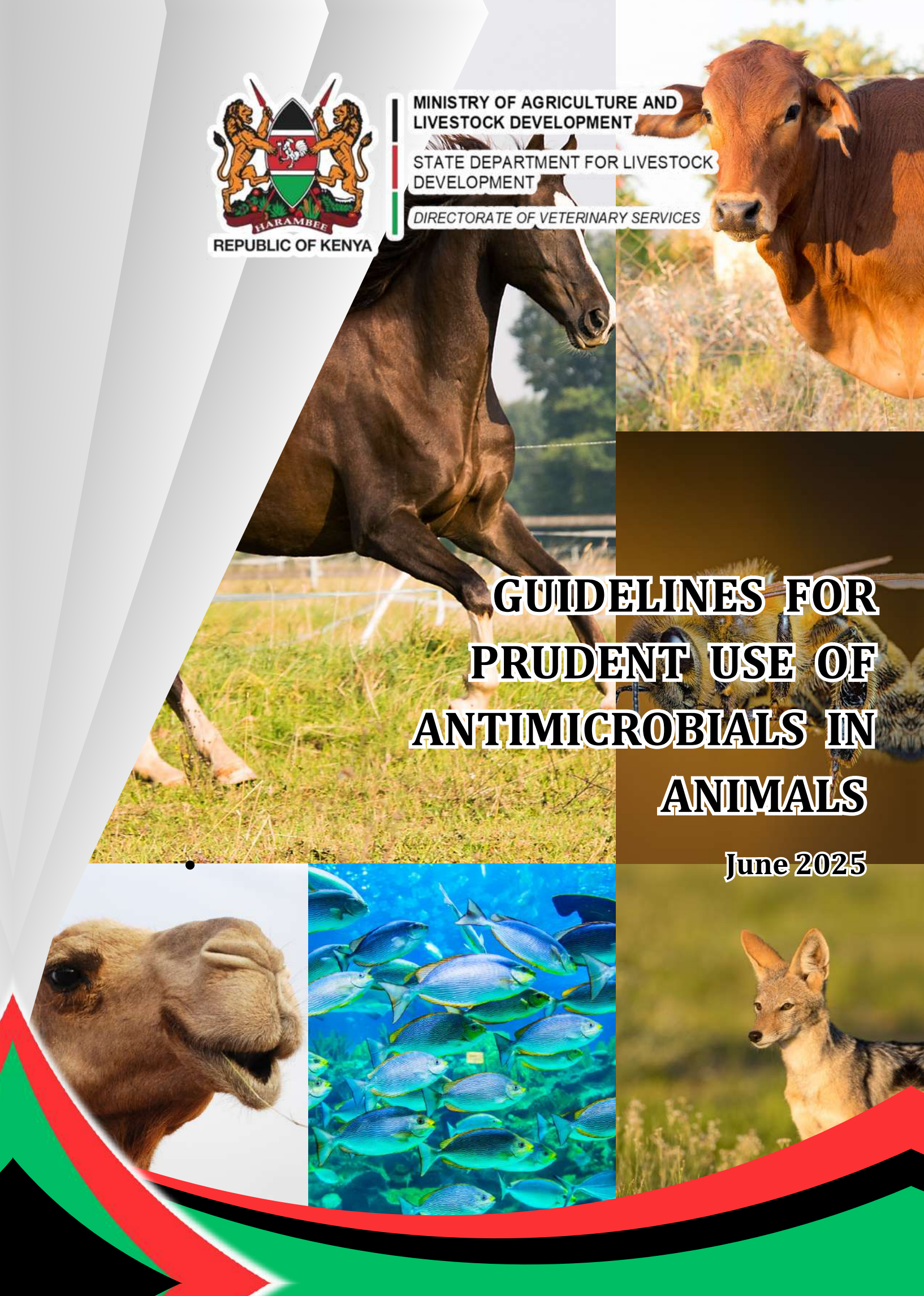




MINISTRY OF AGRICULTURE AND
LIVESTOCK DEVELOPMENT

STATE DEPARTMENT FOR LIVESTOCK
DEVELOPMENT

DIRECTORATE OF VETERINARY SERVICES



GUIDELINES FOR PRUDENT USE OF ANTIMICROBIALS IN ANIMALS

June 2025

TABLE OF CONTENTS

FOREWORD	1
ACKNOWLEDGEMENT	3
GLOSSARY	4
OPERATIONAL DEFINITIONS	6
CHAPTER ONE	9
INTRODUCTION	9
1.1 Background	9
1.2 Scope, Purpose and Outcome	11
CHAPTER TWO	14
ROLES AND RESPONSIBILITIES IN PRUDENT USE OF ANTIMICROBIALS	14
2.1 Competent Authority	14
2.2 Regulatory Agencies	16
2.3 County governments	19
2.4 Pharmaceutical Industry (manufacturers)	21
2.5 Veterinary medicine wholesalers and retailers	22
2.6 Animal Health Professionals (AHPs)	23
2.6 Laboratories	27
2.7 Animal owners and keepers	29
2.8 Animal feed manufacturers	31
2.9 Veterinary training and research institutions	31
2.10 Food business operators	33
2.10 Associations in Promoting Prudent Use of Antimicrobials	34
CHAPTER THREE	37
AWARENESS CREATION AND COMMUNICATION	37
CHAPTER FOUR	38
COMPLIANCE AND ENFORCEMENT	38
4.1 Extra/off-label use	40
4.2 Recording	40

CHAPTER FIVE	41
DISEASE PREVENTION AND REDUCING THE NEED TO USE ANTIMICROBIALS	41
5.1 General Principles of prudent use of antimicrobials	41
5.2 Oral Administration of prescribed Antimicrobials to Groups of Animals via Feed and Drinking Water	44
5.3 Bovines and small ruminants	46
5.4 Poultry	47
5.5 Pigs	48
5.6 Camels	49
5.7 Aquaculture	50
5.7.1 Antimicrobial use in aquaculture	51
5.8 Rabbits	52
5.9 Equines	53
5.10 Companion Animals	55
5.11 Bees and other beneficial insects	60
CHAPTER SIX	62
SURVEILLANCE AND MONITORING	62
CHAPTER SEVEN	65
IMPLEMENTATION FRAMEWORK	65
7.1 Training and Education	65
7.2 Dissemination	65
7.3 Regulatory Measures	66
7.4 Monitoring and Evaluation	66
7.5 Sustainability and Adaptation	66
7.6 Collaboration and Coordination	66
REFERENCES	67

FOREWORD

Antimicrobials, particularly antibiotics, remain indispensable tools in the prevention and management of infectious diseases in animals. Their application spans food-producing animals, companion animals, wildlife, bees, and other beneficial insects. In livestock production, antimicrobials are especially critical for safeguarding public health against food-borne diseases, ensuring efficient and sustainable animal production, and protecting animal welfare. They also play a pivotal role in containing outbreaks and preventing the spread of zoonotic diseases to humans. However, many of the antimicrobials used in veterinary practice are the same as those vital for human health. This overlap creates the risk of antimicrobial resistance (AMR), making prudent and responsible use an urgent priority.

These national guidelines have been developed to provide clear direction to Kenya's national and county governments, Animal Health Professionals (AHPs), farming communities, and other stakeholders, including the general public. They emphasize evidence-based antimicrobial stewardship, encouraging the use of diagnostics, preventive medicine, and viable alternatives to antimicrobials. They are fully aligned with international standards set by the World Organization for Animal Health (WOAH) and the Codex Alimentarius.

At the national level, the guidelines reinforce Kenya's Veterinary Policy, relevant provisions of the Veterinary Surgeons and Veterinary Paraprofessionals Act, the Veterinary Medicines Directorate regulations, and the Antimicrobial Resistance (AMR) National Action Plan and surveillance strategy. By promoting responsible antimicrobial use across the livestock value chain—including AHPs, farmers, suppliers, and research institutions—these guidelines strengthen Kenya's contribution to the global fight against AMR, supporting good health and well-being as envisioned under Sustainable Development Goal 3.

Importantly, these guidelines will also accelerate the implementation of the RENOFARM initiative by reducing the need for antimicrobials in animal production through sustainable husbandry practices. This, in turn, will help Kenya enhance the productivity and resilience of its livestock sector while reducing poverty and supporting the Government's Bottom-Up Economic Transformation Agenda. By boosting the livestock value chains, these measures will create more opportunities for farmers and communities, ensuring sustainable growth and improved livelihoods.

Realizing these outcomes requires collective action and unwavering commitment. Through consistent adherence to these guidelines, Kenya will not only safeguard the effectiveness of antimicrobials for future generations but also secure a healthier livestock sector, a safer food system, and a stronger foundation for national economic transformation.



Dr. Azegele Allan.E, OGW
Director of Veterinary Services

ACKNOWLEDGEMENT

We would like to take this opportunity to express our appreciation to all those who offered their time, expertise, and resources towards the successful update and review of the guidelines for the prudent use of antimicrobials in animals in Kenya. This important undertaking could not have seen the light of day without the leadership and support of the Cabinet Secretary for the Ministry of Agriculture & Livestock Development and the Principal Secretary of the State Department for Livestock Development. We are especially grateful for the visionary leadership and tireless dedication they have set aside for this noble cause.

The review committee was ably led by the DVS with commitment to coordinating efforts among the diverse set of stakeholders towards creating comprehensive, practical guidelines that further antimicrobial stewardship in Kenya's animal sector. We would like to extend special thanks to the Foundation for Innovative New Diagnostics (FIND) and Commonwealth Pharmacists Association for the crucial financial and technical support towards this review exercise. Their dedication and commitment to the control of the rising antimicrobial resistance are key in advancing animal health and protecting public health in Kenya and beyond.

We also acknowledge the technical input and coordination provided by the Representatives of the County Directors of Veterinary Services, the Veterinary Medicines Directorate (VMD), the Kenya Veterinary Board (KVB), the Food and Agriculture Organization of the United Nations, International Livestock Research Institute (ILRI), the Kenya Agriculture and Livestock Research Organization (KALRO), the Faculty of Veterinary Medicine-University of Nairobi, the Veterinary Inputs Suppliers Association of Kenya (VISAK) and Brooke East Africa. Their valuable insights, experience in the field, and technical expertise have been fundamental in developing scientifically sound guidelines, aligned to both local and international requirements.

The review of these guidelines was made possible through the support of the United Kingdom Department of Health and Social Care (DHSC)'s Fleming Fund programme through Mott MacDonald as the grant agent and the Fleming Fund Strategic Alignment grantees, Commonwealth Pharmacists Association and FIND.

This achievement is a strong testimony to collaboration across sectors and to the shared vision on the promotion of prudent antimicrobial use in animal health. Collectively, these contributions given by all contributors will go a long way in addressing antimicrobial resistance, animal and human health, as well as ensuring sustainable agricultural practices here in Kenya.

GLOSSARY

AHP	Animal Health Professional
AMC	Antimicrobial Consumption
AMR	Antimicrobial Resistance
AMU	Antimicrobial Use
AST	Antimicrobial Susceptibility Testing
AWaRe	Access, Watch, Reserve (WHO classification of antimicrobials)
CAC	Codex Alimentarius Commission
CASIC	County Antimicrobial Stewardship Interagency Committee
CDR	Community Disease Reporter
CDVS	County Director of Veterinary Services
CLSI	Clinical and Laboratory Standards Institute
DVS	Director of Veterinary Services
EUCAST	European Committee on Antimicrobial Susceptibility Testing
FAO	Food and Agriculture Organization
FBO	Food Business Operators
FIND	Foundation for Innovative New Diagnostics
GDP	Good Distribution Practice
GMP	Good Manufacturing Practice
ILRI	International Livestock Research Institute
IPC	Infection Prevention and Control
KALRO	Kenya Agricultural and Livestock Research Organization
KVA	Kenya Veterinary Association
KVB	Kenya Veterinary Board

MRL	Maximum Residue Limits
MRSA	Methicillin Resistant Staphylococcus aureus
MRSP	Methicillin Resistant Staphylococcus pseudintermedius
NAP	National Action Plan on Prevention and Containment of AMR
NASIC	National Antimicrobial Stewardship Interagency Committee
NVAUR	National Veterinary Antimicrobial Use Register
NVL	National Veterinary Laboratory
NVRL	National Veterinary Reference Laboratory
POM-V	Prescription Only Medicines – Veterinary
SPC	Summary of Product Characteristics
SPS	Sanitary and Phytosanitary
TWG	Technical Working Group
UNEP	United Nations Environment Programme
VCIA	Veterinary Critically Important Antimicrobials
VISAK	Veterinary Inputs Suppliers Association of Kenya
VMD	Veterinary Medicines Directorate
VMP	Veterinary Medicinal Products
VP	Veterinary Policy
VS	Veterinary Surgeon
VSVP	Veterinary Surgeons and Veterinary Paraprofessionals
WHO	World Health Organization
WOAH	World Organisation for Animal Health

OPERATIONAL DEFINITIONS

Animal Health Professional (AHPs)

Means a Veterinary Surgeon or Veterinary Paraprofessional registered and licensed by Kenya Veterinary Board to practice in accordance with the Veterinary Surgeons and Veterinary Paraprofessionals Act, 2011(VSVP).

