reactive protein, fibrinogen)	Clinical signs and diagnostic methods for infections in animals are demonstrated correctly.	

	• Microbiological Culture and phenotypic characterisation • AST • Molecular Diagnostics • Polymerase Chain Reaction (PCR) for pathogen detection • Whole-genome sequencing for AMR profiling • Serological Tests • Enzyme-linked immunosorbent assay (ELISA) • Agglutination and complement fixation tests	
2.2 Select appropriate laboratory tests for confirmatory diagnosis	Selecting appropriate laboratory tests for confirmatory diagnosis • Importance of laboratory confirmatory diagnosis • Consider the performance characteristics of diagnostic tests (Sensitivity, specificity and predictive value of diagnostic tests) • Consider operational characteristics of diagnostic tests (feasibility and cost)	Appropriate laboratory tests for confirmatory diagnosis were selected correctly.
2.3 Interpret diagnostic test results to inform antimicrobial therapy decisions	Interpreting diagnostic test results to inform antimicrobial therapy decisions • Differentiating bacterial, viral, fungal and parasitic infections • Understanding false positives and false negatives in diagnostic tests • Combining clinical signs with laboratory findings for accurate diagnosis	Diagnostic test results interpreted correctly.

UNIT 4.0: IMPLEMENTING DISEASE PREVENTION AND CONTROL MEASURES		DURATION: 3 HOURS	CREDITS: 0.3
Specific Learning Outcomes	Learning Activities	Assessment Criteria	
3.1 Apply biosecurity principles in the control of animal diseases.	Applying biosecurity principles in the control of animal diseases • Cleaning and disinfection of animal facilities and equipment • Assessment of the efficacy of disinfection • Knowledge of detergents and disinfectants • Footbaths, wheel baths, hand washing facilities • Use of Personal Protective Equipment (PPE) • Knowledge of infrastructure of animal housing and fencing • Pest control ○ Safe disposal • Movement control	Biosecurity principles in the control of animal diseases applied correctly.	
3.2 Explain principles of the epidemiology of diseases relating to AMR.	Explain principles of epidemiology of diseases pertaining to AMR. • Distribution and occurrence of diseases (What? When? Where? How?) • Transmission patterns • Associated risk factors and drivers • Control measures • Passive and active surveillance • Reporting tools and procedures	Principles of epidemiology of diseases relating to AMR explained correctly.	

3.3 Design herd/flock health programs for various species.	Designing herd/flock health programs for various species. • Routine farm visit activities such as:- ○ Vaccination programs and National Disease Calendar ○ Deworming programs ○ Farm animal husbandry activities or practices (e.g Dehorning) ○ External parasites control ○ Nutrition programs ○ Tuberculosis and Brucellosis testing • Early disease reporting • Record keeping ○ Disease and treatment given ○ Duration of treatment • Emergency Drug kit • Animal welfare ○ Stress ○ Housing ○ Stocking density ○ Husbandry practices • On-farm training and consultations ○ Rational use of antimicrobials ○ Importance of vaccination	Herd/flock health programs designed correctly.
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3.4 Demonstrate knowledge of legislation and government policies relating to AMR	Demonstrating knowledge of legislation and government policies relating to AMR • Legislation relating to: ○ Veterinary practice and animal health ○ Medicines and allied substances ○ Operations of agro-veterinary shops ○ Disposal of medicines and allied substances ○ Notifiable diseases • National Policies/Strategies Relating to AMR and AMU	Knowledge of legislation and government policies demonstrated correctly
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UNIT 5.0: APPLY AMS PRINCIPLES IN HERD HEALTH PROGRAMMES		DURATION: 4 HOURS	CREDITS: 0.4
Specific Learning Outcomes	Learning Activities	Assessment Criteria	
4.1 Apply AMS principles in herd health.	Applying AMS principles in a planned herd health program • Core principles of AMS and their importance in preserving the effectiveness of antibiotics ○ Rational use antibiotics ○ Implementing preventive measures to reduce the need for antibiotics • Implementation of an AMS program at the farm ○ Farm AMU policy ○ Antimicrobial treatment guidelines ○ AMR monitoring ○ Alternative treatment and therapies	AMS principles in herd health activities are applied correctly.	

