



**FMLD**  
FEDERAL MINISTRY  
OF LIVESTOCK  
DEVELOPMENT

# FEDERAL MINISTRY OF LIVESTOCK DEVELOPMENT (FMLD)



## NATIONAL ANIMAL HEALTH ANTIMICROBIAL USE SURVEILLANCE STRATEGY, PROTOCOLS AND STANDARD OPERATING PROCEDURES

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NATIONAL ANIMAL HEALTH ANTIMICROBIAL USE SURVEILLANCE STRATEGY, PROTOCOLS AND STANDARD OPERATING PROCEDURES  
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## About the Ministry

The Federal Ministry of Livestock Development (FMLD) was established on July 9, 2024, by President Bola Ahmed Tinubu to transform Nigeria's livestock sector into a sustainable and globally competitive industry. With a mandate to enhance livestock productivity, ensure food security, and drive economic growth, the Ministry is committed to addressing key challenges such as poor infrastructure and conflicts between farmers and herders. FMLD is structured into 17 departments, focusing on areas like livestock breeding, ranch development, pest control, and veterinary public health. Through strategic policies, research, and private-sector engagement, the Ministry aims to modernize livestock farming, create jobs, and boost Nigeria's economy.

### Our Mandate

According to a circular issued by the Secretary to the Government of the Federation (SGF), Sen. George Akume, CON, on September 12, 2024, with Ref. No. SGF/OP//S3/X11/218, the Ministry is mandated to “develop the policies and programmes needed to transform the livestock sector into a vibrant, sustainable, as well as globally competitive industry, ensuring food security, economic growth, improved livelihoods for farmers, and maintenance of social harmony.”

### Our Vision

To build a resilient, sustainable, and inclusive livestock sector that drives economic growth, ensures food security, and improves livelihoods.

### Our Structure

The Federal Ministry of Livestock Development is responsible for formulating and implementing policies to enhance livestock productivity, sustainability, and economic growth. The Ministry operates through 13 specialized departments, including seven (7) technical departments and six (6) common services departments, alongside a Special Duties Office, three (3) units, and seven (7) parastatals/agencies.

- I. **Ruminants and Monogastric Department:** The Department functions in the formation and implementation of policy that enhances the productivity and sustainability of dairy, beef, sheep, cattle, goats, pig, poultry, and other micro livestock sectors. It focuses on improving breeding, managing, practicing, processing, and marketing livestock products for economic growth.
- II. **Ranch and Pastoral Resources Development:** The Department formulates and implements policies for the development and sustainable management of grazing reserves, ranches, and stock routes. It also develops strategies to promote efficient land use within grazing reserves, improving livestock productivity and reducing conflicts between farmers and pastoralists.
- III. **Pest Control Services:** This Department formulates and implements policies for preventing and controlling transboundary pests and vectors of economic and public health importance. It is also responsible for sensitization, advocacy, and monitoring of pesticides used in livestock production.
- IV. **Quality Assurance & Certification:** The Department initiates policy direction on safety guidelines for livestock products to protect animal and public health. It also issues International Veterinary Certificates (export and import permits) in compliance with the World Organization for Animal Health (WOAH).

- V. Veterinary Public Health and Epidemiology:** This Department formulates policies and regulations on veterinary public health, ensuring good hygienic animal processing practices and safe delivery of animal products to consumers. It aims to protect public health from animal-borne diseases.
- VI. Livestock Extension & Business Development:** This Department develops policies and strategies to promote livestock extension services and business development for farmers, contributing to national food security and economic growth.
- VII. Human Resources Management:** Responsible for providing administrative guidelines to maximize productivity by optimizing employee effectiveness. It handles recruitment, training, staff performance evaluation, workplace culture, dispute resolution, and wellness programs.
- VIII. Planning, Research & Statistics:** This Department oversees corporate and strategic planning, research activities, and statistical data collection. It supports livestock sector development through research on new technologies and breeding processes.
- IX. Finance & Accounts:** Responsible for financial planning, budgeting, and fund management. It ensures financial stability, transparency, and fraud prevention while supporting management in financial decision-making.
- X. General Services:** Manages the Ministry's facilities, transportation, logistics, and workplace safety, ensuring smooth operational services.
- XI. Procurement:** Oversees negotiation, purchasing, and stock management of goods and services. It ensures quality, cost efficiency, and adherence to legal and ethical procurement standards.
- XII. Special Duties Office:** Handles urgent issues, unforeseen situations, and strategic tasks requiring special attention. It also manages special projects and acts as a bridge between departments.
- XIII. Reform Coordination & Innovation Service:** Drives policy reforms and innovative initiatives, ensuring continuous improvement, modernization, and efficiency within the Ministry.
- XIV. Press and Public Relations Unit:** Disseminates accurate information about government policies and programs related to the livestock sector. It handles media relations, press releases, social media engagement, and public awareness campaigns.
- XV. Internal Audit:** Ensures accountability, financial discipline, and compliance with regulations by identifying risks, detecting irregularities, and recommending corrective actions to safeguard public funds.
- XVI. Legal Unit:** Provides expert legal guidance, ensuring all Ministry activities align with national laws. It advises on contracts, agreements, and legislation affecting the livestock sector while ensuring regulatory compliance.

### **Our Function**

The core responsibilities of the Ministry include the following:

- i. Facilitate the expeditious resolution of farmers/herders conflicts.
- ii. Increase the productivity and resilience of livestock systems to ensure long-term sustainability.
- iii. Improve animal health systems to minimize the impact of livestock diseases on productivity and public health.
- iv. Promote climate-smart livestock production to enhance sustainability in the face of

climate change.

- v. Encourage innovation, technology adoption, and entrepreneurship among livestock value chain actors.
- vi. Create enabling conditions and incentives to attract private-sector investments across the livestock value chain.
- vii. Enhance market access and value addition through strategic marketing initiatives, infrastructure development, and compliance with global standards.
- viii. Provide incentives for youth and women participation in the livestock sector as a means of job creation, improved livelihoods, and wealth generation.



## *Foreword*

Antimicrobial resistance is a growing crisis that threatens the effectiveness of treatments in both human and animal health, with significant implications for food security and economic stability. The **National Animal Health Antimicrobial Use Surveillance Strategy, Protocols, and Standard Operating Procedures (SOPs)** provides a structured framework to monitor and regulate antimicrobial use (AMU) in the animal health sector.

Developed under the **One Health** approach, this strategy emphasizes collaboration among veterinary professionals, policymakers, researchers, and the private sector to ensure responsible antimicrobial use in livestock, poultry, aquaculture, and companion animals. It sets forth clear surveillance methodologies, data management protocols, and regulatory recommendations to mitigate the risks associated with AMR.

The success of this initiative will depend on the concerted efforts of government institutions, private sector players, veterinarians, and researchers, to institutionalize correct and rational use of Antimicrobials in the animal health sector.

Finally, we urge all stakeholders to adopt and implement the recommended practices outlined in this document, strengthening Nigeria's commitment to combating AMR in animal health.



**Alh. Idi Mukhtar Maiha**  
Honourable Minister of Livestock Development

## *Acknowledgment*

The development of this **National Animal Health Antimicrobial Use (AMU) Surveillance Strategy** is the result of extensive review of antimicrobial use and consumption practices in the animal health sector, stemming from robust collaboration among stakeholders committed to containment of antimicrobial resistance. We acknowledge the **Federal Ministry of Agriculture and Food Security, Federal Ministry of Livestock Development; Federal Ministry of Environment; the Federal Ministry of Health and Social Welfare and the National AMR Coordinating Committee (AMRCC) domiciled in the Nigeria Centre for Disease Control and Prevention (NCDC), and the National Veterinary Research Institute (NVRI)** for their leadership in advancing AMR surveillance in the animal health sector.

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We also extend our appreciation to the **Food and Agriculture Organization (FAO), World Organisation for Animal Health (WOAH), and World Health Organization (WHO)** for their technical contributions.

Our gratitude goes to the committed team at the CVON's office and their colleagues in the **Nigerian Veterinary Medical Association (NVMA), Veterinary Council of Nigeria (VCN), research institutions, professional associations, and private sector** who played a significant role in shaping this document. Their expertise and commitment will help drive sustainable antimicrobial stewardship in Nigeria's animal health sector.