Animal keeper

A person who is responsible for the care and supervision of an animal but does not necessarily own it. A keeper may manage the day-to-day needs of the animal, such as feeding, housing, or administering care, on behalf of the owner. Keepers can include farm workers, or temporary caretakers, and they are often bound by the same legal and ethical responsibilities regarding the animal's welfare as the owner during the period of care.

Animal owner

A person or entity who holds legal title or rightful ownership of the animal. The owner has full responsibility for the animal's welfare, care, and management, including decisions related to its health, housing, feeding, and medical treatments.

Antimicrobial agents

Means a naturally occurring, semi-synthetic or synthetic substance that exhibits antimicrobial activity (kill or inhibit the growth of microorganisms) at concentrations attainable in vivo. Anthelmintics and substances classed as disinfectants or antiseptics are excluded from this definition.

Antimicrobial Consumption

It is the total amount of antimicrobials available in the country, calculated as the imports minus exports.

Antimicrobial resistance

Refers to the ability of microorganisms such as bacteria, viruses, fungi, and parasites to survive, grow, or multiply despite the presence of antimicrobial agents that would normally inhibit or kill them. AMR is detected when a pathogen exhibits reduced susceptibility to an antimicrobial at levels above established clinical or epidemiological thresholds, making standard treatments ineffective and increasing the risk of disease spread, severe illness, or death.

Antimicrobial Use (AMU)

AMU is the quantity of antimicrobial product administered to an animal or group of animals (such as a herd or flock), measured in milligrams of antimicrobial.

Beneficial insects

Beneficial insects are species that provide valuable nutritional, industrial and ecological services such as pollination, pest control, and improving soil health.

Co-resistance

Refers to the phenomenon where a bacterium possesses multiple resistance genes located on the same mobile genetic element, such as a plasmid, which allows it to resist several different antimicrobials simultaneously. These resistance genes are physically linked, so when one resistance gene is selected for by exposure to a specific antimicrobial, the bacterium can also exhibit resistance to other antimicrobials, even if they are unrelated.

Competent Authority

Refers to the Director of Veterinary Services.

Cross-resistance

Refers to a phenomenon where a single resistance mechanism or gene provides resistance to multiple antimicrobials that have similar modes of action, even if the bacterium has never been exposed to some of those antimicrobials. This can happen, for example, when an antimicrobial resistance mechanism like efflux pumps or modification of the drug's target site is effective against multiple drugs within the same class or even different classes of antimicrobials.

Food business operators (FBO)

An FBO is a person or entity involved in the manufacturing, processing, packaging, storage, transportation, distribution, and sale of food of animal origin in compliance with food safety regulations.

Maximum Residue Limits (MRL)

Refer to the highest level of drug residue legally allowed in food. These limits ensure that food remains safe for human consumption.

Pharmacovigilance

Pharmacovigilance is a process by which information is collected and analysed to detect and prevent unexpected or unwanted adverse effects following the use of veterinary medicinal products. The scope of veterinary pharmacovigilance is mainly the safety and efficacy in animals and safety in people.

Regulatory authority

Refers to Veterinary Medicine Directorate and Kenya Veterinary Board.

Veterinary medicinal products

Means any product with approved claims to having a prophylactic, therapeutic or diagnostic effect or to alter physiological functions when administered or applied to an animal.

Veterinary Paraprofessionals

Shall have the meaning assigned to it under VSVP Act, 2011.

Veterinary Services

Means the combination of governmental and non-governmental individuals and organisations that perform activities to implement the standard of the Terrestrial and Aquatic Code.

Veterinary Surgeon

Shall have the meaning assigned to it under VSVP Act, 2011.

Zoonotic

Refers to any disease or infection that is naturally transmissible between vertebrate animals and humans. A zoonotic disease (also known as a zoonosis) is one that originates in animals but can infect humans through direct contact, consumption of contaminated animal products, or indirect transmission via vectors or the environment. These diseases may be bacterial, viral, parasitic, or fungal in nature and can have significant public health, animal health, and economic impacts.

CHAPTER ONE

INTRODUCTION

1.1 Background

The widespread use of antimicrobials in both human and veterinary medicine has significantly accelerated the emergence and spread of antimicrobial-resistant microorganisms. This challenge is compounded by the low global investment in developing new and effective antimicrobial molecules. In Kenya, antimicrobials are widely used across the various livestock value chain, including cattle, sheep, goats, camels, donkeys, pigs, poultry, farmed and free-ranging wildlife. These animal resources are essential to the livelihoods of over 60% of Kenyans, providing food, employment, and economic sustenance. However, the sector faces considerable challenges, particularly from animal diseases and parasites.

The continuous use of antimicrobials in livestock without proper stewardship has enhanced the development of antimicrobial resistance (AMR). This has threatened animal health, productivity, supply of livestock products both domestically and for exports and prices for major sources of protein including meat, fish, eggs, and milk. Estimates have indicated that if the persistent trends in AMR do not slow down, there will be a 11% loss in livestock production by 2050 in low and middle countries. Such a substantial loss in animal production will lead to a decline in income generation which will exacerbate the economic situation (World bank 2017). Preserving the efficacy of antimicrobials is crucial to ensuring that animal production can meet the growing global demand for high-quality protein. As such, controlling the emergence and spread of AMR is a top priority for the Directorate of Veterinary Services (DVS), and these guidelines are designed to promote the prudent use of antimicrobials to safeguard both human, animal health and environment.

Antimicrobials are often given to animals orally, topically or through injections and can potentially accumulate in edible tissues or other animal products such as milk, eggs, honey etc. They may also find their way into soil and food crops fertilised with manure from treated animals. Antimicrobials are also used in companion animals, aquatic animals as well as bees and other beneficial insects.

Diverse types of antimicrobials exist for use in animals. These include antibiotics, antifungals, antivirals, antiprotozoals and antiparasitics. Various antimicrobial residues present in foods retain activity while in the body and could lead to development of antimicrobial resistance by microorganisms, allergic reactions and toxicity. Antimicrobial residue monitoring is essential for detecting and maintaining antimicrobial residues in foods within the recommended Maximum Residue Limits (MRL). Antimicrobial resistance testing helps in reducing antimicrobial use and consumption (AMU/C) by identifying the specific pathogens involved and their resistance patterns, allowing for targeted treatment with the most effective antimicrobial, thus avoiding unnecessary or ineffective treatments.

Humans and animals share a significant number of disease-causing pathogens, with 60% of human pathogens being zoonotic. The use of similar antimicrobials in both human and veterinary medicine contributes to the development and spread of AMR posing a significant threat to public and animal health. Globally, AMR is a growing crisis, with an estimated 1.27 million deaths annually directly attributed to drug-resistant infections, with the highest mortality rate in western sub-Saharan Africa at 27.3 deaths per 100,000 population (Murray et al., 2022). AMR now rivals major health threats like HIV/AIDS and malaria, with projections suggesting that AMR could lead to an annual death toll surpassing 10 million by 2050 if interventions are not intensified (WHO, 2015). The urgency of the situation calls for the establishment of specific burden estimates for Kenya to better understand and address the local AMR burden. There is evidence that the overuse and misuse of antibiotics in veterinary practice, particularly in livestock for growth promotion and disease prevention, accelerates the development of antimicrobial resistance (AMR). It is therefore imperative that an approach that promotes prudent and responsible antibiotic use, in tandem with improved biosecurity, surveillance, and public awareness to protect the health of humans, animals, and ecosystems is pursued.

The Directorate of Veterinary Services (DVS) collaborates with international organisations such as the Quadripartite Joint Secretariat on AMR (World Health Organization (WHO), the World Organization for Animal Health (WOAH), the United Nations Food and Agriculture Organization (FAO) and The United Nations Environment Programme (UNEP)) to develop and implement strategies aimed at controlling the spread of AMR. These partnerships ensure that Kenya aligns with global efforts to combat the issue. To tackle AMR effectively, Kenya has developed a National Action Plan on Prevention and Containment of Antimicrobial Resistance (NAP 2023 – 2027) based on the "One Health" approach, which integrates efforts across the human, animal and environmental sectors (GOK NAP 2023-2027).

The plan focuses on strengthening prevention, improving control measures, and ensuring the continued availability and efficacy of antimicrobial agents. It also emphasises the importance of international collaboration, recognizing that AMR is a global issue that requires coordinated efforts.

These guidelines for the prudent use of antimicrobials are an integral part of Kenya's strategy to combat AMR. They complement existing national and County laws and form a crucial part of the country's overall AMR national action plan for the prevention and containment of AMR. By implementing these guidelines, Kenya aims to reduce the development of resistance and safeguard human and animal health, and protect the environment.

1.2 Scope, Purpose and Outcome

The **scope** of these guidelines is to provide comprehensive, practical guidance for the responsible and prudent use of antimicrobials in all animal species, particularly in food animals. The guidelines aim to address the growing challenge of AMR, which poses a serious threat to both human and animal health, and the environment. By promoting the judicious use of antimicrobials in veterinary medicine, these guidelines will contribute to reducing the development and spread of AMR.

Antimicrobial resistance is an ecological problem, as resistant microorganisms persist and proliferate in the environment, posing a risk to the efficacy of both human and veterinary medicines. Resistant microorganisms spread across different ecosystems and threaten human, animal and plant health. The focus of these guidelines is primarily on antimicrobials used for veterinary purposes. The use of antimicrobials for other purposes, such as plant health, is outside the scope of these guidelines.

The **purpose** of these guidelines is to assist animal health professionals and other stakeholders in the animal resource industry to prudently use antimicrobial agents. This will ensure that antimicrobial agents are used in ways that maximise their therapeutic efficacy while minimizing the risk of the development and spread of resistance.

These guidelines are grounded in several key **principles**:

1. **Clinical Diagnosis:** The use of antimicrobial agents should always be based on a veterinary diagnosis following clinical examination and antimicrobial susceptibility testing (AST). This ensures targeted treatment and the selection of the most appropriate antimicrobial agent. Where AST is not available, AHPs should ensure they use evidence-based empirical therapy, making sure antimicrobial agents are selected based on clinical experience, published guidelines and local disease patterns. AHPs should also prioritise first line (narrow-spectrum) antimicrobial agents.
2. **Risk-Based Approach:** When choosing antimicrobial treatments, consideration should be given to the risk of resistance development, particularly with regard to antimicrobial agents that are critically important for human and animal health. The choice of antimicrobial agents should be made with the aim of preserving these drugs for cases where there is no alternative treatment.
3. **Minimization of Antimicrobial Use:** The ultimate goal of prudent use is to reduce the overall need for antimicrobial agents. This can be achieved by improving animal health management, enhancing biosecurity, and implementing disease prevention strategies, such as vaccination, to reduce the occurrence of infections. Alternatives to antimicrobial agents such as prebiotics, probiotics, postbiotics, immunostimulants and validated ethnoveterinary products should be considered.
4. **Regulatory Compliance:** Antimicrobial agents should only be used in accordance with relevant national and international legislation (such as VMD, WHO, WOAH guidelines), including strict adherence to the conditions of use specified in the Summary of Product Characteristics (SPC). Regular updates to regulatory frameworks will ensure that these guidelines remain relevant in light of emerging resistance patterns and new scientific knowledge.

The expected **outcome** of these guidelines is to contribute to safeguarding human and animal health by ensuring antimicrobial agents remain effective for treating infections, and ensure food of animal origin is free of antimicrobial residues. Additionally, these guidelines will support the global One Health efforts by preventing the emergence and spread of AMR through the responsible use of antimicrobial agents in veterinary practice.

Finally, these guidelines also seek to promote collaboration between stakeholders, including veterinary services, governments, animal owners/keepers, human health and environmental professionals, to ensure a coordinated and sustained effort in tackling AMR in Kenya and beyond.

CHAPTER TWO

ROLES AND RESPONSIBILITIES IN PRUDENT USE OF ANTIMICROBIALS

The primary responsibility for the prudent use of antimicrobial agents lies with the prescriber, dispenser, animal owner and the person administering the antimicrobial agents. Prudent use of antimicrobial agents requires collaboration between Animal and public Health Professionals, competent authority and regulatory agencies, Industry players, Farmers and other relevant One health stakeholders.

2.1 Competent Authority

1. The Director of Veterinary Services (DVS) serves as the competent authority responsible for overseeing provision of animal health services. The DVS should proactively develop and implement risk-based measures to promote the prudent use of antimicrobials, ensuring these measures are properly applied and enforced, and evaluate their effectiveness regularly. The DVS should also allocate adequate resources to support the implementation of these measures, as well as to advance research initiatives and raise awareness on responsible antimicrobial use.
2. In particular, the DVS is responsible for:
 - Monitoring the implementation of the National Policy and National Action Plans for the prevention and containment of AMR, the AMR Surveillance Strategy and AMR Communication Strategy in order to evaluate and assess the impact and effectiveness of measures taken under them
 - Carrying out targeted checks on AHPs with questionable patterns of prescription in collaboration with KVB and VMD.
 - Undertaking farm inspections in order to evaluate animal husbandry, animal health and welfare conditions.
 - Developing policies for the introduction of mandatory herd health programmes promoting best practices, disease prevention measures such as vaccinations and vector control, and ensuring that hygiene standards are maintained.