4.2 Apply AMS best practices in herd health	Applying AMS best practices in herd health • Educate farmers on herd health and AMS best practices • Provide on-farm consultation on AMS best practices • Provide written resources to farmers on AMS best practices	AMS best practices applied correctly
4.3 Evaluate herd health and AMS programmes	Evaluating herd health and AMS programmes • Regular farm visits • Data collection and analysis • Performance indicators for herd health and AMS	Herd health and AMS programmes evaluated correctly

UNIT 6.0: APPLYING CORRECT DISPOSAL OF ANTIMICROBIALS AND ANIMAL WASTE		DURATION: 6 HOURS	CREDITS: 0.6
Specific Learning Outcomes	Learning Activities	Assessment Criteria	
5.1 Describe safe disposal of antimicrobial.	Describing safe disposal of antimicrobial: • Overview of environmental impact of unsafe disposal of antimicrobials • Methods ○ Incineration ○ Encapsulation ○ Other techniques • Take-back programme	Safe disposal of antimicrobial described correctly.	

5.2 Describe the various methods of animal waste disposal.	Describing the methods of animal waste disposal • Manure disposal ○ Stacking and storage of manure ○ Composting ○ Anaerobic digestion • Carcass disposal ○ Management of farm and abattoir effluent ○ Management of litter	Methods of animal waste disposal described correctly.
5.3 Demonstrate knowledge of legislation relating to the disposal of antimicrobials and animal waste	Demonstrating knowledge of legislation relating to the disposal of antimicrobials and animal waste • Guidelines on animal waste disposal • ZAMRA guidelines on disposal of antimicrobials	Knowledge of legislation relating to the disposal of antimicrobials and animal waste demonstrated correctly.

UNIT 7.0: DESCRIBE RELEVANT POLICIES, REGULATIONS, STANDARDS, AND GUIDELINES RELATED TO AMU AND AMS		DURATION: 6 HOURS	CREDITS: 0.6
Specific Learning Outcomes	Learning Activities	Assessment Criteria	
6.1 Describe relevant global and national resolutions on AMR	Describing relevant global and national resolutions on AMR • Global Action Plan on AMR (WHO) • The OIE (WOAH) strategy on AMR and prudent use of antimicrobials • The FAO Action Plan on AMR • Multisectoral National Action Plan on AMR	Global and national resolutions on AMR described correctly.	
6.2 Describe relevant policies, regulations, standards and guidelines related to AMR	Describing relevant policies, regulations, standards and guidelines related to AMR. • Committees	Relevant policies, regulations, standards, and guidelines related to AMR are described appropriately.	

	○ National multisectoral steering committee - Guide, oversee and monitor AMR-related activities in all sectors ● Antimicrobial Resistance Coordinating Committee (AMRCC) ● Acts of Parliament ○ Animal Health Act 27 of 2010 ○ Public Health Act CAP 295 ○ Medicines and Allied Substances Act 3 of 2013 ○ Biosafety Act 10 of 2007 ○ Food Safety Act 7 of 2019 ○ Veterinary and Veterinary Para-professions Act 45 of 2010 ● Policies ○ National Health policy ○ Livestock development policy ○ National medicines policy ○ National Fisheries and Aquaculture policy ○ Waste Management Guidelines ○ National Agriculture policy ● International Standards ○ Codex Alimentarius Commission ○ International Health Regulations	
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6.3 Describe legislation and regulation of animal health and veterinary practice	Describe legislation and regulation of animal health and veterinary practice. • Acts of parliament ○ Animal Health Act 27 of 2010 ○ Public Health Act CAP 295 ○ Medicines and Allied Substances Act 3 of 2013 ○ Dangerous Drugs Acts CAP 95 ○ Control of Dogs Act CAP 247 ○ Veterinary and Veterinary Para-professions Act 45 of 2010 • Guidelines and Standards ○ Zambia Standard Treatment Guidelines for Cattle, Fish, Pigs, Poultry and Small Ruminants ○ Essential Veterinary Medicines List ○ AMS guidelines ○ Others	Legislation and regulation of animal health and veterinary practice described correctly.
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UNIT 8.0: EXPLAIN TECHNICAL INFORMATION ON ANTIMICROBIAL RESISTANCE (AMR) AND ANTIMICROBIAL STEWARDSHIP (AMS) TO FARMERS AND OTHER RELEVANT STAKEHOLDERS		DURATION: 6 HOURS	CREDITS: 0.6
Specific Learning Outcomes	Learning Activities	Assessment Criteria	
7.1 Identify key factors contributing to AMR in veterinary practices	Identifying key factors contributing to AMR in veterinary practice - Common veterinary practices that contribute to the development and spread of AMR - Inappropriate antibiotic such as: - For growth promotion and treatment - Overuse and misuse of antibiotics in livestock - Poor sanitation and biosecurity practices - Spreading of AMR in animal waste.	Key factors contributing to AMR in veterinary practice identified correctly.	
7.2 Implement best practices for responsible antibiotic use	Implementing best practices for responsible antibiotic use - Practical to implement AMS on farms and veterinary practices - Improving animal health and welfare through proper nutrition, hygiene, and vaccination - Consulting with the veterinarian for accurate diagnosis and treatment. - Maintain accurate records of antibiotic use	Best practices for responsible antibiotic use implemented correctly	
7.3 Explain the inter-connectedness of human, animal, plant and the environmental health (One Health) in relation to AMR.	Explaining the connection between human, animal, plant and the environmental health (One Health) Impact of AMR on health of:-	Inter-connectedness of human, animal, plant and the environmental health explained correctly.	