**Dr. Samuel Akawu Anzaku**  
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## ACRONYMS AND ABBREVIATIONS

AH	Animal Health
AMR	Antimicrobial Resistance
AMU	Antimicrobial Use
ARCN	Agricultural Research Council of Nigeria
ARUSS	Antimicrobial Resistance and Usage Surveillance System
CPE	Continuing Professional Education
CSS	Cross Sectional Survey
CVON	Chief Veterinary Officer of Nigeria
DHIS	District Health Information Software
DVS	Director of Veterinary services
EHR	Electronic Health Records
FDEA	Federal Department of Fisheries and Aquaculture
FDVPCS	Federal Department Veterinary and Pest Control Services
FMAFS	Federal Ministry of Agriculture and Food Safety
GAP-AMR	Global Action Plan on Antimicrobial Resistance
GDP	Gross Domestic Product
GLASS	Global AMI Surveillance system
GLASS IT	Global AMI Surveillance system Information Technology
ISO	International Organization for Standardization
KMP	Knowledge Management Products
LMICs	Low and Middle-income Countries
MRL	Maximum Residue Limit
NABDA	National Biotechnology Development Agency
NADIS	National Animal Disease Information System
NAFDAC	National Agency for Food, Drugs and Administration Control
NAP	National Action Plan
NAQS	National Agricultural Quarantine Service

NASHGODAN	National Sheep and Goat Development Association of Nigeria
NBS	National Bureau of Statistics
NCC	National Coordinating Committee
NCDC	Nigeria Centre for Disease Control and Prevention
NGO	Non-governmental Organization
NIAS	Nigerian Institute of Animal Science
NPF	Nigeria Police Force
NSS	National Surveillance Strategy
VCN	Veterinary Council of Nigeria
NVMA	Nigerian Veterinary Medical Association
NVRI	National Veterinary Research Institute
ODK	Open Data Kit
OIE Epizooties)	World Organization for Animal Health (Office International des
PAN	Poultry Association of Nigeria
PPS	Point Prevalence Surveys
VMAP	Veterinary Medicine and Allied Products
VMPS	Veterinary Medicines and Product Sections
VTH	Veterinary Teaching Hospital
WOAH	World Organization for Animal Health
WHO	World Health Organization

## 1.0 INTRODUCTION AND BACKGROUND

Antimicrobials, encompassing antibiotics, antivirals, antifungals and antiparasitic have played an instrumental role in managing infectious diseases across both human and animal population. These compounds have significantly reduced morbidity and mortality rates, improved public health outcomes, and enhanced agricultural productivity by ensuring healthy livestock, poultry, and aquaculture production.

In Nigeria, the use of antimicrobials in the animal health sector is a common practice, driven by the need to maintain the health and productivity of livestock, poultry, and aquaculture. The country's agricultural sector, which accounts for a significant portion of the economy, relies heavily on these drugs to prevent, and control infectious diseases, particularly in regions where agricultural production is intensive. According to the National Bureau of Statistics (NBS, 2023), agriculture contributes about 19.63% to Nigeria's GDP, with livestock and poultry farming being major components. However, this reliance on antimicrobials is not without consequences.

The Nigerian agricultural sector is characterized by a high level of antimicrobial use, particularly in poultry farming, which is the most significant consumer of these drugs. A study by Olatoye and Ogundipe (2015) indicated that over 80% of poultry farmers in southwestern Nigeria routinely use antibiotics, often as a preventive measure rather than in response to disease outbreaks. This practice has led to the development of multi-drug resistant strains of bacteria, posing a significant threat to both animal and human health.

The inappropriate and indiscriminate use of antimicrobials in Nigeria has contributed to the emergence of Antimicrobial Resistance (AMR), with reports indicating a growing resistance among pathogens that affect both animals and humans. A study conducted by Fadare *et al.* (2018) revealed that up to 70% of antimicrobials used in the animal sector in Nigeria are administered without Veterinary prescription, often for purposes such as growth promotion rather than disease treatment. Factors contributing to this include the poor implementation of regulation and oversight in the distribution and sale of Veterinary antimicrobials, the absence of strict guidelines for their use, and the widespread availability of over-the-counter drugs without prescription. Additionally, the misuse of antimicrobials and non-observance of withdrawal period even when the drugs are prescribed, which is prevalent in Nigeria, further exacerbates the situation, undermining efforts to treat infections effectively.

## 2.0 GLOBAL OUTLOOK

Global consumption of veterinary antimicrobials is estimated at 93,309 tons in 2017 and projected to rise by 11.5% to 104,079 tons by 2030, two thirds (66%) of the global increase is attributed to the increase in number of food animal production as global protein demand is increasing (Klein *et al.*, 2018). However, the abuse of antimicrobials has led to the development of antimicrobial resistance (AMR), a phenomenon where microorganisms evolve to withstand the effects of these drugs. Antimicrobial Resistance poses a severe threat to global health, food security, and economic stability, making it a critical issue requiring urgent attention.

The projected Asian AMU in 2030 amounts to 68% of the antimicrobials used worldwide, that is 63,062 tons and while Africa used lower quantity in 2017, 4,606 tons, Africa's AMU is expected to increase by 37% in 2030 ([www.mdpi.com](http://www.mdpi.com)). The inappropriate prescription of antimicrobials; under and over dosage in treatment, and their use as growth promoters in livestock particularly in low and middle-income countries (LMICs) like Nigeria, where regulatory systems may be less robust, and access to antimicrobials is less controlled has resulted in antimicrobial resistance exacerbating the public health crisis in these regions. By 2050, AMR could result in an 11% reduction in global livestock production, severely affecting the livelihoods of millions (Jonas *et al.*, 2017).

The absence of stringent regulatory frameworks and inadequate enforcement of policies where existing contribute to the rising challenge of AMR worldwide, the use of antimicrobials in both human and Veterinary medicine has surged dramatically. The growing demand for treating infections, preventing diseases, and enhancing livestock growth has fueled the rise of antimicrobial resistance. As a result, infections have become more difficult to treat, leading to a notable increase in illness and death rates, deaths from AMR in humans is postulated to rise to 10 million by 2050 (Dadgostar 2019).

The World Health Organization (WHO) estimates that antimicrobial consumption in animals is expected to increase by 67% by 2030, primarily driven by growth in animal farming to meet the rising demand for animal protein (Van Boeckel *et al.*, 2015). This trend is particularly concerning regions with less stringent regulatory oversight, where antimicrobials are often used indiscriminately, leading to the rapid emergence, and spread of resistant pathogens.

Efforts to curb AMR on a global scale have led to the development of various strategies and frameworks. One of the most prominent is the Global Action Plan on Antimicrobial Resistance (GAP-AMR), which was endorsed by the WHO in 2015. This plan emphasizes the importance of a One Health approach, recognizing the interconnectedness of human, animal, and environmental health, and advocating for coordinated actions across sectors to combat AMR effectively. The GAP-AMR outlines five strategic objectives: improving awareness and understanding of AMR, strengthening knowledge through surveillance and research, reducing the incidence of infection, optimizing the use of antimicrobial agents, and developing sustainable investment in new medicines, diagnostic tools, vaccines, and other interventions (WHO, 2015). The World Bank

models estimate that under a low burden of antimicrobial resistance, health costs could increase \$330 billion; under a high burden scenario, this increase could be \$1.2 trillion (World Bank, 2017).

### 3.0 SCOPE AND PURPOSE

To develop a guideline of the animal health antimicrobial use, surveillance strategy, protocols, and Standard Operating Procedures (SOPs) so to make for prudent AMU and stewardship in alignment with National Action Plan (NAP) aimed at Policy development.

The purpose of the guideline is to make for Optimized use of Antimicrobial by;

- 1) Analyzing the Animal health AMU in Nigeria with the view of mitigating the associated risks.
- 2) Developing surveillance strategies with SOPs and Protocols
- 3) Developing data management and reporting system with and through relevant stakeholders hence providing AMU stewardship.
- 4) Providing a monitoring and evaluation methodology for prudent AMU

### 4.0 ANIMAL HEALTH AMU IN NIGERIA: SITUATION ANALYSIS AND RISK

Sir Alexander Fleming said in his Nobel Prize address: “the use of antimicrobials can, and will, lead to resistance”. The overuse and misuse of antibiotics in food-producing and companion animals have resulted in the selection and transmission of resistant bacteria (Caneschi *et al.*, 2023). Perioperative application of antimicrobials can significantly reduce the risk of post-operative infections but in many cases, they may not be required (Balda *et al.*, 2023).

Between the years 2010 and 2012, the use of antibiotics increased by 40.4%. They have been said to be consumed more during the rainy season than the dry seasons (Adesokan *et al.*, 2015). Antibiotics commonly misused in Veterinary hospitals include penicillin-streptomycin combination, oxytetracycline, gentamicin and sulphadimidine (Ihedioha *et al.*, 2020). Antimicrobial use without sensitivity testing is also a practice that needs to be discouraged (Smith *et al.*, 2023). Oxytetracycline has been found to be the default rapid response *de facto* drug for Pets (cats and dogs).