- Promoting research into alternatives to antimicrobials, diagnostic tests and the prudent use of antimicrobial agents
- Providing resources for the development and dissemination of guidelines for both the prudent use of antimicrobial agents, hygiene and farm biosecurity measures
- Funding and supporting awareness and training campaigns on AMR and the prudent use of antimicrobials aimed at animal health professionals and farmers.
- Developing control measures to limit the spread of resistant microbes through biosecurity measures, identification of carriers, animal quarantine, vaccinations, vector control, restrictions on the movement of people and investigations.
- Strengthening the diagnostic capacity of National Veterinary Laboratories by establishing AMR surveillance, residue monitoring programs and quality assurance of veterinary medicinal products. This also includes investing in capacity building to ensure laboratories have the necessary resources and up to date technology.
- Engaging with international organizations such as the WOA, WHO, FAO and UNEP to align national AMU and AMR strategies with global standards and benefit from shared research, surveillance data, and guidelines.
- Fostering public understanding of the risks of AMR by promoting transparent communication, publicly reporting on AMU and AMR trends, and encouraging community involvement in surveillance and control measures.
- Promoting research on AMR and AMU by both private and public entities.
- Ensuring compliance with food safety management systems.
- Promoting antimicrobial stewardship programs, encouraging the One Health approach and collaboration with stakeholders to reduce unnecessary antimicrobial use.

2.2 Regulatory Agencies

The regulatory agencies are the Veterinary Medicines Directorate (VMD) and the Kenya Veterinary Board (KVB). The VMD is responsible for regulating veterinary medicinal products, and the KVB is responsible for regulating veterinary professionals.

2.2.1 The role of VMD

In particular, VMD is responsible for:

- Ensuring antimicrobial agents registered for use in the country are of good quality, safe, and efficacious.
- Ensuring antimicrobial agents are distributed through licensed and authorised outlets as per VMD guidelines.
- Ensuring compliance to restricted use to selected classes of antimicrobial agents.
- Ensuring that advertising and promotion of antimicrobial agents is done in accordance with VMD guidelines
- Ensuring compliance with good distribution practices in the antimicrobial agents supply chain
- Undertaking regular post-market surveillance.
- Processing and acting on pharmacovigilance reports
- Collaborating with pharmaceutical industry to support training related to responsible use of antimicrobial agents
- Ensuring the development of effective procedures for the safe collection and disposal of unused, rejected, substandard and falsified, illegally marketed or out-of-date antimicrobial agents.
- Ensuring that the Summary of Product Characteristics (SPC), the package insert, and labelling includes the information necessary for the appropriate use of veterinary medicinal products containing antimicrobial agents. The SPC summary should contain the following items as appropriate:

- a. name(brand) of the veterinary medicinal product
- b. active ingredient
- c. list of excipients
- d. pharmaceutical form (product description)
- e. quantitative composition
- f. pharmacological properties
- g. physicochemical properties
- h. any potential adverse effects
- i. target animal species and, as appropriate, age or production category
- j. therapeutic indications
- k. target microorganisms
- l. dosage regimen (i.e. dose, frequency of dosing, and route and duration of administration)
- m. withdrawal periods
- n. incompatibilities and interactions
- o. storage conditions and shelf-life
- p. human, animal and eco-toxicity properties
- q. operator safety
- r. particular precautions before use
- s. precautions for the protection of the environment
- t. use during pregnancy, lactation or lay
- u. particular precautions for the proper disposal of unused or expired products
- v. information on conditions of use relevant to minimize the development of resistance
- w. contraindications
- x. known signs of overdosage and information about its treatment.

2.2.2 The role of KVB

The Kenya Veterinary Board (KVB) is responsible for:

- Collaborating with DVS and VMD in ensuring compliance with these guidelines.
- Ensuring that AHPs adhere to the code of ethics when administering antimicrobial agents.
- Licensing animal health professionals and ensuring only qualified individuals prescribe or dispense antimicrobial agents.
- Ensuring approval of continuous professional development, education and training on AMU and AMR to keep professionals updated on best practices.

2.3 County governments

The role of county governments in Kenya in implementing the antimicrobial prudent use guidelines includes the following key responsibilities:

1. Supporting and Monitoring Compliance

- Ensure local animal health facilities and veterinary services adhere to national antimicrobial use (AMU) guidelines.
- Monitor compliance with prudent use practices across relevant sectors.

2. Resource Mobilization for Disease Prevention

- Allocate resources to implement infection prevention and control (IPC) measures.
- Promote antimicrobial stewardship programs, including vaccination and other preventive measures to reduce reliance on antimicrobials.

3. Coordination and Governance

- Establish County Antimicrobial Stewardship Interagency Committees (CASICs) and technical working groups to oversee AMR/AMU activities.
- Coordinate stewardship programs, surveillance, awareness campaigns, and policy enforcement at the county level.

4. Data Collection and Reporting

- Facilitate the collection and dissemination of AMR/AMU data to national authorities and local stakeholders.
- Support evidence-based decision-making by monitoring trends in antimicrobial use and resistance.

5. Capacity Building and Training

- Provide training for healthcare workers, Animal Health Professionals (AHPs), and other stakeholders on antimicrobial stewardship and prudent use guidelines.

- Improve prescribing and dispensing practices through continuous education.

6. Community Engagement and Awareness

- Conduct awareness campaigns to educate communities on the dangers of antimicrobial resistance (AMR).
- Promote responsible antimicrobial use among farmers, animal owners, and other stakeholders.

7. Regulatory Enforcement

- Collaborate with the Directorate of Veterinary Services (DVS) and regulatory agencies (e.g., Veterinary Medicines Directorate, Kenya Veterinary Board).
- Enforce regulations on antimicrobial use, including:
 - a. Restricting over-the-counter sales without prescriptions.
 - b. Ensuring compliance with withdrawal periods in animal products.

County governments play a pivotal role in localizing Kenya's national AMR containment efforts by ensuring compliance, mobilizing resources, coordinating multisectoral action, and engaging communities. Their efforts align with the "One Health" approach, integrating human, animal, and environmental health strategies to combat antimicrobial resistance effectively.

2.4 Pharmaceutical Industry (manufacturers)

The pharmaceutical industry in Kenya is responsible for ensuring the availability of quality antimicrobial agents, supporting rational use, participating in surveillance and stewardship efforts, and adhering to ethical promotion and distribution practices. Their collaboration with regulators and stakeholders is critical to reducing inappropriate antimicrobial use and combating AMR. Their key responsibilities include:

- Providing all the required information requested by the VMD when applying for market authorization.
- Ensuring the production and supply of safe, quality, and efficacious antimicrobial agents.
- Ensuring compliance with Good Manufacturing Practices (GMP) during the production and quality control of antimicrobial agents.
- Ensuring compliance with Good Distribution Practices (GDP) during the supply of antimicrobial agents in the market.
- Ensuring the supply of AM to VMD-licensed premises only.
- Undertaking pharmacovigilance programs.
- Developing alternatives to AM, such as probiotics, vaccines and immunostimulants.
- Undertaking research and development of new and existing AMs.
- Operating under valid licenses and ensuring antimicrobials are stored, handled, and transported under optimal conditions to preserve quality and efficacy.
- Ensure adherence to the VMD guidelines on the advertisement of antimicrobial agents.
- Ensure veterinary antimicrobials are distributed in their original sealed and labelled primary package as registered by the VMD.
- Establish systems to detect and report substandard or falsified veterinary medicinal products.

2.5 Veterinary medicine wholesalers and retailers

Wholesalers and retailers are the last mile in the veterinary antimicrobial supply chain. By ensuring legal, quality-assured, and prescription-based distribution, maintaining accurate records, participating in surveillance and reporting, and supporting awareness efforts. They play a direct role in reducing misuse and helping to contain antimicrobial resistance in Kenya.

- Source AM products from VMD-licensed pharmaceutical companies only.
- Maintain records of AM distributed, including name, batch numbers, and expiry dates.
- Store and transport AMs under suitable environmental conditions as per the manufacturer's instructions.
- Maintain prescription records by retailers.
- The retailers should support campaigns and dialogue with farmers on prudent use of antimicrobials, antimicrobial resistance, alternatives to antimicrobial uses, and good animal husbandry practices.
- Share data on antimicrobial sales and usage trends with competent authorities when required in support of surveillance efforts
- Ensure that a valid prescription is presented before POM is dispensed, and shall give clear and accurate instructions and correct information on proper product use.
- Ensure that any unused or expired veterinary medicinal products are disposed of properly, following the VMD guidelines and environmental safety protocols to prevent contamination and the development of resistance.
- Support restricted access to certain classes of antimicrobials in line with VMD guidelines.

2.6 Animal Health Professionals (AHPs)

Prescriber of the antimicrobials

1. Should be a qualified animal health professional as outlined in the VSVP Act, 2011. Additionally, the prescriber should be familiar with the history of the herd, flock, or animal(s) being treated with at least one physical contact examination prior to prescription.
2. Is obliged to make treatment decisions independently and to avoid or declare conflicts of interest. The position or status of the prescriber about the farmer should therefore be such as to ensure independent decisions, primarily based on expert knowledge. This can be achieved by:
 - AHP prescribing antimicrobial agent as guided by the VSVP Act (Code of Ethics) Regulations, 2015 and the VSVP Act (The Veterinary Medicines Directorate) Regulations, 2015.
 - Establishing working commitments between animal owner and Animal Health Professionals for specific herds to improve herd health, reduce disease prevalence, and the need for antimicrobials.
3. Where it is necessary to prescribe an antimicrobial, the prescribing AHP should ascertain, using an on-site clinical examination, that the symptoms indicate a microbial infection.
4. Taking appropriate samples for identifying the pathogen and measuring its antimicrobial susceptibility. In acute cases, when treatment needs to be started immediately to avoid animal suffering, death/loss, or to limit the spread of infection, it is recommended that samples be collected before treatment with antimicrobial agents.
5. Adhering to national and international recommendations for prescribing and administering antimicrobials. Particular attention should be given to:
 - WOAH List of Antimicrobial Agents of Veterinary Importance and the National Essential Veterinary Medicines List (EVML). Consideration should also be given to the AWaRe classification by WHO.

- Up-to-date standard treatment guidelines and recommendations provided by national authorities, including VMD and DVS. These treatment guidelines and recommendations shall assist AHPs in selecting the appropriate antimicrobial and suitable dosing regimen, route of administration, safety precautions, and withdrawal periods.
 - Practice-based protocols for common infections, which take into account regional and local trends in antimicrobial sensitivity and published antibiograms. Such protocols shall help the AHPs to make optimum prescribing decisions in the absence of sensitivity data.
6. The prescriber should ensure that the most appropriate antimicrobial is selected, based on the most accurate and up-to-date information on pharmacodynamics and pharmacokinetics and functioning of the different classes of antimicrobial agents.
 7. The prescriber should prioritise the use of a single antimicrobial in treating infections whenever possible. If a combination of antimicrobials is necessary, the prescriber should ensure that each drug component are synergistic or potentiates each other.
 8. Due to the risk of AMR development, the prescriber should give due consideration to alternative interventions, which could prevent recurrence of the disease.
 9. Regular reporting of prescriptions to VMD for monitoring antimicrobial use.

Dispenser of the antimicrobial agents

Veterinary medicine dispensers play a vital role as guardians of antimicrobial stewardship by responsibly dispensing medications, ensuring their quality, educating users on proper use, and adhering to regulatory requirements to effectively combat antimicrobial resistance.

The dispensers of antimicrobials will be responsible for;

- Ensuring that antimicrobial agents are issued only upon presentation of a valid prescription from a licensed AHP, in compliance with the VSVP Act and VMD regulations.
- Maintaining the quality of veterinary antimicrobial agents by storing them under appropriate conditions as per manufacturer and VMD guidelines.

- Providing clear instructions to animal owner/keeper on the correct antimicrobial agent, dosage, administration, withdrawal periods, and the importance of completing prescribed courses to minimize the development of AMR.
- Maintaining accurate records of antimicrobial sales and usage to support traceability and surveillance efforts.
- Reporting adverse events or suspected treatment failures to regulatory authorities.
- Operating within licensed premises approved by the VMD and complying with all relevant laws regulating the sale and distribution of veterinary medicines.
- Engaging with ongoing antimicrobial stewardship initiatives, including training and public awareness campaigns, to promote responsible antimicrobial use.

Administrator of the antimicrobials

The person administering antimicrobial agents to animals is usually the animal health professional, owner of the animals or staff in the home and on farms. These are the people responsible for closely following the prescriber's instructions on administering antimicrobials and alternatives. They also play a critical role in observing and monitoring sick animals.