	○ Human ○ Animal ○ Plant ○ Environment ● How responsible antibiotic use contributes to protecting public health	
7.4 Communicate the basics of AMR and AMS to encourage behavioral change	Communicating basics of AMR and AMS ● Communication Skills ○ Use of technology ○ Basics of public speaking ○ Modes of communication ○ Basics of effective communication ○ Types of Ineffective Communication ○ Principles of social and behavioral change communication. ○ Report writing ● Facilitation skills ○ Extension and adult learning ○ Social and cultural competence ● Definition/explanation of key terms ● Antibiotics, antimicrobials, sensitivity, withdrawal period, resistance, microbes, stewardships, duration of treatment, route of administration ● Simplified explanation of microbial resistance mechanisms	The basics of AMR and AMS to influence behavioral change communicated correctly.

UNIT 9.0: EXERCISING PROFESSIONALISM AND ETHICS WHEN CONDUCTING AMS - RELATED ACTIVITIES.		DURATION: 3 HOURS	CREDITS: 0.3
Specific Learning Outcomes	Learning Activities	Assessment Criteria	
8.1 Apply ethical principles to AMS decision-making	Applying Ethical Principles to AMS decision making • Definitions of core ethical principles (beneficence, non-maleficence, autonomy and justice) • Weighing the benefits and risks of antibiotic use, considering animal welfare and recognizing the societal impact of AMR • Ethical dilemma	Ethical principles to AMS decision-making applied correctly.	
8.2 Maintain confidentiality and data integrity.	Maintaining confidentiality and data integrity. • Importance of maintaining confidentiality regarding animal health records, antibiotic usage data and client information • Data security training (Social media impact) • Confidentiality audit • Implement practices that ensure data integrity and prevent unauthorized access or disclosure • Disclosure of confidential information when required by law	Confidentiality and data integrity maintained correctly.	
8.3 Communicate antibiotic use, AMR and AMS transparently and honestly.	Communicating antibiotic use, AMR and AMS practices transparently and honestly • Accurate and unbiased information about antibiotic use, AMR and AMS practices with farmers, Veterinary professionals and other stakeholders	Antibiotic use, AMR and AMS practices transparently and honestly communicated correctly.	

	○ Address concerns and questions honestly ○ Acknowledging uncertainties and avoiding misleading statements ○ Accurate record keeping	
8.4 Adhere to professional standards and regulations	Adhering to professional standards and regulations ● Familiarize and comply with relevant professional code of conduct and veterinary regulations (Medicines and Allied Substances Act No. 3 of 2013 and Veterinary and Veterinary Paraprofessionals Act No. 45 of 2010) ● Staying up to date with changes in legislation and best practices ● Case studies on regulatory violations	Professional standards and regulations adhered to.
8.5 Demonstrate responsible advocacy for AMS.	Demonstrating responsible advocacy for AMS ● Responsible antibiotic use and AMS practices in a professional and ethical manner ○ Evidence-based decision making ○ Advocacy for better social living conditions ○ Challenging inappropriate antibiotic use ○ Fostering a culture of stewardship within the livestock industry while respecting the varying levels of knowledge of those they interact with	Responsible advocacy for AMS demonstrated correctly.

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