Most of the antimicrobial resistance studies have been found in poultry in Nigeria (Okon *et al.*, 2022). Farmers across the world have been using antibiotics in poultry production for both therapeutic and non-therapeutic purposes since the mid-1900s (Parkhi *et al.*, 2023). Majority of farmers use antibiotics in their animal farms and for purposes of growth promotion, treatment of disease and prevention, etc. Broad spectrum antibiotics are the most frequently used antibiotics (Ibiang *et al.*, 2023).

Non-therapeutic purposes such as antibiotics given as feed additives cause drug residues in food animals body tissues, eggs, etc. (Ezenduka *et al.*, 2011). Antibiotic residues in eggs are caused by treating antimicrobial-resistant *Salmonella* isolates in hens, use of medicated feed, inappropriate antibiotic withdrawal time. *Salmonella* species and *E. coli* isolated from raw table eggs have been said to resist multiple antimicrobial agents commonly used in veterinary and human practice (Atoyebi *et al.*, 2019, Okorie-kanu *et al.*, 2016, Sornplang *et al.*, 2022)

The use of antibiotics by farmers in Nigeria is mostly economic driven with the focus to save their animals in the bid to ensure return on investment with little or no regard for appropriate dosage regimen and withdrawal time. A cursory visit to Day old chicken market side reveals the immediate use of antibiotics upon purchase of these birds to reduce mortality, preventive use of antimicrobials is a routine with the average Nigerian livestock farmer, Ndahi *et al*, 2023 supports this, based on study carried out.

Aquaculture production has grown rapidly in Nigeria but with it also the unbridled use of antibiotics which predisposes fish consumers to the risks of antimicrobial residues and resistance (Okocha *et al.*, 2021). The use of antimicrobial drugs in aquaculture is a common practice. Antibiotic residues have been found in fish with oxytetracycline being the most common drug of use, followed by ciprofloxacin, gentamicin, neomycin, and probiotics (Busari *et al.*, 2024). Farmers have been seen to self-prescribe and administer drugs themselves rather than consult Veterinarians. By this absurd practice, they fail to observe antibiotic withdrawal periods before selling the fishes (Adamu *et al.*, 2021, Alhaji *et al.*, 2021).

Horizontal gene transfer due to use of growth promoters has been indicated as in the case of *Aeromonas hydrophila* which is a multidrug resistant bacterium (Ogbonna *et al.*, 2020). Efficient management of municipal waste is one of the recommended means to curb the issue of antimicrobial resistance in aquaculture products (Tiamiyu & Olasunkanmi, 2015). Water from fishponds need to be decontaminated before disposal.

Antibiotic education for healthcare workers and antimicrobial stewardship programs are significant interventions to mitigate antibiotic overuse (Oloso *et al.*, 2018). Antimicrobial usage in animal production is of increasing concern even of public health importance, the increased demand for protein has seen increase in animal production with consequent upsurge in antimicrobial use as farmers are seen to misuse, overuse or underuse them (Kabir *et al.*, 2004). Tetracyclines have been of increased overuse across the livestock and aquaculture production sector (Bamidele *et al*, 2022).

## 5.0 ANTIMICROBIAL USE SURVEILLANCE STRATEGIES

Surveillance strategies shall include processes and actions that will make for data Collection, analysis, interpretation, dissemination, and implementation.

A. Define the surveillance scope and objectives: monitor trends, assess the quality of antimicrobial use, prevailing infections, farms, Veterinary pharmacies, clinics, practitioners, Departments of Veterinary Services.

### B. Study Design

- Cohort Studies: Monitor patient groups over time to monitor antimicrobial usage patterns
- Cross-sectional surveys: Periodic assessment of AMU across farms, Vet outlets, clinics and hospitals

- Point Prevalence Surveys (PPS): Assess antimicrobial use on a specific day across multiple farms, Vet outlets, clinics, and hospitals

### C. Sampling

- Site Selection: Choose representative Farms, Vet outlets, clinics, hospitals, across the defined well spread geographic areas.

- Patient Selection: Specify criteria for sample selection such as areas of most disease prevalence, high animal population, dominant number of Veterinarians, high veterinary activity

### D. Data Collection Process

- Step 1: Training: Train data collectors to ensure consistency in data entry and interpretation

- Step 2: Data Collection: Use standardized forms to collect data on farm, clinics, hospitals antimicrobial use and Vet outlets prescriptions/sales information.

- Step 3: Quality Control: Implement quality checks, including double data entry and random audits to ensure data accuracy.

### E. Data Analysis and Reporting

- Data Cleaning: Ensure data is complete, accurate, and formatted for analysis.

- Statistical Analysis: Use descriptive statistics to summarize AMU trends. Advanced analysis may include multiple methods to assess factors associated with inappropriate use.

- Reporting: Regular reports should be generated for stakeholders Include actionable recommendations for improving AMU.

## 5.1 APPROACH – NATIONAL SURVEILLANCE STRATEGY

The Government at the national level is ultimately responsible for ensuring the prudent use of antimicrobials as they are the custodians of policy development and implementation, over and beyond this, the national government is responsible for providing the regulatory framework that ensures compliance and put in place the necessary legislative structures for antimicrobial stewardship. As Regulators, the government at the national level is also involved in education, research sponsorship and overall development of customized antimicrobial use protocol.

The Federal Government as employer of professional custodians of antimicrobials should ensure adaptation and alignments of AMU in tandem with best global practices ensuring only quality antimicrobials are made available to the populace and recall same when the need arises.

The National strategies on AMU should include;

- Putting in place an active National Co-ordinating Committee mirrored at the sub-national.
- Policy adoption and passage of law regulating AMU.
- Provide funding for a National Action Plan for AMU inclusive of surveillance.

- Government should support ISO certification of selected laboratories and capacity building.
- Strengthen Regulatory Agencies
- Adoption of an integrated National One-Health Task Force on Regulation of AMU
- Develop, launch, and fund National Antimicrobial Awareness Campaign zeroing in on AMR risks.
- Fund Research in order to establish antimicrobial acceptability, efficacy and ban where so proven.
- Institutionalize Antimicrobial Stewardship program with the educational sector to encourage continued research on AMU.
- Generate a Prescription only Platform/cache for Antimicrobials with relevant guidelines and indicators.
- Collaborative support and partnership with selected Diagnostic laboratories in the perceived high risk for the purpose of obtaining a Real-Time electronic AMU Data generation-prescription tool which will make for monitoring.
- Develop antimicrobial use database subject to periodic review and analysis.
- Monitoring and Evaluation of the National Action Plan

## 5.2 APPROACH – SUB-NATIONAL SURVEILLANCE STRATEGY

The state and Local Government Areas are the executors of the strategies put in place by the national, they will cascade and duplicate the national policies to the level of the communities. Sub-national strategies on AMU shall include;

- Domicile AMU Policies and Laws in the states and local government areas.
- Put in place Stewards' teams across the states and LGAs that will lead AMU matters.
- Execute AMU Advocacy Campaigns and awareness on AMU with associated risks.
- Mapping of Stakeholders
- The instrumental office of the Director of Veterinary Services shall ensure registration of all Veterinary pharmacies, clinics, hospitals, and diagnostic laboratories to ensure strict adherence to prescription only approach.
- Collaboration with all relevant stakeholders inclusive of ambulatory Veterinarians and Para-vets to ensure prudent AMU.
- Training and re-training on antimicrobial stewards across industry professionals, stakeholders, and students who shall be involved in surveillance.
- Enforcement of Real-Time electronic data generation prescription tool

- Mandate reporting system on AMU across Veterinary pharmacies, farms, Veterinary clinics, Hospitals...

## 6.0 PROTOCOLS AND STANDARD OPERATING PROCEDURES

Protocols and Standard operating procedures of antimicrobial use are aimed at: a) Responsible and prudent use of antimicrobial (b) Disease prevention and control and (c) to check maximum residue limit.

The introduction and use of guidelines were reported to lead to appropriate use of antimicrobials by small animal clinicians in the United Kingdom (Hughes et al. 2012), it can so be postulated that the provision of such documentation by Regulatory bodies, Government agencies, Private Veterinarians and Veterinary institutions promote responsible and prudent use of antimicrobials.

Responsible and prudent use of Antimicrobials is targeted at reducing antimicrobial usage and slow down AMR.