The administrator of antimicrobial agents will be responsible for;

1. Following the prescriber's instructions. When administering antimicrobial agents to a group of animals, the administrator should ensure that the correct group of animals is treated, at the required dose, and for the specified duration of the treatment.
2. Where the antimicrobial agent is administered through feed, monitoring and ensuring that all animals ingest the required quantity of the medicated feed to avoid over- or under-dosing. Where inappropriate dosing is detected, the prescribing veterinarian should be informed and should assess the need to modify the treatment regime e.g. by switching to parenteral treatment.
3. Considering the environmental impact of AMU in animal feed, including the importance of responsible disposal of unused or expired medications, and animal manure generated during the treatment period. As such, the AHP shall follow VMD Guidelines on Veterinary Medicinal Products Waste Management.

4. Reporting the lack or reduced efficacy of an antimicrobial product to the regulatory and competent authorities without delay and within the existing pharmacovigilance system at VMD.
5. In accordance with relevant national legislation such as VSVP Act, VMD regulations.
Those who administer antimicrobials:
 - Shall obtain the antimicrobial agents, based on a veterinary prescription, and from authorised sources, by adhering to the instructions given by the AHPs on administering antimicrobial agents, and ensuring that withdrawal periods are observed, to avoid violative Maximum Residue Limits (MRLs) of antimicrobial residues in meat, milk, eggs or honey.
 - Cooperate with the AHP who regularly visits the animals and knows the history and current health status of the herd, flock, or animal, to allow him/her to put in place disease prevention measures that also take account of animal welfare.
 - Ensuring one keeps up to date with aspects of prudent use of antimicrobials and AMR.
 - Ensure that the correct dose, treatment duration and dosing schedule is followed.
 - Maintaining and sharing records of all the treatments undertaken on all the animals.

2.6 Laboratories

Laboratories that conduct antimicrobial susceptibility testing, assess the quality of antimicrobials, and provide results on target pathogens play a critical role in ensuring that AHPs across the country have access to reliable susceptibility testing and quality antimicrobials. These laboratories should furnish AHPs with comprehensive test results and any other relevant information that may aid in decision-making.

Kenya's national network for veterinary laboratory services—including diagnosis, drug residue analysis, quality assurance, and AMR monitoring—comprises the National Veterinary Reference Laboratories (NVRL) in Kabete, six National Veterinary Laboratories (NVLs) located in Karatina, Mariakani, Eldoret, Nakuru, Garissa, and Kericho, as well as county veterinary laboratories, private laboratories, universities, and research institutions.

- The NVRL Kabete, the designated reference laboratory for AMR, shall provide scientific advice and support the NVLs, organise annual proficiency tests/interlaboratory comparisons for AST for the NVLs, and harmonise the implementation of AST methods. The NVRL Kabete shall provide scientific and technical reports to the competent authorities in the diagnosis and monitoring of AMR, drug residue analysis, and antimicrobial quality assurance.
- Designated official laboratories must be accredited to carry out isolation, AST, residue monitoring, and quality assurance. These may include universities, research institutions, and private laboratories.
- Designated official laboratories shall provide diagnostic services and submit scientific and technical reports to the competent authority.
- All laboratories, including public and private, should follow standardised protocols for antimicrobial susceptibility testing and drug residue analysis to guarantee consistency in results across the network. The NASIC Technical Working Group (TWG) for AMR Surveillance should guide the Veterinary Laboratories on antimicrobial susceptibility testing protocols and interpretation of relevant standards, e.g., Clinical and Laboratory Standards Institute (CLSI) and European Committee on Antimicrobial Susceptibility Testing (EUCAST)

- Laboratories should take part in external proficiency tests for antimicrobial susceptibility testing and other relevant microbiological tests to ensure that their results are valid.
- Laboratories should maintain high standards of biosafety and biosecurity to prevent contamination, cross-infection, and accidental release of resistant strains during the testing process.

2.7 Animal owners and keepers

Animal owners and keepers perform important roles in ensuring the responsible use of veterinary antimicrobial agents. They are responsible for preventing disease outbreaks and implementing animal health and welfare programs on their farms. They may, as appropriate, call on the assistance of AHPs.

1. Animal owners shall have the following responsibilities:

- Implement animal health plans and disease preventive measures in cooperation with the veterinary team professionals with guidance from veterinary authorities (e.g., Vaccination programs, disease control strategies, mastitis control plan).
- Use antimicrobial agents that have been prescribed by a qualified animal health professional and acquired from authorized sources.
- Use veterinary antimicrobials with strict adherence to prescription instructions, or guidance from a veterinary professional knowledgeable about the animals under treatment and the production environment.
- Isolate sick animals and dispose of dead animals appropriately under conditions approved by the veterinary and environmental management authorities .
- Comply with handling and storage conditions of veterinary antimicrobials according to approved product labelling.
- Ensure observation of hygienic conditions by producers and animal health professionals while handling sick animals.
- Comply with recommended withdrawal periods to ensure that residue levels in animal-derived food do not pose a risk to consumers.
- Avoid the use of expired veterinary antimicrobials and dispose of all unused veterinary antimicrobials following the provisions on the product label or as guided by relevant veterinary and environmental management authorities.
- Ensure proper management of animal wastes and other materials to avoid dissemination of antimicrobial agents and resistance determinants into the environment.

- Avoid replacement for good management and hygiene practices or other disease prevention methods such as vaccination.
- Regularly provide information to veterinary professionals on recurrent disease problems.
- Maintain all clinical and laboratory records of microbiological and susceptibility tests carried out as advised by the veterinary authorities. These data should be shared with the veterinary professional responsible for treatment of the animals in order to optimise the use of veterinary antimicrobials.
- Implement biosafety and biosecurity measures to prevent unnecessary contact with and transmission of resistant microbes to personnel, including farm workers.
- Assist veterinary authorities in monitoring and surveillance programs related to antimicrobial resistance.
- Keep records of all veterinary antimicrobials used, including:
 - a. Name of the veterinary antimicrobial or active substance and batch number and expiry date.
 - b. Name of supplier.
 - c. Date of administration.
 - d. Identification of the animal or group of animals to which the veterinary antimicrobial was administered.
 - e. Clinical condition(s) treated.
 - f. Quantity administered and duration of the antimicrobial agent administration.
 - g. Date of last administration and required withdrawal period.
 - h. Results of laboratory tests.
 - i. Results of treatments.
 - j. Name of the prescribing veterinary surgeon or other suitably trained person authorised by national legislation.
 - k. Disposal records for unused or expired antimicrobial agents.

2.8 Animal feed manufacturers

1. Animal feed manufacturers shall adhere to legal requirements for feed hygiene, implement best practices for producing safe, nutritionally balanced feed, and ensure proper feed formulation, handling and storage. They shall guarantee that all ingredients including antimicrobial agents meet required standards and that the manufacturing process prevents contamination with harmful agents that could compromise feed safety.
2. Medicated feed shall only be produced by a feed manufacturer on a veterinarian's prescription. The manufacturer shall be approved for the manufacture of medicated feed by the relevant regulatory agency.
3. The manufacturer shall follow good manufacturing practices and ensure appropriate mixing to guarantee the homogeneity of antimicrobials in the feed. They shall take appropriate steps to avoid cross-contamination and minimise the transfer of antimicrobials to subsequent batches of feed.
4. The medicated feed shall be labelled appropriately and only be supplied to the end-user on a veterinarian's prescription.
5. Detailed records of the antimicrobials used, the medicated feed produced and their destination should be maintained and be shared with VMD.

2.9 Veterinary training and research institutions

1. Veterinary faculties and other training institutions shall ensure that sufficient emphasis is given to the prudent use of antimicrobial agents and the problem of AMR in their training programmes, and that knowledge relating to these areas is kept up to date.
2. The programmes should focus on developing learning materials and techniques relating to ways of improving and promoting breeding and husbandry practices that promote animal health. Such practices may include bio-security measures, good farming practices and herd health planning that prevent infections and therefore reduce the need for antimicrobial agents.
3. Sensitization of primary and secondary school learners on prudent use of antimicrobial agents in animals as well as alternatives to and replacement of antimicrobial use.

4. Universities and other research facilities should give priority to research in the area of AMU and AMR. Priority areas of research include:
 - Developing alternative, preferably preventive, tools for infection control.
 - Evaluating the impact of the use of antimicrobials in animals on public health and the environment.
 - Further investigating pharmacokinetic and pharmacodynamic data and using models to simulate the effects of different dosing schedules (based on different combinations of disease, pathogen, target tissue and animal species). The results from modelling should provide a scientific background for setting effective dosing schedules in practice.
 - Further investigating co-resistance and cross-resistance, to antimicrobial agents including disinfectants, and certain metals.
 - Developing new classes of antimicrobial agents and innovative disease control and prevention strategies that reduce AMU and the risk of AMR in collaboration with the industry
5. Should contribute to providing information on: The risk of nosocomial infections in veterinary practices and clinics; The use of monitoring procedures to detect and report the occurrence of infections and the use of infection prevention and control measures to minimise the occurrence.
6. Produce scientific publications that promote the principles of prudent use of antimicrobials.
7. Using nano- technology and drug delivery systems / bacteriophages.

2.10 Food business operators

Food business operators, including retailers, should ensure that suppliers follow principles of prudent antimicrobial use by maintaining Supplier Quality Assurance (SQA) systems. Reference should be made to the Code of Practice to Minimise and Contain Foodborne Antimicrobial Resistance CXC 61-2005. Key responsibilities include:

1. Implementing Supplier Quality Assurance (SQA) systems to ensure suppliers use antimicrobials responsibly, in compliance with national and international guidelines, preventing misuse for growth promotion or disease prevention.
2. Ensuring food products are free from unsafe antimicrobial residues by monitoring withdrawal periods and conducting regular residue tests, especially for medically important antimicrobials.
3. Auditing suppliers to verify compliance with antimicrobial usage and biosecurity measures, maintaining detailed records of test results and incidents.
4. Supporting initiatives and providing transparency about efforts to reduce antimicrobial residues and AMR risks in food products.
5. Ensuring proper hygiene in food processing and providing training on biosecurity and reducing antimicrobial residues.
6. Working with authorities and stakeholders to promote AMR prevention measures and communicate safe food handling practices to consumers.

2.10 Associations in Promoting Prudent Use of Antimicrobials

Veterinary professional associations, industry stakeholder associations, and farmer associations share the responsibility of promoting the prudent use of antimicrobials to reduce the risk of antimicrobial resistance (AMR) development and spread. They should provide training, support initiatives, and encourage best practices across their sectors.

The professional associations will be responsible for:

- Offering specific training on AMR through Continuous Professional Development (CPD) programs and incorporating principles of prudent antimicrobial use into professional codes of conduct.
- They are also encouraged to work with relevant authorities to support the collection and monitoring of antimicrobial usage data, helping to track trends and identify areas needing intervention or education.

Industry stakeholder associations will be responsible for:

- Actively supporting the development and implementation of initiatives that promote prudent antimicrobial use.
Creating communication and awareness materials and providing members and the general public with adequate information on the risks of AMR.
- Encouraging the adoption of production systems that uphold the principles of prudent antimicrobial use.
- Supporting national initiatives involving data collection on antimicrobial sales and distribution, contributing to broader efforts to monitor AMU and address AMR.

Farmer associations, in collaboration with AHPs, will be responsible for:

- Promoting the prudent use of antimicrobials among their members.
- Ensuring that farmers understand the risks of AMR arising from the inappropriate use of antimicrobials in animal production.

- Informing members about the public health risks of AMR, such as contracting resistant infections through animal contact, and providing training on preventive animal health practices, proper antimicrobial use, and biosecurity.
- Assisting farmers in accessing qualified AHPs for proper antimicrobial administration.

Consumer associations will be responsible in promoting the prudent use of antimicrobials in animals by advocating for safe food practices, raising public awareness, and fostering demand for responsibly produced animal products. Their involvement should align with the "One Health" approach and supports Kenya's efforts to combat antimicrobial resistance (AMR). They will achieve this by undertaking:

1. Public Awareness and Education

- Organizing campaigns to educate consumers about the risks of AMR and the importance of prudent antimicrobial use in animal production.
- Disseminating information on food safety, including the significance of adhering to withdrawal periods to avoid antimicrobial residues in meat, milk, eggs, and other animal products.

2. Advocacy for Transparency and Labelling

- Advocating for clear labelling of animal products to indicate whether they were produced with responsible antimicrobial use or are "antibiotic-free."
- Pushing for traceability systems that allow consumers to verify the antimicrobial use practices of producers.

3. Promoting Responsible Consumption

- Encouraging consumers to purchase animal products from sources that adhere to prudent antimicrobial use guidelines, thereby creating market incentives for responsible farming practices.
- Collaborating with retailers and food business operators (FBOs) to highlight and promote products from farms with verified good antimicrobial stewardship practices.

4. Engagement with Stakeholders

- ❖ Working with regulatory bodies (i.e., KVB, VMD, DVS) and industry players to ensure consumer concerns are incorporated into AMR policies and guidelines.
- ❖ Participating in multistakeholder forums, such as the National Antimicrobial Stewardship Interagency Committee (NASIC), to represent consumer interests in AMR discussions.