- Prescription or Order Form: will ensure prescription/monitored utilization as provided by qualified Veterinarians.
- Purchase order form: all drug outlets must have purchase order forms that show order history, type, volumes.
- Distribution Records: should reflect the usage, transfer, and points of sales.
- Antimicrobial audit: Make for recognition of abuse.
- Adverse Effects reporting

All forms used should be electronic for ease of accurate data collation, storage, analysis and dissemination.

Intensify Disease Prevention and Control is targeted at increasing vaccination against preventable diseases and reduces consumption of antimicrobials.

- Increase biosecurity measures on farms and all animal facilities.
- Check and question vaccination history before use of antimicrobials.

Check Maximum Residue Limits (MRL): is targeted at preventing resistance by use of alternative antimicrobials and discourage use of growth promoting antibiotics.

- Screen for drug residues
- Use of alternative antimicrobials
- Observation of withdrawal time.

PROTOCOLS of antimicrobial use should be based on:

1. Prophylaxis of infection
2. Validated scientific clinical studies.
3. Treatment of documented infections

4. Sensitivity testing
5. Specific indications
6. Effects of use/misuse

#### STANDARD OPERATIVE PROCEDURE for Antimicrobial use

Step 1: Disease diagnosis by a qualified professional mostly a Veterinarian based on clinical signs, environment audit, and history followed by definitive laboratory diagnosis. Tentative diagnosis can also be used to initiate treatment for 24-48 hours pending laboratory result.

Step 2: Confirm vaccination and drug treatment history, this is to confirm need for re-vaccination or actual vaccination after treatment so to prevent re-occurrence and to plan for alternative antimicrobial.

Step 3: Antimicrobial Sensitivity testing for specific antimicrobial intervention

Step 4: Antimicrobial prescription by a Veterinarian

Step 5: Drug administration by a Veterinarian or designated qualified professional.

Step 6: Antimicrobial records establishment and audit

Step 7: Adverse effect reporting if any.

#### 6.1 DATA SOURCES

Farms which include water, feed, environment: Poultry farms, Livestock farms, Dog farms, fish farms

Kraals; Cattle, Sheep and Goat markets

Abattoirs

Veterinary Outlets and Stores

Importers

VMAP-NAFDAC

Private Practitioners

Ambulatory Veterinarians

Veterinary Clinics and Hospitals

Department of Veterinary Services; Federal and States

Para-Veterinarians

Diagnostic laboratories

## 6.2 DATA COLLECTION TOOLS/PROTOCOLS

Tools include but not limited to:

- Collection forms:

Prescription/Order form: prescription as provided by the Veterinarian providing animal species, age, gender, location, specified antimicrobial, route, diagnosis, duration of use.e.t.c

Distribution form: from Importer/wholesaler which makes for the usage, transfer, and points of sales, source, type.

Purchase form: from drug outlets that shows order history, type, volumes, dates.

Clinic/Hospital treatment records: Patient demographics, infection type, treatment regimen

Record Books: from farms that reflects history for antimicrobial types, use, infections, dates, number, and types of antimicrobials.

Sales Record Books: This captures the volume and type used over time.

DVS Office Records: Field submitted and collated disease reported to the office of the DVS.

Stock Record Books: Which reflects inventory.

- Electronic Surveillance Systems

WHO Global AMR Surveillance System (GLASS): Can be adapted to local settings and linked with antimicrobial use for surveillance.

Antimicrobial Resistance and Usage Surveillance System (ARUSS): Offers an integrated approach for monitoring AMU and resistance data can be adapted to local settings.

District Health Information Software 2 (DHIS2): Widely used for health data collection and can be customized for AMU/AMR surveillance.

- Mobile and Web-Based Applications

Mobile data collection apps such as COMM Care or Open Data Kit (ODK) can be designed and employed for real-time data collection from Veterinary hospitals, clinics, Veterinary pharmacies, and other settings.

PROTOCOLS:

### 1. Adopt a Study Design

- Cohort Studies: Monitor patient groups over time to monitor antimicrobial usage patterns
- Cross-sectional surveys: Periodic assessment of AMU across farms, Vet outlets, clinics and hospitals

- Point Prevalence Surveys (PPS): Assess antimicrobial use on a specific day across multiple farms, Vet outlets, clinics, and hospitals

## 2. Adopt a Sampling schedule.

- Site Selection: Choose representative Farms, Vet outlets, clinics, hospitals, across the defined well spread geographic areas.

- Patient Selection: Specify criteria for sample selection such as areas of most disease prevalence, high animal population, dominant number of Veterinarians, high veterinary activity

## 3. Train Data Collectors for data uniformity and conformity

## 4. Data Collection

- Step 1: Training: Train data collectors to ensure consistency in data entry and interpretation

- Step 2: Data Collection: Use standardized forms to collect data on farm, clinics, hospitals antimicrobial use and Vet outlets prescriptions/sales information.

- Step 3: Quality Control: Implement quality checks, including double data entry and random audits to ensure data accuracy.

## 6.3 DATA MANAGEMENT AND REPORTING

Antimicrobial stewardship cannot be effective without a robust data management system, this is the only way to track consumption, identify intervention points and reduce the burden of antimicrobial resistance. According to the World Health Organization (WHO), monitoring antimicrobial consumption is essential to developing an evidence-based response to AMR (WHO, 2019).

Data Management should be carried in the below stepwise manner before reporting;

Step 1: Data Collection – Ensure consistent standardized approach and uniformity avoiding double entries.

Step 2: Data Cleaning -Ensure data obtained is complete based on specific schedule, accurate, and well formatted.

Step 3: Data Storage -Electronic and cloud-based systems should be used like electronic health records (EHRs) for safe keeping of data.

Step 4: Statistical Analysis -Descriptive statistics is used to summarize AMU data/ trends, this is effectively done using digital automatic analytical tools/platforms to reduce the chances of errors. Advanced analysis may include multiple methods to assess factors associated with inappropriate use.

## REPORTING:

Regular reports should be generated for all stakeholders, healthcare providers, and public health officials which should include actionable recommendations for improving AMU.

The Director of Veterinary Services at the sub-national level shall be responsible to work with all relevant stakeholders at the states and local government areas (Vet hospitals, outlets, importers, labs etc.) in collating and analyzing data on AMU which will be sent to the Federal Department Veterinary and Pest Control Services(FDVPCS) of the Federal Ministry of Agriculture & Food Security who shall consolidate and make available to national stakeholders and to World Organization for Animal Health (WOAH)

Sub-National Reporting: AMU data is collated by the instrument of the office of the DVS, collated and sent to the office of the Chief Veterinary Officer of Nigeria of the FDVPCS

National Reporting: is as done by the FMA&FS and this report is sent to such national authorities as NCDC and the National AMU Co-ordinating committee which report may form part of policy and intervention programs.

International Reporting: as Nigeria is a part of OIE, AMU collated data is sent to OIE which helps monitor and benchmark AMU across member countries and regions which helps reduce the risk of AMR. The three levels of WHO (country, regional and global) interact with countries through the GLASS IT platform for data submission, validation, analysis and finally for reporting.

REPORTING FORMAT: either of the below can be used.

1)The data collected at minimum should be the weight in kilograms of the active ingredient of the antimicrobial(s) used in food-producing animals per year. It is possible to estimate total usage by collecting sales data, prescribing data, manufacturing data, import and export data or any combination of these.

The total number of food-producing animals by species, type of production and their weight in kilograms for food production per year (as relevant to the country of production) is essential basic information. Information on dosage regimens (dose, dosing interval and duration of the treatment) and route of administration are elements to include when estimating antimicrobial usage in food-producing animals.

2.The antimicrobial agents, classes, or sub-classes to be included in data reporting should be based on current known mechanisms of antimicrobial activity and antimicrobial resistance data.

Nomenclature of antimicrobial agents should comply with international standards where available. For active ingredients present in the form of compounds or derivatives, the mass of active entity of the molecule should be recorded. For antimicrobial agents expressed in International Units, the factor used to convert these units to mass of active entity should be stated.

3.The reporting of antimicrobial use data may be further organised by species, by route of administration (specifically in-feed, in-water, injectable, oral, intramammary, intra-uterine and topical) and by type of use.

## 7.0 STAKEHOLDERS

### 7.1 VETERINARIANS=PRESCRIBERS

Veterinarians are ultimately responsible for the type of antimicrobial recommended for infection intervention across the animal healthcare system. They can act as good stewards by following the 5 “D” s of antimicrobial stewardship; right Drug, correct Dose, right Drug-route, suitable Duration, timely De-escalation to pathogen-directed therapy so they shall:

Prescribe only authorized antimicrobials.

Ensure accurate diagnosis and need for antimicrobial use.

Differentiate prophylactic and therapeutic use of antimicrobials from surgical interventions.

Ensure Sensitivity testing before antimicrobial intervention.

Establish no history of antimicrobial resistance or misuse.

Discourage off label uses.

Educate animal owners on AMR to make for prudent use of antimicrobials.

Avoid antibacterial treatment when there is only evidence of viral infection or of a self-limiting bacterial infection.

Select an antimicrobial with a spectrum of activity as narrow as possible.

Consider underlying physiologic status like pregnancy and pathologic status like hepatic and renal deficiencies while prescribing antimicrobials.

Reassess antimicrobial treatment after 24-48 hours and consider modification.

Make preference for oral antimicrobial as compared to parenteral except in case of severe infection.

Promote appropriate disposal of leftover antimicrobials.

Monthly report of adverse effects of antimicrobials use to the appropriate officer in charge who should report to the DVSs of the state who will in turn will report to the CVON.

Private Veterinarians should send in their reports on AMU to the DVS on monthly basis.

Continually updates themselves on AMU guidelines.

Participate in Sub-national and national antimicrobial campaigns to promote the prudent use of antimicrobials.

Data sources

- Treatment records; reflecting type of Antimicrobial, dosage, duration of use, indication, route of administration, treatment outcome, adverse effect, location, animal specie
- Prescription forms reflecting VCN No and seal.

- Clinical report
- Procurement records: volume, type
- AMUs section built into NADIS form on request.

## 7.2 IMPORTERS AND PHARMA INDUSTRIES

Shall provide detailed dossier of drugs being imported.

Shall import only registered antimicrobials.

Have the responsibility to make available import and distribution data available to local authorities.

Ensure all marketing and sales actions align with national and sub-national legislation.

Educate marketing and sales team on AMU compliance.

Ensure proper registration of antimicrobials with regulatory authorities.

Avoid importation and sales of banned antimicrobials.

Ensure reflection of manufacturing and expiry date on product pack in line with label regulation for traceability

Promote withdrawal time with clients as a necessary part of marketing promotions.

Ensure proper disposal of expired antimicrobials in line with local regulation.

Participate in AMU-AMR Campaigns

Data sources

- Distribution records: Location, Quantity sold,
- Import records: Type, Quantity, Dosage, Manufacturing and Expiry date, Formulations, Batch no, Withdrawal period, Volume.
- Sales records:
- Destruction certificate of recalled and or expired antimicrobial drugs.

## 7.3 LOCAL MANUFACTURERS

Ensure adherence to local legislation that governs antimicrobial manufacturing.

Ensure strict compliance and Quality Assurance

Shall register all locally manufactured antimicrobials.

Continually update on local and global guidelines of AMU and antimicrobials on ban list

Avoid multi-combo production of antimicrobials in accordance with local and global best practices.

Conform with government licensing and procedures.

Ensure quality testing of raw materials used in manufacturing.

Enforce reflection of manufacturing and expiry date on product pack

Proper storage of raw materials and finished products under specified conditions

Keep proper records of antimicrobials produced, volumes, type, and distribution.

Recall unsatisfactory products for proper disposal in accordance with local regulation.

Data source

- Stock records
- Distribution records
- Production records
- Quality control report
- Destruction certificate

#### 7.4 DISTRIBUTORS

Shall distribute only registered antimicrobials with regulatory authority.

Ensure antimicrobials delivered are received in proper uncompromised state.

Ensure proper storage of antimicrobials.

Keep proper records of distribution points, volumes, sales, and types.

Avoid distribution of expired and banned antimicrobials.

Ensure proper environmentally friendly disposal of expired and damaged antimicrobials in line with local regulation.

Data sources

- Procurement records
- Sales records
- Disposal records
- Replacement records

#### 7.5 VETERINARY PHARMACIES AND RETAILERS

Ensure proper storage of antimicrobials.

Demand prescription from clients/customers before sales

Keep proper records of antimicrobial sales as aligned with prescription form.

Educate clients on proper use of antimicrobials.

Avoid sales of unregistered antimicrobials

Avoid sales of expired antimicrobials

Ensure proper disposal of expired antimicrobials in line with local regulation.

Avoid sales of banned antimicrobials

Ensure proper environmentally friendly disposal of expired and damaged antimicrobials in line with local regulation.

Data sources

- Procurement records
- Sales records
- Return stock records.
- Disposal records
- Prescription forms
- Adverse reaction records

## 7.6 VETERINARY CLINICS AND HOSPITALS

They are a major source of monitoring and surveillance data.

Promote use of diagnostic tools for antimicrobial use

Ensure antimicrobial stewardship.

Document antimicrobial use showing indication, drug choice, dose, route, and duration of treatment.

Audit of perioperative antimicrobial prophylaxis indication, choice, timing and duration.

Document/Provide annual report on antimicrobial stewardship activities which includes an evaluation of effectiveness, reported to the management.

Provide Stewardship/mentorship in antimicrobial use for students and professionals.

Data sources

- Prescription records
- Treatment records
- Laboratory records
- Procurement records
- Disposal records
- Adverse reaction records
- Antimicrobial susceptibility records

## 7.7 FARMS; POULTRY, LIVESTOCK, AQUACULTURE, WILDLIFE AND PET ANIMALS

Document and provide, when necessary, records of antimicrobials used on animals, date, duration, type, reasons for use.

Follow prescription only use of registered antimicrobials.

Document and report AMR cases

Ensure antimicrobial withdrawal time.

Ensure prudent use of antimicrobials.

Document and report adverse effects of antimicrobials

Avoid use of banned and expired antimicrobials

Data sources

- Disinfectant records
- Procurement records
- Treatment records
- Disposal records
- Adverse reaction records
- Relevant Sales records
- 

## 7.8 REGULATORY AGENCIES

Ensure registration of all antimicrobials imported, manufactured, and sold in the country.

Ensure compliance with legislation and regulation.

Routine surveillance visits to all points of antimicrobial use as supervised by a Veterinarian.

Monitor compliance and ensure prosecution of defaulters.

Carry out and support Campaigns on AMU-AMR

Data sources

- List of approved and authorized antimicrobial products
- Veterinary formulary
- Essential antimicrobial list
- Enforcement checklist document
- Importation records
- Seizure and destruction records
- Export records

## 7.9 PROFESSIONAL AND SCIENTIFIC ASSOCIATIONS

Cooperate with regulatory authorities to ensure and promote the prudent use of antimicrobials.

Promote prudent and responsible use of antimicrobials among their members through activities that include guideline development and training.

Engage in antimicrobial awareness campaign based on AMU-AMR

Avoid conflicts of interest and commercial consideration.

Encourage incentivized antimicrobial data reporting amongst members.

Encourage collaboration with local and international bodies on AMU-AMR activities.

Research into new and alternatives to Antimicrobials

Data sources

- Continuing Education Program records
- Research documents on AMU
- Records of sanctions
- Journals
- List of new Antimicrobials
- List of alternatives to Antimicrobials
- 

## 7.10 RESEARCH FUNDERS

Support and conduct research that make for intervention in alternative antimicrobial use.

Help develop Apps for real-time antimicrobial use monitoring.

Promote research studies in antimicrobial therapeutic drug monitoring in special animal species.

Promote research on interventional studies for antimicrobial prescribing.

Encourage and support local based research for antimicrobial preferential use.

Fund research results to development of relevant antimicrobials

Sponsor AMR Leaders' program among students to make for early adoption of prudent use of antimicrobials.

Data sources

- Funded research under AMU
- Records of research outcomes

## 7.11 VETERINARY DIAGNOSTIC LABORATORIES

Encourage laboratory based antimicrobial prescription and use.

Address the different needs for diagnostics including point-of-care testing and surveillance.

Collaborate with the private and public sector in the development of evidence-based guidelines on the use of tests for the diagnosis of infection.

Support studies on the effect of the prudent use of antimicrobials, and on the cost-effectiveness of diagnostics

Data sources

- Laboratory diagnostic records
- Antimicrobial susceptibility records
- Sample records
- Sample disposal records
- Records of susceptibility kits consumption
- Treatment history records

## 8.0 STRATEGIC OBJECTIVES

1. Awareness, education, and capacity building
2. Strengthen knowledge through surveillance and research.
3. Institutionalization and strengthening of regulatory frameworks.
4. Effective stakeholders' collaboration
5. Political will and resource mobilization

### 8.1 AWARENESS, EDUCATION AND CAPACITY BUILDING

#### A. Awareness

- Enlightenment through media (print, Social, electronic)
- IEC materials (caps, T-shirts, banners, fliers, branded exercise books etc.)
- Awareness creation amongst target groups
- World AMR awareness week (Nov 18<sup>th</sup> -25<sup>th</sup> every year)
- Creation of the AMU content for media
- Advocacy visits to policy makers to buy-in or on-boarding them on issues related to AMU.