5. Monitoring and Reporting

- Serving as a watchdog by reporting suspected cases of non-compliance (e.g., misuse of antimicrobials or violative residues in food) to the relevant authorities.
- Collaborating with researchers and media to highlight trends and risks associated with AMR in the food chain.

6. Supporting Policy Development

- Providing input on consumer-centric policies related to antimicrobial use in veterinary practice, ensuring they balance public health, food safety, and farmer livelihoods.
- Advocate for stricter regulations on over-the-counter sales of antimicrobials and enforcement of prescription-only policies.

By actively engaging in these areas, consumer associations can help bridge the gap between producers, regulators, and the public, fostering a culture of responsibility and sustainability in antimicrobial use. Their inclusion in Kenya's AMR mitigation efforts will strengthen the implementation of these guidelines and contribute to long-term food safety and public health outcomes.

CHAPTER THREE

AWARENESS CREATION AND COMMUNICATION

Raising awareness and communicating these guidelines effectively is essential to promote the responsible use of antimicrobials in animals and reduce AMR. Targeted campaigns will ensure that all stakeholders understand the importance of proper antimicrobial use, including guidelines on access, handling, storage, administration, adherence to treatment courses, avoidance of under-dosing, withdrawal periods, safe disposal, and record-keeping

Awareness programs should emphasise on best practices such as appropriate treatment, the avoidance of prophylactic antimicrobial use, and the adoption of biosecurity measures. AHPs play a key role in this effort; they should therefore stay updated on disease prevention techniques, emerging therapeutics, drug resistance patterns, diagnostic tools, and alternative treatment options to support the prudent use of antimicrobials.

For purposes of awareness creation and communication, these guidelines adopt the Access, Watch and Reserve (AWaRe) classification of antimicrobials to ensure One Health Approach, while giving recognition to the WOAHA classification of antimicrobials. This is based on their importance in public health and veterinary practice. By following these guidelines, AHPs can promote responsible antimicrobial use through proper communication to various stakeholders therefore mitigating the spread of antimicrobial resistance.

AHPs also have a responsibility to educate staff, clients, and other animal handlers on prudent antimicrobial use and Infection Prevention and Control (IPC) or biosecurity. Campaigns in the veterinary sector should be inclusive, involving all relevant stakeholders, and supported by regulatory bodies and competent authorities to ensure widespread impact.

Guidelines should offer practical tools for implementation and encourage proactive steps in minimising AMR risks. Awareness initiatives aimed at pet owners are encouraged to highlight the importance of vaccination, vector control, proper nutrition, hygiene and responsible antimicrobial use. Campaigns targeting consumers can also foster demand for animal products produced in line with responsible veterinary practices, building public confidence in safe and sustainably produced food.

CHAPTER FOUR

COMPLIANCE AND ENFORCEMENT

Compliance and enforcement on these guidelines are essential to control the spread of antimicrobial resistance (AMR). A robust system of regulation, monitoring, and accountability is needed to ensure that all stakeholders—from animal health professionals to farmers—adhere to these guidelines.

1. To effectively prevent and control infectious diseases, Animal Health Professionals and other users of veterinary antimicrobials shall:
 - Constantly comply with national legislation and regulations such as Animal Diseases Act (CAP 364 2015) and ensure that these guidelines will be used in conjunction with other existing laws.
 - Promptly report incidences and prevalence of antimicrobial resistance and adverse events to the Directorate of Veterinary Services and VMD as part of pharmacovigilance reporting.
 - Use Veterinary antimicrobials only when necessary and in an appropriate manner, thus:
 - Adhere to prescription guidelines and ethics as stipulated in the national legislation (VSVP ACT cap 366) and relevant regulations (VMD regulations 2015).
 - The regulations stipulate that all antimicrobials in Category 1 & 2 should:
 - a. Be prescribed by a veterinary surgeon and other authorised AHPs
 - b. Be supplied only through licensed or authorised distribution systems
 - c. Be administered to animals by a veterinary surgeon or under the supervision of a veterinary surgeon or other suitably trained persons authorised in accordance with national legislation
 - d. Enhance regulations on compliance and enforcement for supervision
2. Promotion of veterinary antimicrobials will be conducted after approval by VMD and in compliance with:

- The marketing authorization granted, particularly the content of the summary of product characteristics and
- The established codes of advertising practices of the relevant national legislation and regulations.

3. The choice of a veterinary antimicrobial to be used shall be guided by

- The expected therapeutic efficacy of the treatment based on:
 - a. Clinical experience of the AHPs.
 - b. Spectrum of the antimicrobial activity towards the pathogens involved.
 - c. The epidemiological history of the production unit—particularly regarding the antimicrobial resistance profiles of pathogens—should be reviewed, with antimicrobial susceptibility ideally established before treatment begins, and any second-line treatment following failure or recurrence should be guided by microbiological test results.
 - d. Appropriate dosage form and route of administration.
 - e. Response to initial treatment.
 - f. Known pharmacokinetics or tissue distribution to ensure that the selected veterinary antimicrobial is active at the site of infection.
 - g. Prognosis.
- The need to minimise the adverse health impact from the development of mic

3. The appropriate use of veterinary antimicrobials is primarily a clinical decision grounded in evidence-based medicine, relying on the experience and expertise of the prescribing veterinary professional and an accurate diagnosis supported by adequate diagnostic procedures.
4. There may be occasions when animals, which have been exposed to pathogens, may need to be treated without recourse (without confirmatory diagnosis - differential diagnosis) to an accurate diagnosis and antimicrobial susceptibility testing in order to prevent the development of clinical disease and for reasons of animal welfare.
5. If the label allows for flexibility on duration of treatment, the veterinarian should consider a dosage regimen that is long enough to allow an effective recovery of the animal but short enough to limit the selection of resistance in food borne and/or commensal microorganisms.

4.1 Extra/off-label use

The extra-label use of a veterinary antimicrobial drug may be permitted in appropriate circumstances and at the discretion of the veterinary practitioner including the administrative withdrawal periods to be used. It is the responsibility of the Animal Health Professionals (AHP) to define the conditions of responsible use in such a case including the therapeutic regimen, the route of administration and the duration of the treatment. Extra-label use of antimicrobial growth promoters is not permitted.

4.2 Recording

1. Records on antimicrobials dispensing and use should be kept at all dispensing outlets according to relevant national legislations (CAP 366 and VMD regulations 2015) and should be accessible to authorised veterinary professionals and regulatory authorities.
2. For investigation of antimicrobial resistance, animal health professionals should:
 - Record the antimicrobial susceptibility testing results.
 - Keep records of adverse events to veterinary antimicrobials including lack of expected efficacy due to antimicrobial resistance, and report it, as appropriate, to the regulatory authorities.
 - Maintain farm records on the use of antimicrobials and periodically review and update to ensure compliance with the directions on use.
 - Animal Health Professionals should keep records of treatments; and hand them over to a new attending AHP in accordance with codes of ethics.

CHAPTER FIVE

DISEASE PREVENTION AND REDUCING THE NEED TO USE ANTIMICROBIALS

The prudent use of antimicrobials is essential to combat the growing threat of antimicrobial resistance (AMR). The overreliance on these vital medications increases the risk of diminishing their effectiveness. It is crucial to prioritise disease prevention strategies that not only safeguard animal welfare but also minimise the necessity for antimicrobial interventions. Effective disease prevention encompasses a holistic approach that includes sound breeding and good management practices, biosecurity measures, vaccination protocols, and optimal nutrition. By focusing on these proactive strategies, the overall health of animal populations can be improved, the incidence of infectious diseases minimized, and ultimately, the reliance on antimicrobials significantly reduced.

5.1 General Principles of prudent use of antimicrobials

In general, the following measures can help to prevent diseases and reduce the need to use antimicrobials in all species:

1. Establishing hygiene and biosecurity protocols—such as using separate personal protective equipment for each area; restricting access to farms and specific units; providing hand washing and disinfection stations (equipped with liquid soap and both hot and cold water) near work areas; ensuring the prompt removal and safe disposal of deceased animals; implementing an ‘all-in all-out’ system for each unit and paddock; adhering to a rigorous cleaning and disinfection schedule; and conducting regular checks on disinfection procedures.
2. Establishing standard operating protocols for all farm operations to prevent the introduction and spread of infectious diseases. The protocols shall include the procedure for handling of sick animals, isolating infected individuals, waste and carcass disposal, cleaning and disinfection, etc.
3. Isolation of new animals before introducing them to the herd to monitor and prevent the spread of diseases. Controlling movements of animals between herds and isolating sick ones to prevent the spread of diseases.

4. Practicing good animal husbandry such as providing proper nutrition, housing, and care and implementing stress reduction techniques to improve overall well-being. Breeding for disease resistant animals.
5. Using vaccines to protect against infectious diseases. Ensuring routine / up-to-date vaccination programs are tailored to specific species.
6. Creating integrated production systems that eliminate the necessity to purchase and mix animal populations or transport animals with uncertain disease status.
7. Avoiding stressful situations that can weaken animals' immune systems and increase their susceptibility to infections such as minimising animal movements, shortening travel times, and ensuring compliance with recommended population density guidelines.
8. Offering training and incentives to farmers on AMR and responsible use of antimicrobials.
9. Regularly monitoring animal health and disease outbreaks and use of the data to inform early intervention and good management practices.
10. Ensuring antimicrobials are used only when necessary and prescribed by an animal health professional. Guidelines for dosage, duration, withdrawal periods and special precautions on usage shall be adhered to according to manufacturers'/experts instructions.
11. Providing only safe and high-quality feed and water.
12. Antimicrobials should not be used for growth promotion, prophylaxis, metaphylaxis and feed additives.
13. Control the presence of rodents, insects, and other pests that can act as vectors for disease.
14. Promote the use of indigenous medicinal plants and other alternatives such as ethnoveterinary remedies and non-antibiotic growth promoters to improve animal health and reduce reliance on antimicrobials.
15. Maintaining effective vector control for parasites such as fleas, ticks, and worms prevents secondary infections that could require antimicrobial

16. Proper disposal and treatment of manure to reduce the risk of disease transmission and minimize exposure to disease-causing organisms.
17. Promoting collaboration between veterinarians, farmers, healthcare providers, and environmental scientists under the "One Health" approach. This integrated approach to health would address zoonotic diseases, antimicrobial resistance, and environmental sustainability together.
18. Prioritize the use of narrow-spectrum antimicrobials based on sensitivity testing, avoid critically important antimicrobials for human medicine, and use broad-spectrum drugs only when necessary to target specific pathogens.

5.2 Oral Administration of prescribed Antimicrobials to Groups of Animals via Feed and Drinking Water

Oral antimicrobial treatment is often administered to groups of animals through medicated feed or by adding the antimicrobials to drinking water or feed on the farm. Whenever possible, individual treatment of the affected animal(s) (e.g. administration through injection) should be preferred to group or mass treatment. When using group treatment, the following points should be taken into account:

1. Oral antimicrobial treatment given *via* medicated feed or drinking water must only be administered where prescribed by a qualified veterinary professional. It is important to maintain ongoing veterinary oversight throughout the treatment process. Clear communication with all stakeholders involved (farm staff, veterinarians, regulatory bodies) regarding treatment plans and protocols should be done.
2. Antimicrobials should only be administered to groups of animals *via* feed or drinking water where there is evidence of microbial disease or infection. Such treatment should not be given as a prophylaxis.
3. The administration of antimicrobials *via* feed or water should be limited to the animals requiring treatment, and the drug delivery systems should be appropriate for the intended treatment. The effectiveness of the treatment and potential adverse events or resistance development should be monitored, and necessary action taken.
4. The quantities of antimicrobials administered in feed or water should be monitored and documented on a continuous basis, especially in intensive food-animal production systems. Sharing of medicated feed between farms should be avoided. The instruction given in the product information (SPC, leaflet, label) and by the veterinary profession must be complied with.
5. Where an antimicrobial is administered through feed, it is important to ensure the homogeneity of distribution of the drug, in order that each animal obtains the required therapeutic dose for treating the disease in accordance with the prescription.
6. Extra/off-label use should be limited to the necessary minimum and to exceptional occasions where no other authorised treatment options are available.

7. Adequate, clean storage facilities should be available on the farm to ensure proper storage of the medicated feed; access to these facilities should be restricted.
8. Training for farm personnel on the proper administration and monitoring of medicated feed and water should be regularly done by relevant veterinary authorities.
9. Appropriate records of the treatment regime and group of animals, and response observed that it is administered should be maintained (treatment dates, dosages, animal IDs).

5.3 Bovines and small ruminants

Mass or group medication of cattle is uncommon in Kenya, although transported animals can be subjected to group treatment using antimicrobials, when justifiable. Treatment given to cows against mastitis is of particular importance due to high prevalence of the disease and low compliance to withdrawal of milk from human and calf consumption.