Awareness creation approach

- i. Conduct stakeholder mapping and analysis to Identify the target stakeholder groups.
- ii. Develop AMU messages.

- iii. Test the messages.
- iv. Disseminate/publicize the messages.

#### B. Education

- Push for inclusion of AMU in primary and secondary school education curriculum
- Professional (Continuous Professional Education),
- farmers (seminars, workshops, short term training)
- public (education in schools, markets squares, religious centers, and communities etc.)

#### C. Capacity building

- Hands on training for farm hands or AMR diagnostics in the laboratory
- Simulation exercise,
- Refresher training
- Technical assistance

### 8.2 STRENGTHEN KNOWLEDGE THROUGH SURVEILLANCE AND RESEARCH

- Identify research needs, alternatives to antimicrobials.
- Conduct problem-oriented studies; operational research, studies on the use of antimicrobials,
- Enhance dissemination of information generated for decision- making.
- Usage of Tools; select relevant tools, conduct capacity trainings on their applications.
- Mapping of farms, veterinary hospitals and clinics, manufacturers, importers and exporters
- Establish Comprehensive Surveillance Systems for Antimicrobial Use (AMU) to track importation, distribution, sales, procurement, consumption and use. Data will be collected from NAFDAC, veterinary outfits, farms, and diagnostic laboratories. Develop early warning systems for pharmacovigilance and to address misuse, abuse and presence of counterfeit medicines.
- Promote Interdisciplinary Research to generate evidence on quality of antibiotics, their efficacy; generate evidence on appropriate disposal of antimicrobials by teams of veterinarians, microbiologists, epidemiologists, and other researchers working together to study issues in antimicrobial use (AMU) in animals.
- Enhance Data management for AMU in AH and strengthen systems for data collection, collation, analysis, interpretation, reporting and dissemination using up-to-

date technologies and data analytics tools to collect data, gain insights into trends and inform practice and policy decisions.

- Implement Training and Education Programs: Develop modules/ incorporate AMU actions into veterinary in-service, pre-service and animal health workers curriculum/training. Also provide training for farmers to promote best practices.
- Strengthen laboratory systems and diagnostic stewardship to aid targeted prescriptions and treatment using the appropriate antimicrobials.
- Generate data on antimicrobial sensitivity testing from across animal health laboratories.
- Use the data to generate national antibiogram to support empirical animal health antimicrobial use at lower levels.
- Develop Knowledge Management Products (KMPs) including research articles, technical reports, policy briefs, Annual National AMU reports for Animal Health sector in the country.
- Support relevant research activities including publications in impact factor- rated journals.
- Identify and pursue grant opportunities with partners on research.

### 8.3 INSTITULIZATION AND STRENGTHENING OF REGULATORY FRAMEWORKS

- Quarterly meetings of regulatory agencies to enhance partnerships and collaboration.
- Training and retraining of stakeholders and regulators to institutionalize the policies.
- Coordination, enforcement, supervision, and inspection through a joint team
- Joint development and validation of essential veterinary medicine list for the country by all regulatory agencies which should be jointly reviewed regularly.
- Harmonization of existing regulations and legislation by relevant agencies as a long -term goal
- Domestication of international standards and periodic update in line with global best practices
- Incorporation of AMU actions into antimicrobial stewardship at all levels

## 8.4 EFFECTIVE STAKEHOLDERS' COLLABORATION

### 1. Stakeholders mapping and analysis.

- Ministries of Agriculture, Livestock Development, Health, Marine and Blue Economy and Environment
  - VCN
  - NCDC
  - NAFDAC
  - NVRI
  - NAQS
  - National Biotechnology Development Agency (NABDA)
  - Private Animal Health Service Providers
  - Agric Research Council of Nigeria
  - NVMA
  - Manufacturers of VMPs
  - Importers of VMPs
  - Distributors of VMPs
  - VTHs
  - Vet Diagnostic Laboratories
  - Livestock and Farmers Associations (including cooperatives, Miyetti Allah, NASHGODAN, PAN etc.)
  - Enforcement Agencies
  - Customs for Importation
  - Relevant House of Reps and Senate Committee Leaders
  - Secretary to the Governors Forum
  - Processors of Animal Products
  - Feed Millers Association
  - Media (TV, Radio, Market Women Association, Religious leaders, Social Media AMR Influencers)
  - Transporters of Livestock and Livestock Products
- ### 2. Enhance effective and Mutual engagement of stakeholders – for Buy-in and Ownership
- Seek for experts' opinions.

- Assign agreed roles.
  - Agree on joint actions – control measures.
3. Facilitate participatory and Wholistic Approach – for ease of implementation and broader coverage.
- Harmonize surveillance protocols.
  - Agreed on information dissemination strategies.
  - Joint identification of gaps and challenges
  - Gender inclusiveness
4. Conduct Risk analysis and Communication to all stakeholders – to develop mitigative measures, Focused Group Discussions
- Gather relevant evidence.
  - Analysis of relevant data
  - Develop risk communication and mitigation messages.
  - Communicate risk to stakeholders.
5. Enhance Political Will and Resource Mobilization
- Funding and staffing for activities.
  - Coordination and good Governance
  - Legislation
  - Resource advocacy (NGOs and Partner organizations)
  - Costing of the operational plan

#### 8.5 POLITICAL WILL AND RESOURCE MOBILIZATION

- Advocacy visits to identified stakeholders.
- Reliable data to back-up the information on AMU to convince the government of the risk involved in misuse of antimicrobials.
- Reliable data - cost benefits analysis to convince development partners to support AMU program.
- Build trust on judicious use of resources allocated for AMU program.

- Identify AMU champions across board.
- AMU policies should be domesticated at subnational level.

## 9.0 GLOBAL AND INTERNATIONAL ALLIANCE

International collaborations and alliances along global best practices will help establish standards on antimicrobial use systems to ensure the prudent use of antimicrobials. Adoption of global best practices will support the much-needed capacity building in antimicrobial stewardship which will;

- Facilitate the coordination of response to cross-border threats relating to antimicrobial-resistant organisms.
- Encourage national development of standards and adoption of selective reporting of microbiological results to optimise antimicrobial prescribing.
- Provide support of research and development of new antimicrobials and new point-of-care tests.
- Facilitate cross-sectoral collaboration in the animal health, food production and healthcare sectors regarding the surveillance of, and policies for, antimicrobial use.
- Design, implement and monitor antimicrobial stewardship interventions and campaigns to support appropriate antimicrobial use and reduce inappropriate antimicrobial use.
- Establish mechanisms for sharing best practice interventions on appropriate antimicrobial use and their impact on relevant qualitative and quantitative data.
- Enable cooperation on the surveillance of antimicrobial consumption and antimicrobial resistance using a harmonised methodology with the aim of providing timely information regarding cross-border threats from resistant organisms, as well as providing valid and internationally comparable information on resistance and consumption.
- Support the development of good evidence-based clinical practice guidelines that address the most common infections and are adaptable to local resistance patterns and available licensed antimicrobials.
- Facilitate access to essential antimicrobials and diagnostic tests by supporting market availability and tackling shortages.

## 10.0 ESTABLISH NATIONAL CO-ORDINATION COMMITTEE FOR AMU AND AMR ACTIVITIES TRAINING, EDUCATION, AWARENESS, POLICY IMPLEMENTATION OF AMU-AMR AND NATIONAL SYSTEM

The control of Veterinary antimicrobial use is an all-encompassing project that transcends across sectors, disciplines, professions, and governmental agencies hence a corporate multisectoral approach in One-Health is necessary.

A Standing National Coordinating Committee should be put in place as it relates to registration, regulation, importation, manufacturing, distribution of antimicrobials and their use across the Livestock, poultry, aquaculture, wildlife, and Pets sub-sector. The Private and Public Veterinarians also the Para-Vets must be part of this critical co-ordinating system whose committee thus shall cut across the;

FDVPCS of the Federal Ministry of Agriculture and Food Security

Federal Department of Fisheries and Aquaculture

VMAP-NAFDAC

Nigerian Customs

Nigeria Police Force

Nigeria Agricultural Quarantine Services

Nigerian Veterinary Medical Association

National Veterinary Research Institute

Veterinary Council of Nigeria

Agric Research Council of Nigeria

Nigerian Institute of Animal Science

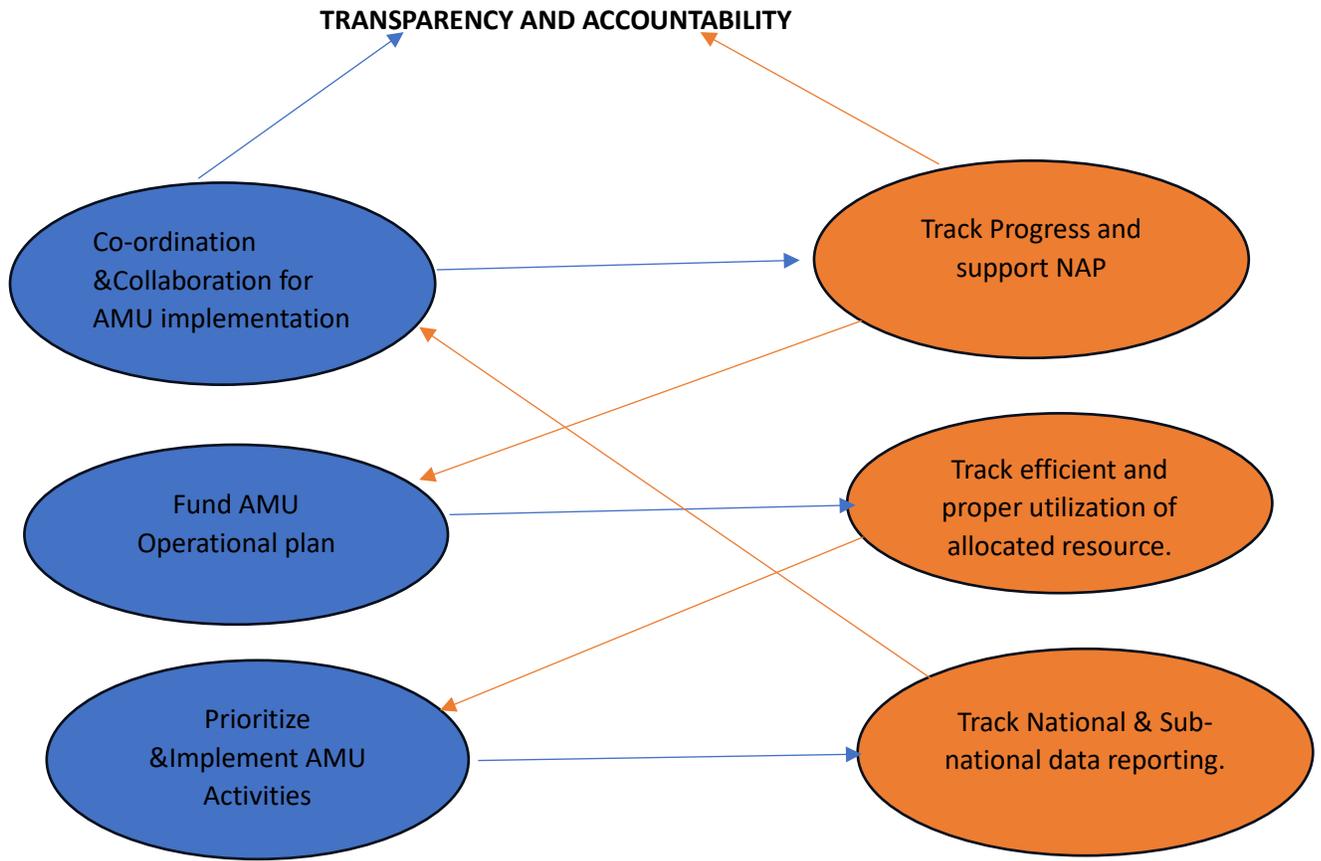
Nigeria Centre for Disease Control

The above national committee shall be domiciled with the office of the CVON and can be mirrored at the sub-national level to provide co-ordination on AMU Awareness campaign, training and re-training and policy implementation that surrounds antimicrobial use. Antimicrobial use requires deliberate and intentional stewardship to break the continued cycle of AMR hence the above national committee is essential to be tasked with the outlined focal points.

## 11.0 MONITORING AND EVALUATION

Monitoring and evaluation can be achieved through use of indicators which could be qualitative or quantitative that spotlights changes brought about by inputs directed at change. M&E should be an integral part of the National Action Plan (NAP) targeted at the following;

- To track progress and performance of National Action plan implementation of antimicrobial use
- Align national, regional, and global monitoring requirement specific to antimicrobial use
- Ensure feedbacks to enhance transparency and accountability to stakeholders.
- Inform decision-making in national action plan and programming; captures success factors that forms basis for learning and decision making.
- To Adapt and revise the operational plan as necessary.
- Build strong data systems for all key stakeholders.
- Ensure efficient use of resources.
- Identification and bridging of gaps by making necessary amendments during implementation.



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## ANNEX I

ACTIVITY/SUB-ACTIVITIES	RESPONSIBLE ENTITY	TIME FRAME			COST
		Low	Medium	Long	
<b>STRATEGIC INTERVENTION 1: AWARENESS, EDUCATION AND CAPACITY BUILDING</b>					
<b>ACTIVITY 1.1 AWARENESS</b>					
1.1.1 Enlightenment through media (print, Social, electronic)		1			
1.1.2 IEC materials (caps, T-shirts, banners, fliers, branded exercise books etc.)		1			
1.1.3 Awareness creation amongst target groups		1			
1.1.4 World AMR awareness week (Nov 18 <sup>th</sup> -25 <sup>th</sup> every year)		1			
1.1.5 Creation of the AMU content for media		1			
1.1.6 Advocacy visits to policy makers to buy-in or on-boarding them on issues related to AMU.		1			
<b>ACTIVITY 1.2 EDUCATION</b>					
1.2.1 Push for inclusion of AMU in primary and secondary school education curriculum			2		
1.2.2 Professional (Continuous Professional Education),		1			
1.2.3 Farmers (seminars, workshops, short term training)		1			
1,2,4 General public (public education in schools, markets squares, religious centres, and communities etc.)		1			
<b>ACTIVITY 1.3 CAPACITY BUILDING</b>					
1.3.1 Hands on training for farm hands or AMR diagnostics in the laboratory.		1			
1.3.2 Simulation exercise,		1			
1.3.3 Refresher training		1			

1.3.4 Technical assistance					
<b>STRATEGIC INTERVENTION 2: STRENGTHEN KNOWLEDGE THROUGH SURVEILLANCE AND RESEARCH</b>					
2.1 Identify research needs, alternatives to antimicrobials.		1			
2.2 Conduct problem-oriented studies; operational research, studies on the use of antimicrobials,			2		
2.3 Enhance dissemination of information generated for decision-making.		2			
2.4 Usage of Tools; select relevant tools, conduct capacity trainings on their applications.		2			
2.5 Mapping of farms, veterinary hospitals and clinics, manufacturers, importers and exporters		2			
2.6 Establish Comprehensive Surveillance Systems for Antimicrobial Use (AMU) to track importation, distribution, sales, procurement, consumption and use. Data will be collected from NAFDAC, veterinary outfits, farms, and diagnostic laboratories. Develop early warning systems for pharmacovigilance and to address misuse, abuse and presence of counterfeit medicines.			2		
2.7 Promote Interdisciplinary Research to generate evidence on quality of antibiotics, their efficacy; generate evidence on appropriate disposal of antimicrobials by teams of veterinarians, microbiologists, epidemiologists, and other researchers working together to study issues in antimicrobial use (AMU) in animals.			2		
2.8 Enhance Data management for AMU in AH and strengthen systems			2		

<p>for data collection, collation, analysis, interpretation, reporting and dissemination using up-to-date technologies and data analytics tools to collect data, gain insights into trends and inform practice and policy decisions.</p> <p>2.9 Implement Training and Education Programs: Develop modules/ incorporate AMU actions into veterinary in-service, pre-service and animal health workers curriculum/training. Also provide training for farmers to promote best practices.</p> <p>2.10 Strengthen laboratory systems and diagnostic stewardship to aid targeted prescriptions and treatment using the appropriate antimicrobials.</p> <p>2.11 Generate data on antimicrobial sensitivity testing from across animal health laboratories.</p> <p>2.12 Use the data to generate national antibiogram to support empirical animal health antimicrobial use at lower levels.</p> <p>2.13 Develop Knowledge Management Products (KMPs) including research articles, technical reports, policy briefs, Annual National AMU reports for Animal Health sector in the country.</p> <p>2,14 Support relevant research activities including publications in impact factor- rated journals.</p> <p>2.15 Identify and pursue grant opportunities with partners on research.</p>			2		
<b>STRATEGIC INTERVENTION 3: INSTITULIZATION AND STRENGTHENING OF REGULATORY FRAMEWORKS</b>					