The measures to be taken to prevent diseases and reduce the need to use antimicrobials include:

1. Avoiding the prophylactic use of antimicrobials in newly acquired animals or those that have been transported. Such animals should be kept free from stress and given immune boosting supplements.
2. Avoiding the prophylactic and metaphylactic use of antimicrobials in young animals (calves, kids and lambs) and instead promoted disease preventive strategies such as vaccinations, and feeding colostrum in the newborns.
3. Promoting the use of dry cow therapy on high-risk animals at drying-off. This would reduce incidences of clinical mastitis and consequently antimicrobials required to treat mastitis.
4. Promoting the use of rapid diagnostic tests (e.g. penside tests) for early detection and management of mastitis and other bacterial diseases to prevent misuse (overuse and underuse) and prolonged use of antimicrobials for treatment. Discourage feeding calves, lambs, and kids with milk from cows, ewes and nannies that have been treated with antimicrobials within the withdrawal period.
5. County Veterinary Services should sensitize pastoralists or livestock owners to practice extensive ruminant production to adhere to livestock movement controls as specified in the Animal Diseases Act, Cap 364 in order to control spread of animal diseases.
6. County Veterinary Services shall issue vaccination guidelines taking into consideration County specific disease occurrence patterns and existing national strategies in coordination with the Directorate of Veterinary Services.

5.4 Poultry

It is essential to prevent the routine, prophylactic group medication of poultry. This is commonly practised on farms before or after transporting day-old chicks, or in chicks to counteract productivity losses in the poultry production systems occasioned by biosecurity lapses.

1. Hatcheries and poultry farms as a primary source of day-old chicks should comply with requirements in the National Hatchery and Breeding Farm inspection protocols, 2018 to prevent introduction and establishment of diseases.
2. Records on use of antimicrobials, specifically disinfectants in hatcheries should be well kept and be available for inspection on request by the competent authorities.
3. Farmers should be advised to purchase day-old chicks from licensed hatcheries who practise primary vaccinations for disease prevention. Vaccination management should incorporate measures to avoid a stress reaction and improvements to the availability of autogenous vaccines.
4. Farmers should prioritise biosecurity measures on farms to reduce the need for prophylactic use of antimicrobials upon arrival of day-old chicks.
5. Specific animal welfare programs addressing disease prevention should be introduced, including footbath scores and adherence to biosecurity protocols.
6. The use of antimicrobials for non-infectious diseases with limited secondary infections should be avoided. Husbandry, management and rearing practices should be evaluated to avoid the recurrence of such diseases.
7. Antimicrobials shall not be used as a specific method to control salmonellosis in poultry. To ensure that Kenya's target for reducing salmonellosis is met, all national control programs should include biosecurity measures designed to prevent salmonella infection in poultry farms. The introduction of such measures has a positive effect in terms of preventing other diseases.

5.5 Pigs

Antimicrobials are most often used in pigs to relieve weaning diarrhoea, intestinal infections and respiratory diseases. These infections are often associated with transport and the stress caused when pigs originating from different farms are brought together or when pigs are housed in holdings with inappropriate ventilation systems, unsuitable feeding methods and/or insufficient biosecurity measures (GOK, 2023).

Possible measures to be taken to reduce antimicrobial use include:

1. Implementing an 'all-in all-out' system of production.
2. Limiting excessive handling or rough treatment of pigs, which can cause stress and make them more vulnerable to infections.
3. Promoting specialised pig production systems, such as compartmentalization and closed farming environments, that prioritise niche markets like organic and antimicrobial-free products.
4. Administering vaccines against common pig diseases such as porcine circovirus (PCV), porcine reproductive and respiratory syndrome (PRRS), atrophic rhinitis, swine erysipelas.
5. Monitoring immunity levels through serological testing to ensure vaccines are effective over time (especially in commercial farms).
6. Incorporating prebiotics, probiotics and postbiotics into pig diets to promote gut health, enhance immunity, and reduce the need for antimicrobials. Use plant-based compounds like essential oils and herbal extracts to enhance immunity and act as natural antimicrobials.
7. Supplementing diets with zinc oxide or copper to help manage post-weaning diarrhoea, a condition that often leads to antimicrobial use.

5.6 Camels

Strategies used for reducing the use of antimicrobials in other farm animals should apply in camels. The use of vaccines to tackle some of the diseases e.g., rabies, anthrax, tetanus, hemorrhagic septicaemia, camel pox etc in camels has been demonstrated to be particularly effective (Lamuka et al., 2017).

The measures for prudent antimicrobials use in camels includes:

1. Frequent monitoring and health checks of camels for early disease detection, isolation of new camels to prevent disease introduction, expansion of mobile veterinary services in pastoral areas for timely diagnosis and treatment, and training local pastoralists as community disease reporters (CDRs) to collectively enhance disease surveillance and reduce the need for antimicrobials.
2. Advocate for community management of water points in pastoral areas, ensuring cleanliness, and controlling access to reduce waterborne diseases (Othieno et al., 2022).
3. Ensuring access to shade and water during hot periods helps reduce stress and disease susceptibility.

5.7 Aquaculture

Use of antimicrobials in aquaculture poses a great risk for antimicrobial resistance as the compounds are applied directly to the environment. When antimicrobials are used to treat cultured aquatic animals, residues often enter the environment through effluent, runoff, or direct disposal. Environmental parameters such as water salinity, pH and temperature and animal factors will affect the efficacy of antimicrobials used.

Most cultured aquatic animals being poikilothermic are sensitive to drug excipients in addition to the active ingredients. This calls for the need to limit antimicrobial use in aquaculture as much as possible as antimicrobial resistance can easily develop in the aquatic environment. Aquaculture biosecurity measures focusing on infection prevention and control should be primarily practised. These measures include,

1. Operating an 'all-in all-out' system per unit or farm.
2. Applying single bay management where possible.
3. Treatment of culture water for ponds and ensuring each pond has its own inlet.
4. Carrying out fallowing of sites between production cycles.
5. Quickly removing dead fish and ensuring systems are in place for handling, disposing of and treating by-products.
6. Ensuring a system is in place for collecting blood and/or water when slaughtering on site.
7. Developing systems to avoid the spread of diseases by transport (e.g. Treatment of transportation water and avoiding contact with other aquaculture animals during transport).
8. Encouraging the development and use of effective vaccines for aquaculture.
9. Recommending adequate welfare parameters, such as stocking density to reduce stress in fish culture.
10. Providing appropriate environmental conditions for aquaculture with regard to water quality, water flow rates, oxygen levels and nutrition.

5.7.1 Antimicrobial use in aquaculture

1. All antimicrobials for aquaculture should be prescription only medicines and should be used as a last resort.
2. Autogenic bacterial vaccines and other available commercial vaccines for commonly occurring diseases in fish farms should be used for aquaculture to reduce the need for antimicrobial use.
3. Qualified veterinary professionals should make diagnosis on farm and prescribe only registered products for aquatic animal use. For off-label use, there must be justification guided by the veterinary professional. Antimicrobial sensitivity testing should be done prior to treatment.
4. Data reporting to the Veterinary Authority from specific disease surveillance programs should be used to help prevent possible outbreaks of disease. Regular fish farm inspections and monitoring can help detect diseases early, reducing the need for antimicrobials.
5. Where there is warranted antimicrobial use, it is important to ensure that minimal amount of drug is used in the production area by feeding at appropriate times ensuring there are no leftovers that will contaminate the environment. To increase uptake, it is recommended to withdraw feed for some time then feed medicated feed little at a time while observing uptake.
6. Implement targeted therapy using antimicrobials specifically effective against the identified pathogen.
7. Allow sufficient time between treatment and harvest to ensure drug residues fall below safety threshold.
8. Monitor residues through regular testing to ensure compliance with safety standards. There should be continuous training to aquaculture players on biosecurity measures, fish handling techniques to minimise stress, proper antimicrobial use, disease management practices and alternative to antimicrobials.
9. Promote the use of vaccines, probiotics, immunostimulants, high-quality diets, and controlled culture density as alternatives to antimicrobials for enhancing fish disease management.

10. Use antimicrobials only authorised in aquaculture. Ensure compliance with national and international regulations.
11. Fast and accurate diagnosis before antibiotic use.

5.8 Rabbits

Rabbits are susceptible to weaning diarrhoea, coccidiosis, and respiratory diseases among other infections, often leading to the need for group medication.

5.8.1 Disease control and prevention measures

To reduce the need for antimicrobials the following measures should be employed:

1. Focus on proper nutrition during weaning by introducing high-fibre diets and probiotics to promote gut health and prevent enteritis.
2. Implement regular cleaning and disinfection of pens and maintain clean water and feeding systems in order to reduce pathogen exposure and to prevent biofilm formation.
3. Use separate, sanitised equipment for each group of rabbits to avoid cross-contamination.
4. Maintain dry, clean environments to prevent the spread of coccidia, using effective disinfectants.
5. Optimise air quality through proper ventilation, filtration, and humidity control to reduce respiratory disease risks.
6. Introduce dietary changes gradually, particularly during weaning, to prevent gastrointestinal disturbances. High-fibre diets are crucial for digestive health.
7. Maintain optimal stocking densities to prevent stress and fighting.
8. Provide environmental enrichment to reduce aggressive behaviour.
9. Isolate newly purchased or sick rabbits for 2-4 weeks and perform health screening before introducing them to the main group.

5.8.2 Antimicrobial Use in Rabbits

1. Antibiotics should only be used on prescription by an animal health professional after clinical examination and where possible faecal or bacterial culture tests used to confirm the presence of pathogens.
2. Perform antimicrobial sensitivity testing before administering antimicrobials to ensure appropriate treatment and avoid broad-spectrum antibiotics.
3. Avoid prophylactic use of antimicrobials for dietary transitions, focusing instead on proper nutrition.
4. Observe adverse events after antimicrobial administration. If diarrhoea develops after antibiotic treatment, withdraw the antibiotic immediately and administer probiotics, provide supportive care, including fluids and nutritional support.
5. Maintain detailed records of all antimicrobial treatments, including dosage, duration, and outcomes.

5.9 Equines

These guidelines apply to antimicrobial use in Donkeys and Horses (Mills, 2022).

Prudent use of antimicrobials is a critical component of equine medicine. Enhancing good welfare practices of equines can reduce the use of antimicrobials due to optimised health in these species. The following equine welfare friendly practices should be encouraged:

1. Use of proper handling techniques and restraint equipment. Practices such as tight tethering or hobbling should be avoided.
2. Working of animals that are fit or mature for the intended purpose.
3. Proper housing that protects the equines from adverse weather conditions.
4. Providing adequate resting periods in between working hours.
5. Allowing only optimum weight load carriage (maximum of 20% of its body weight).
6. Provision of adequate feed and *ad libitum* access to clean drinking water.
7. Provision of a favourable working environment. Working under heat stress or other adverse weather conditions should be avoided.
8. Avoid harsh physical punishment like whipping.

9. Avoid use of traditional practices such as treatment with ineffective traditional remedies, that may worsen the animals' health.

N/B: DVS should design effective programs for the prevention and treatment of diseases and conditions of equines.

Although the basic principles of equine antimicrobial therapy are no different to those in other animal species, there are some special considerations. Since equines are hindgut fermenters, they are susceptible to adverse gastrointestinal consequences associated with lincosamide antibiotics e.g. lincomycin and clindamycin. They cause extreme cases of colitis, enterotoxaemia and diarrhoea among other conditions that can lead to the excessive use of antimicrobials. In addition, the temperament of equines may influence selection of treatment options based on the ability of the Animal Health Professionals (AHPs) or owners to safely administer antimicrobials via different routes. The owners and AHPs should work closely to minimise use of antimicrobials using the following measures:

1. Avoiding the prophylactic use of antimicrobials in equines that lead to adverse events including colitis, allergic reactions, immune-mediated disease and arthropathy. Oral penicillins are considered high risk and should never be used in horses while enrofloxacin is associated with arthropathy in foals.
2. Provision of adequate stall rest in well-ventilated stable and supportive care to control respiratory infections.
3. Establishing proper biosecurity measures and management strategies to minimise the development and spread of respiratory diseases among other infections.

5.10 Companion Animals

Whenever a medical condition exists, it is important to obtain an accurate clinical diagnosis. This includes determining the likelihood of an infection/disease warranting antimicrobial use. Once a decision is made to use antimicrobial therapy, AHPs should strive to optimise therapeutic efficacy of the antimicrobials.

The Following actions and strategies should be implemented to prevent and reduce the need for antimicrobials in companion animals:

1. Preventive strategies, such as appropriate husbandry, routine health monitoring, and vaccinations, should be emphasised.

These husbandry practices include:

- Adherence to the guidelines for feline and canine vaccinations (Squires, 2024).
 - Parasite (internal and external) control, nutritional counselling, and dental health care.
 - Client education and involvement to successfully adopt good preventive health care programs.
 - Appropriate hygiene and husbandry are especially important in multiple pet households.
 - Avoid routine prophylactic use of antimicrobials as a substitute for good animal health management unless clinically justified.
 - The use of antibiotics to prevent infection (e.g., prophylaxis) can only be justified in cases where bacterial infection is likely to occur or where the implications of infection are particularly high (e.g., central nervous system surgery).
2. Recognize risk factors for infections in cats and dogs and prevent or correct them whenever possible. These include, but are not limited to: Urinary catheterization, Intravenous catheters, Wounds, Environmental factors (i.e., stress, crowding, poor hygiene, improper transportation, temperature extremes, poor ventilation, and high humidity), debilitating disease, (e.g. Canine Parvovirus enteritis), Immunosuppressive drugs (e.g., chemotherapeutic agents and glucocorticoid therapy), Endocrine diseases (i.e., diabetic cats are more prone to urinary tract, skin, and mouth infections; dogs with hyperadrenocorticism are more prone to skin and urinary tract infections).

3. Therapeutic alternatives should be considered before, or in conjunction with, antimicrobial therapy. This may include:
 - Supportive care, such as correction of fluid and electrolyte abnormalities, maintaining acid-base balance, and ensuring proper nutrition.
 - Surgical intervention may be necessary in some cases, such as abscessation, empyema, or other diseases requiring source control.
 - Consider supportive care, including dietary therapy and probiotics for acute, nonfebrile diarrhoea.
 - Consider antiseptic preparations and topical (e.g., skin) or locally applied antimicrobials (e.g. for oral cavity) as alternatives to systemic antimicrobials.
4. Considerations should be made whether to delay or alter antimicrobial therapy based on patient status.
 - Use delayed prescribing or watchful waiting if a patient's disease might not be caused by a bacterial infection or in certain situations where infections are self-limiting.
 - Reassess the need for and choice of antimicrobial drugs throughout the course of therapy (antimicrobial "time out").
5. Therapeutic antimicrobial use should be confined to appropriate clinical indications.
 - A definitive diagnosis that indicates antimicrobial therapy is appropriate, should be established whenever possible, and empirical use of antimicrobials should be avoided.
 - Animal Health Professionals should strive to rule out viral infections, parasitism, mycotoxicosis, nutritional imbalances, neoplasia, and other ailments that do not require antimicrobial therapies.
 - Antimicrobial therapy is not indicated in most upper respiratory infections (e.g., feline herpesvirus or calicivirus and canine infectious respiratory disease complex) not suspected to be complicated by secondary bacterial infection.
 - Most cases of pancreatitis in dogs and cats are not associated with bacterial infection and therefore antibiotics should be used judiciously.

- Most cases of feline lower urinary tract disease do not involve bacterial infection, particularly in cats younger than 10 years of age, and in such cases, antimicrobials are not indicated.
 - Systemic antimicrobials are usually not indicated for routine dental prophylaxis or after tooth extractions. In cases of periodontitis, systemic antimicrobials are not a substitute for surgical treatment. In most cases of periapical tooth root abscesses, debridement of infective tissue is sufficient to control infection.
 - Most cases of acute diarrhoea are not due to pathogenic bacterial infections or are self-limiting, so antimicrobials are not indicated, do not hasten time to clinical resolution, and cause further dysbiosis.
6. Therapeutic antimicrobial use should be applied appropriately in the surgical setting.
- Administration of antimicrobials should not replace appropriate sterile technique.
 - Surgical antimicrobial prophylaxis can be initiated 30–60 minutes before the first incision in high-risk-infection procedures. The antimicrobial can be repeated every 90 minutes intraoperatively until the end of surgery. Thereafter postoperative antimicrobials are not necessary and should be used judiciously.
 - Surgical antimicrobial prophylaxis is not usually needed for clean procedures.
 - Sterile technique and proper tissue handling should eliminate the need for prophylactic antibiotics in ovariohysterectomies, orchiectomies, and most other sterile procedures.
 - Ongoing postoperative antimicrobial therapy is rarely required.
7. Antimicrobials considered important in treating refractory infections in human or veterinary medicine should be used in animals only after careful review and reasonable justification. ([WOAH List of Antimicrobial Agents of Veterinary Importance](#), 2023; AWaRe classification of antibiotics for evaluation and monitoring of use).

8. Diagnostic testing, including culture and susceptibility testing, aids in the appropriate selection of antimicrobials. When a urinary tract infection (UTI) (also known as bacterial cystitis) is suspected, urine collected by cystocentesis can help distinguish true bacteriuria from contamination but is not able to distinguish infection from subclinical bacteriuria.
9. When clinical infection with MRSA or Methicillin Resistant Staphylococcus Pseudointermedius (MRSP) is suspected or detected in companion animals, they should be monitored for MRSA/MRSP with a view to possible quarantine. It is very important that the risk of the infection spreading in animal hospitals and veterinary clinics is minimised. Animals showing clinical signs should therefore be handled separately. In dog kennels or in day care facilities, dogs showing clinical symptoms should not be kept with other animals.
10. Regimens for therapeutic antimicrobial use should be optimised using current pharmacological information and principles.
11. Duration of therapy should be based on scientific and clinical evidence in order to obtain the desired health outcome while minimising selection for antimicrobial resistance.
12. Maintain accurate records of indication, treatment, and outcome to evaluate therapeutic regimens.
13. AHPs should work with animal owners and caretakers to ensure the judicious use of antimicrobials. The following practices should be adopted:
 - Administration instructions for antimicrobials must be made clear and labelled correctly (e.g. doxycycline capsules or tablets must always be administered after food to avoid gastric ulceration).
 - Clients should be advised to administer oral and topical medications as directed by their AHPs, including medication timing and duration of use.
 - As with all medications, proper client instruction in administration techniques is crucial to ensure compliance and safety of the pet and the owner.
 - Clients should be warned of potential adverse events and instructed on what to do if any such reactions occur (e.g., stop medication and call your AHPs for further recommendations).

- Animal owners should consult with their AHPs before any antibiotic use, even for antibiotics available without a prescription, to ensure positive outcomes and prevent complications.

5.11 Bees and other beneficial insects

Bees and other beneficial insects, like other agricultural animals, are prone to bacterial infections such as **foulbrood diseases**. While antimicrobials can be effective, their use must be controlled to prevent AMR. The following actions should be taken to reduce the need for antimicrobials in apiculture and other insect rearing:

5.11.1 Good Management and biosecurity Practices

1. Thoroughly disinfect culture areas between production cycles.
2. Maintain optimal environmental conditions, including water quality and diverse floral sources, to support natural immunity.
3. Ensure proper hive and culture area sanitation and ventilation.
4. Maintain separate equipment for each apiary and disinfect all tools between uses.
5. Promote Integrated Pest Management practices in apiculture, sericulture and other insect farming ventures.
6. Quarantine new bees and use strict biosecurity protocols, especially during the import/export of queen bees.
7. Develop and enforce strict disinfection protocols for all transport equipment to prevent the spread of disease between colonies during transit.

5.11.2 Disease Surveillance and Early Detection

Establish surveillance programs to monitor for early signs of bacterial infections. Regular hive and culture areas inspections using **Preclinical Indicators (PCIs)** can help detect diseases early, reducing the need for antimicrobials.

5.11.3 Responsible Antimicrobial Use

1. Use antimicrobials only under veterinary supervision after a confirmed diagnosis. Antimicrobial sensitivity testing should guide treatment, and the use of **critically important antimicrobials (CIAs)** should be limited to last-resort cases.
2. Maintain accurate records of all antimicrobial use and ensure compliance with withdrawal periods to prevent residues in bee products.
3. Encourage the use of alternatives to antibiotics, such as **probiotics, immune stimulants**, and **bacteriophages**. Breed bee strains resistant to bacterial infections.
4. Promote preventive measures for common diseases e.g. development of vaccines and adoption of new technologies like biocontrol agents to minimise reliance on antimicrobials.

5.12 Wildlife, Captive animals and others species

Treatment of wildlife with antimicrobials is rare in the wild and only happens under mandatory situations. However, the use of antimicrobials is common in farmed wildlife species such as crocodiles, ostriches and guinea fowls among others. Conditions such as coccidiosis, chlamydiosis, mycoplasmosis, and pox in crocodiles drive antimicrobial use in wildlife.

On the other hand, ostriches and other domesticated wild birds suffer from common poultry diseases and guidelines on prudent use of antimicrobials in poultry should be implemented in their management.

The measures to be taken to reduce occurrence of diseases and minimise use of antimicrobials include:

1. Establishing appropriate biosecurity measures, good farm practice and management strategies to minimise the contact between wildlife and domestic animals.
2. Ensuring routine vaccinations to control infections and avoid use of antimicrobials.

CHAPTER SIX

SURVEILLANCE AND MONITORING

1. The Veterinary Medicines Directorate (VMD) shall establish systems for regular monitoring and surveillance of antimicrobial use while the Directorate of Veterinary Services (DVS) shall develop systems for monitoring and surveillance of resistance patterns of microorganisms of veterinary importance.
2. VMD shall collect, collate and analyse data on antimicrobial use (AMU) and resistance in a harmonised manner to improve the understanding of the extent and trends of antimicrobial use and resistance in microorganisms affecting animal populations in the country and identify areas of research.
3. Sources of data on AMU include veterinary pharmacies and farm level data while antimicrobial consumption (AMC) include import and export data, manufacturing and sales data. A possible mechanism for the collection of this information is to make the provision of appropriate information by pharmaceutical manufacturers to the regulatory authority- one of the requirements of antimicrobial registration.
4. The data collected on antimicrobial use should:
 - Give an indication of the trends in the use of antimicrobial agents in animals over time and potential associations with antimicrobial resistance patterns of microorganisms of veterinary importance.
 - Help in the interpretation of antimicrobial resistance surveillance data and assist in responding to raising issues in a precise and targeted way.
 - Assist in risk management to evaluate the effectiveness of efforts and mitigation strategies .
 - Inform risk communication strategies; and
 - Enhance improved antimicrobial stewardship, ensuring continued availability of safe and effective antimicrobial agents for both animal and human health.
5. VMD, through the DVS, shall provide the data to the 'Animal Antimicrobial Use Global database of the World Organisation for Animal Health' on an annual basis.

6. Harmonised and comparable data on the use of antimicrobials and AMR in the food chain is necessary for carrying out risk assessment, research, and for evaluating the effectiveness of the measures taken to tackle AMR.
7. VMD shall conduct point prevalence surveys for comparison with national data; establish trends and patterns of AMU and determine the AMR index.
8. Harmonised monitoring and surveillance systems should be used across the country. VMD should develop a reporting format for AMU data which, at minimum, should include data on name of antimicrobial product; strength and concentration of the active ingredient in the product; batch number; expiration date; quantity supplied and additional data as per the VMD guidelines on pharmacovigilance.
9. AHPs shall provide timely data on the use of antimicrobials in veterinary medicine to contribute towards monitoring of antimicrobial use.
10. VMD shall analyse and share the data on antimicrobial use collected from various sources. The reporting of antimicrobial use data may be organised by antimicrobial classes or subclasses, target animal species, route of administration (specifically in-feed, in-water, injectable, oral, intramammary, intrauterine and topical).
11. AHPs shall participate in the monitoring of antimicrobial resistance in zoonotic, pathogenic and indicator microorganisms taken from animal populations and their products, through submission of samples for antimicrobial sensitivity testing.
12. AHPs shall address and report adverse events related to antimicrobial use when they occur. Their key role in reporting these adverse events will directly contribute to the safety of the antimicrobial agents.
13. It is important that adverse events are reported to VMD, even if a link to the antimicrobial used is only suspected. This is crucial for the following types of adverse events:
 - An adverse reaction, which results in death of the animal.
 - An adverse reaction, which results in significant, prolonged or permanent signs.
 - An unexpected adverse reaction, which is not mentioned on the label or package insert.
 - An adverse reaction which occurs in man.

- An adverse reaction, which is observed after extra-label use of antimicrobial agents.
- Lack of expected efficacy possibly indicating development of resistance.
- A problem related to withdrawal periods, possibly resulting from unsafe residues in animal products.
- Possible environmental problems.
- A known adverse reaction mentioned on the package insert, which is serious or which seems to increase in frequency and/or seriousness.

14. If the suspected adverse event is serious, particularly if an animal has died, the incident should be reported immediately to VMD, CDVS or any other relevant veterinary authority.

15. It is important that as much detail as possible related to the adverse event(s) is(are) reported as per VMD guidelines on pharmacovigilance. If available, laboratory data, post-mortem reports, photographs or other relevant information should be included, and likely differential diagnoses should be considered.

16. Should a pattern of adverse events for a specific product emerge, VMD shall initiate regulatory actions to address the adverse events depending on the conditions of occurrence and on their seriousness. Examples include:

- Inclusion of warnings on the product label.
- Changes in the authorised use of the product.
- Suspension of the product from the market until the safety issues are solved.

CHAPTER SEVEN

IMPLEMENTATION FRAMEWORK

These guidelines will be implemented by the national government, county governments, Veterinary Medicines Directorate, Kenya Veterinary Board, training institutions, research organisations, pharmaceutical industry, animal health professionals, animal feed industry, and animal owners and keepers.

7.1 Training and Education

Veterinary training institutions shall embed these guidelines and the importance of antimicrobial stewardship in relevant sections of the teaching curriculums.

Continuous Professional Development (CPD) service providers and NASIC shall develop modules to disseminate these guidelines to animal health professionals through e-academy and other platforms.

Training institutions, VMD and KVB should enhance regulator-student interactions so as to create awareness and understanding of the National Regulatory Framework with particular emphasis on these guidelines. This can be achieved through guest lectures, final year dinner addresses, and student conferences.

KVB, VMD and DVS shall embed implementation of these guidelines in the Animal Health Professionals internship program.

VMD together with other stakeholders (e.g. DVS, training institutions, veterinary associations) shall develop training materials to educate farmers and the public about responsible antimicrobial use for better dissemination.

7.2 Dissemination

NASIC shall implement the AMR Communication Strategy to include these guidelines as one of the materials to be disseminated.

The DVS in collaboration with NASIC, CASICs and the technical working group on prudent use of antimicrobials shall disseminate these guidelines to the relevant stakeholders.

7.3 Regulatory Measures

The Veterinary Medicines Directorate (VMD) shall regulate the sale and distribution of antimicrobials and enforce good distribution practices. The Kenya Veterinary Board shall regulate the use of antimicrobials in animals, ensuring they are applied responsibly and only when necessary.

7.4 Monitoring and Evaluation

DVS shall develop the monitoring and evaluation framework for these guidelines. DVS shall create channels for feedback from stakeholders to continuously refine and improve the guidelines.

KVB shall monitor and evaluate the prudent use of antimicrobials by the animal health professionals as stipulated in these guidelines.

VMD shall monitor and evaluate the prudent distribution and use of antimicrobials by the pharmaceutical industry; farms and animal feed manufacturers as stipulated in these guidelines.

7.5 Sustainability and Adaptation

These guidelines shall be reviewed and updated every three (3) years. However, based on new significant evidence affecting antimicrobial use and feedback from stakeholders, the review can be conducted prior to the five-year lapse.

Each institution or level of government shall avail adequate resources to perform its roles. Such resources shall include data, staff, equipment, building, transport, infrastructure and budgetary allocation.

7.6 Collaboration and Coordination

DVS shall enhance collaboration between +animal health professionals, farmers, livestock industry, veterinary pharmaceutical industry, regulatory bodies and development partners, to ensure implementation of these guidelines.

NASIC and CASICs shall promote a One Health approach by coordinating implementation efforts across human, animal, and environmental health sectors.

NASIC should engage with international organizations and other countries to share best practices and harmonize efforts to enhance prudent use of antimicrobials in the country.

REFERENCES

1. World Bank. 2017. "Drug-Resistant Infections: A Threat to Our Economic Future." Washington, DC: World Bank. License: Creative Commons Attribution CC BY 3.0 IGO. Accessed on 10.6.2025 at <https://www.worldbank.org/en/topic/health/publication/drug-resistant-infections-a-threat-to-our-economic-future>
2. Murray, C. J. L., et al. (2022). **Global burden of bacterial antimicrobial resistance in 2019: a systematic analysis.** *The Lancet*, 399(10325), 629-655.
3. O'Neill, J. (2014) Antimicrobial Resistance: Tackling a Crisis for the Health and Wealth of Nations. *The Review on Antimicrobial Resistance*, 20, 1-16.
4. World Health Organization. (2015). Global action plan on antimicrobial resistance. World Health Organization. <https://iris.who.int/handle/10665/193736>
5. GOK 2023. National Action Plan on Prevention and Containment of Antimicrobial Resistance, Monitoring and Evaluation Framework, Nairobi, Kenya. Accessed on 10.6.2025 <https://www.prescribingcompanion.com/media/1408/national-action-plan-for-the-containment-and-prevention-of-antimicrobial-resistance-me-framework-2023-2027.pdf>
6. The Veterinary Surgeons and Veterinary Paraprofessionals Act (The Veterinary Medicines Directorate Regulations 2022). LN No 29 Of 2011. Accessed on 10.6.2025 at <https://kilimo.go.ke/wp-content/uploads/2024/08/The-Veterinary-Surgeons-and-Veterinary-Paraprofessionals-Act-Amendment-Regulations-on-the-Veterinary-Medicines-Directorate-for-Validation.pdf>
7. Codex Alimentarius Commission, 2005. "Code of practice to minimize and contain antimicrobial resistance." CAC/ RCP:61-2005. Accessed on 10.6.2025 at https://www.fao.org/input/download/standards/10213/CXP_061e.pdf
8. GOK (2023). The Livestock (Pig Industry) Regulations, 2023. Accessed on 10.6.25 at <https://kilimo.go.ke/wp-content/uploads/2024/08/PIG-INDUSTRY-REGS.pdf>
9. Lamuka, P. O., Njeruh, F. M., Gitao, G. C., & Abey, K. A. (2017). Camel health management and pastoralists' knowledge and information on zoonoses and food safety risks in Isiolo County, Kenya. *Pastoralism*, 7, 1-10.

10. WOAHA terrestrial animal health code 2024. Accessed on 10.6.2025 at https://rr-africa.woah.org/app/uploads/2023/09/en_csatvol1_2024.pdf
11. OIE List of Antimicrobial Agents of Veterinary Importance, 2023. Accessed on 10.6.2025 at <https://www.woah.org/app/uploads/2021/06/a-oie-list-antimicrobials-june2021.pdf>
12. Mills, G. (2022). Assessing antimicrobial use and practices in equids. *Veterinary Record*, 191(11), 442–443. <https://doi.org/10.1002/vetr.2499>
13. FAO (2021). Responsible Use of Antimicrobials in Beekeeping. FAO. <https://doi.org/10.4060/cb6918en>. Accessed on 10.6.2025
14. Othieno, J., Njagi, O., Masika, S., Apamaku, M., Tenge, E., Mwasa, B., ... & Fasina, F. O. (2022). Knowledge, attitudes, and practices on camel respiratory diseases and conditions in Garissa and Isiolo, Kenya. *Frontiers in Veterinary Science*, 9, 1022146.
15. Squires, R. A., Crawford, C., Marcondes, M., & Whitley, N. (2024). 2024 guidelines for the vaccination of dogs and cats – compiled by the Vaccination Guidelines Group (VGG) of the World Small Animal Veterinary Association (WSAVA). *Journal of Small Animal Practice*, 65(5), 277–316. <https://doi.org/10.1111/jsap.13718>

Relevant references

1. Bbosa, Godfrey S., Norah Mwebaza, John Odda, David B. Kyegombe, and Muhammad Ntale. 2014. "Antibiotics/antibacterial drug use, their marketing and promotion during the post-antibiotic golden age and their role in emergence of bacterial resistance." *Health* 6 (05):410.
2. Kenya National Bureau of Statistics (KNBS). 2014. "Kenya Open Data Survey." accessed 18th February. <https://www.opendata.go.ke/Agriculture/Census-Vol-II-Q-11-Livestock-population-by-type-an/qbv-8bjk>.
3. Prescott, John F. 2008. "Antimicrobial use in food and companion animals." *Animal Health Research Reviews* 9 (02):127-133.
4. Erin Frey, Michael Costin, Jennifer Granick, Mathew Kornya and J. Scott Weese (2022): 2022 AAEP/AAHA Antimicrobial Stewardship Guidelines. *Journal of American Hospital Association* 58(4): 1-5. <https://doi.org/10.5326/1547-3317-58.4.1>

5. Kenya National Bureau of Statistics (KNBS). 2019. "Kenya Open Data Survey." accessed 18th February. <https://www.opendata.go.ke/Agriculture/Census-Vol-II-Q-11-Livestock-population-by-type-an/qbv-8bjk>.
6. Ho, C. S. *et al.* Antimicrobial resistance: a concise update. *Lancet Microbe* 100947 (2024) doi:10.1016/j.lanmic.2024.07.010.
7. Pulingam, T. *et al.* Antimicrobial resistance: Prevalence, economic burden, mechanisms of resistance and strategies to overcome. *European Journal of Pharmaceutical Sciences* 170, 106103 (2022).
8. World Health Organization (WHO). Global Antimicrobial Resistance and Use Surveillance System (GLASS) Report 2022.
9. OIE - World Organisation for Animal Health. (2020). *OIE standards, guidelines and resolution on antimicrobial resistance and the use of antimicrobial agents* (2nd edition). OIE.
10. DANMAP 2023 - Use of antimicrobial agents and occurrence of antimicrobial resistance in bacteria from food animals, food and humans in Denmark. Accessed On 11.6.2025 at <https://www.danmap.org/>
11. The National Antimicrobial Resistance Monitoring System 2025. Accessed at <https://www.fda.gov/animal-veterinary/antimicrobial-resistance/national-antimicrobial-resistance-monitoring-system> on 11.6.2025
12. The National Food Safety Policy 2021. Accessed on 11.6.2025 <https://kilimo.go.ke/wp-content/uploads/2024/08/Draft-Food-Safety-Policy-2021.pdf>

Additional reading

1. Laboratory Biosafety and Biosecurity policy Guidelines 2019
2. Public Health Act Cap 242
3. Environmental Management and Coordination Act (EMCA, 2015)
4. National Livestock Policy 2019

LIST OF CONTRIBUTORS			
	NAME	ORGANIZATION	ROLE
1.	Dr. Naphtal Mwanziki	Directorate of Veterinary Services	DSET – Lead
2.	Dr. Romona Ndanyi	Directorate of Veterinary Services	AMR Focal Point
3.	Dr. Gathira Muchira	Directorate of Veterinary Services	Veterinary Officer
4.	Dr. Joseph Wairia	Directorate of Veterinary Services	Aquatic Animal Health Focal Point
5	Dr. Mathew Muturi	Directorate of Veterinary Services	Veterinary Officer
6	Dr. Alexina Morang’a	Directorate of Veterinary Services	Veterinary Officer
7	Dr. Philemon Kosgie	Directorate of Veterinary Services	Monitoring and Evaluation Specialist
8	Dr. Lyn Dorice Namarome	Directorate of Veterinary Services	Veterinary Officer
9.	Dr. Anima Sirma	Directorate of Veterinary Services	Veterinary Officer
10.	Dr. Damaris Mwololo	Directorate of Veterinary Services	AMR Secretariat
11.	Dr. Daniel Senerwa	University of Nairobi	Lecturer and Researcher
12.	Dr. Willy Mwangi	University of Nairobi	Clinical Researcher and Lecturer
13.	Professor Isaac Mapenay	University of Nairobi	Clinical Researcher and Lecturer

14.	Dr. Evalyn Wangiru Mwihia	Egerton University	Lecturer
15.	Dr. Eunice Omondi	NVRL Kabete	AMR Secretariat
16.	Dr. Bridgit Muasa	NVRL Kabete	AMR Secretariat
17.	Dr. Emily Muema	VMD	Regulatory Expert
18.	Dr. Nehemiah Birgen	VMD	M&E
19.	Dr. Rose Owada	VMD	Regulator
20.	Dr Mary Mathenge	SEVET	Veterinary Officer
21.	Dr. Tom Odula	VISAK	Industry Representative
22.	Dr. Esther Kamau	NVL Karatina	Lab Veterinarian
23.	Dr. Nauline Chepngo	NVL Eldoret	Lab Veterinarian
24.	Dr. Daniel Muturi	County Government of Nyeri	County Director Representative
25.	Dr. Nazaria Nyaga	County Government of Kajiado	County Director
26.	Dr. Edward Gichohi Kanyari	County Government of Nyandarua	County Director
27.	Dr. Muriuki Kabatha	County Government of Nairobi	County Director
28.	Mr. Henry Adiambo Musoga	KVPA	Vice Chairperson
29.	Dr Allan Elavula Keya	KESCAVA	Veterinary Officer
30.	Dr. Jaquinvadah Gilla	Kenya Veterinary Board	Regulatory Expert
31.	Dr. Samanthe Opere	The Brooke East Africa	Veterinary Officer
32.	Dr. Naomi Kemunto	ILRI	Researcher

33.	Dr. Eugene Ibayi	ILRI	Researcher
34	Dr. Monicah Maichomo	KALRO	Researcher
35.	Dr. Joseph Kamau	KALRO	Veterinary Officer
36.	Dr. Moses Olum	KALRO	Veterinary Researcher
37.	Dr. Kinuthia Bubi	FIND	Project coordinator
38.	Dr. Dishon Muloi	ILRI	Researcher
39.	Dr. Veronicah Chuchu	FIND	AMR Scientist
40	Joseph Njung'e	FIND	Information Systems Specialist
41.	Dr. Amos Lucky Mhone	CPA	Animal Health Advisor
42.	Dr. Morris Buliva	ILRI	Researcher
43.	Dr. Maurice Ogutu McOwino	VISAK	Vice Chair



GUIDELINES FOR PRUDENT USE OF ANTIMICROBIALS IN ANIMALS



MINISTRY OF AGRICULTURE AND
LIVESTOCK DEVELOPMENT

STATE DEPARTMENT FOR LIVESTOCK
DEVELOPMENT

DIRECTORATE OF VETERINARY SERVICES