3.1 Quarterly meetings of regulatory agencies to enhance partnerships and collaboration.		1			
3.2 Training and retraining of stakeholders and regulators to institutionalize the policies.		1			
3.3 Coordination, enforcement, supervision, and inspection through a joint team		1			
3.4 Joint development and validation of essential veterinary medicine list for the country by all regulatory agencies which should be jointly reviewed regularly.			2		
3.5 Harmonization of existing regulations and legislation by relevant agencies as a long-term goal			2		
3.6 Domestication of international standards and periodic update in line with global best practices			2		
3.7 Incorporation of AMU actions into antimicrobial stewardship at all levels.		1			
<b>STRATEGIC INTERVENTION 4: EFFECTIVE STAKEHOLDERS' COLLABORATION</b>					
<b>ACTIVITY 4.1: STAKEHOLDERS MAPPING AND ANALYSIS.</b>					
4.1.1 Mapping		1			
<b>ACTIVITY 4.2: ENHANCE EFFECTIVE AND MUTUAL ENGAGEMENT OF STAKEHOLDERS – FOR BUY-IN AND OWNERSHIP.</b>					
4.2.1 Seek for experts' opinions.		1			
4.2.2 Assign agreed roles.		1			
4.2.3 Agree on joint actions – control measures.		1			
<b>ACTIVITY 4.3: FACILITATE PARTICIPATORY AND WHOLISTIC APPROACH</b>					
4.3.1 Alignment for implementation and broader coverage.		1			
4.3.2 Harmonize surveillance protocols.		1			
4.3.3 Agree on information dissemination strategies.		1			

4.3.4 Joint identification of gaps and challenges		1			
4.3.5 Gender inclusiveness		1			
<b>ACTIVITY 4.4: CONDUCT RISK ANALYSIS AND COMMUNICATION TO ALL STAKEHOLDERS</b>					
4.4.1 To develop mitigative measures, Focused Group Discussions		1			
4.4.2 Gather relevant evidence.		1			
4.4.3 Analysis of relevant data		1			
4.4.4 Develop risk communication and mitigation messages.		1			
4.4.5 Communicate risk to stakeholders.		1			
<b>ACTIVITY 4.5 ENHANCE POLITICAL WILL AND RESOURCE MOBILIZATION</b>					
4.5.1 Funding and staffing for activities.		1			
4.5.2 Coordination and good Governance		1	2		
4.5.3 Legislation		1			
4.5.4 Resource advocacy (NGOs and Partner organizations)		1			
4.5.5 Costing of the operational plan		1			
<b>STRATEGIC INTERVENTION 5: POLITICAL WILL AND RESOURCE MOBILIZATION</b>					
5.1 Advocacy visits to identified stakeholders.	1				
5.2 Reliable data to back-up the information on AMU to convince the government of the risk involved in misuse of antimicrobials.	1				
5.3 Reliable data - cost benefits analysis to convince development partners to support AMU program.	1				
5.4 Build trust on judicious use of resources allocated for AMU program.		2			
5.5 Identify AMU champions across board.	1				
5.6 AMU policies should be domesticated at subnational level.	1				

- ✧ Low: 1 -2 years
- ✧ Medium: 2 -3 years
- ✧ High: 4 -5 years

ANNEX II: NATIONAL ANIMAL HEALTH ANTIMICROBIAL USE SURVEY FORM (see attached)

## GLOSSARY

**Abattoir:** A facility where animals are slaughtered for meat production in compliance with health and safety standards.

**Adverse Effect:** An undesired harmful effect resulting from the use of a medication or intervention.

**Ambulatory Veterinarians:** Veterinarians who provide mobile services, traveling to farms or homes to treat animals.

**Antifungals:** Medications used to treat fungal infections in animals or humans.

**Antivirals:** Medications that inhibit the replication of viruses, used to treat viral infections.

**Antimicrobial Agent:** A substance, such as an antibiotic, antifungal, or antiviral, used to kill or inhibit the growth of microorganisms.

**Antimicrobial Consumption:** The total quantity of antimicrobials used in a given population, typically over a specific period.

**Antimicrobial Overuse:** The excessive or inappropriate use of antimicrobial drugs, leading to resistance and other public health issues.

**Antimicrobial Resistance (AMR):** The ability of microorganisms (bacteria, viruses, fungi, and parasites) to resist the effects of antimicrobial agents, making standard treatments ineffective.

**Antimicrobial Stewardship:** A coordinated program that promotes the appropriate use of antimicrobials to improve patient outcomes and reduce microbial resistance.

**Antimicrobial Use:** The application of antimicrobial agents in clinical practice to treat infections or for prophylactic purposes.

**Antiparasitic:** Medications used to prevent or treat infections caused by parasites in animals or humans.

**Audit:** A systematic review or examination of records, operations, and processes to ensure compliance with established guidelines or standards.

**Aquaculture:** The farming of fish, shellfish, and other aquatic organisms for food, usually under controlled conditions.

**Biosecurity:** Measures taken to prevent the introduction and spread of infectious diseases among animals and humans.

**Broad-Spectrum Antibiotics:** Antibiotics that are effective against a wide range of bacteria, both gram-positive and gram-negative.

**Cohort Studies:** Observational studies that follow a group of people (or animals) over a period to measure the occurrence of a specific outcome, such as a disease.

**Cross-Sectional Surveys:** Studies that collect data at a single point in time from a population to determine the prevalence of certain characteristics or conditions.

**Data Analysis:** The process of systematically applying statistical and logical techniques to evaluate and interpret data.

**Destruction Certificate:** A document that certifies the lawful destruction of specific items, often used in the context of expired or contaminated drugs.

**Diagnostic Laboratories:** Facilities equipped to perform tests to diagnose diseases in animals or humans through biological samples.

**Distributor:** An entity that purchases, stores, and sells veterinary medicines and other products to retail outlets or end-users.

**Distribution Record:** A log or record that tracks the distribution of veterinary medicines from manufacturer to end-user for regulatory and safety purposes.

**Epidemiologists:** Public health professionals who study patterns, causes, and effects of health and disease conditions in populations.

**Government Agencies:** Public institutions responsible for regulating and overseeing activities related to animal health, food safety, and veterinary practices.

**Growth Promoters:** Substances, often antimicrobial agents, added to animal feed to promote growth and improve feed efficiency.

**Horizontal Gene Transfer:** The process by which genetic material is transferred between organisms, often facilitating the spread of antimicrobial resistance.

**Import Record:** Documentation of imported goods, often required for veterinary medicines to ensure compliance with regulations.

**Intramammary:** Refers to the administration of medication directly into the mammary gland, often used to treat mastitis in dairy animals.

**Intra-Uterine:** Refers to the administration of medication or treatment directly into the uterus, commonly used for reproductive health issues in animals.

**Kraals:** Traditional enclosures for livestock, often found in Africa, used for protection and management of animals.

**Maximum Residue Limit (MRL):** The highest level of a drug residue legally allowed in food products derived from animals, ensuring food safety.

**Municipal Waste:** General waste generated by households, businesses, and institutions that is collected and managed by local authorities.

**Off-Label:** The use of veterinary drugs in a manner not specified in the approved labeling, such as different dosages or species.

**One Health:** An integrated approach recognizing the interconnectedness of human, animal, and environmental health.

**Para-Veterinarians:** Trained professionals who assist veterinarians in animal care and may perform some veterinary tasks under supervision.

**Parenteral:** A method of administering drugs by injection, bypassing the digestive system, including intravenous, intramuscular, and subcutaneous routes.

**Peri-Operative Use:** The administration of drugs before, during, and after surgery to manage infections or pain.

**Pharmacovigilance:** The practice of monitoring the effects of medicines after they have been licensed for use, particularly to identify and evaluate adverse effects.

**Point-of-Care Testing:** Diagnostic tests performed at or near the site of patient care, offering immediate results.

**Point of Sales:** The place where veterinary drugs are sold, either in retail stores or online platforms.

**Policy Development:** The process of creating guidelines and regulations that govern veterinary practices and public health initiatives.

**Post-Operative Infection:** Infections that occur after surgery, requiring careful monitoring and appropriate treatment.

**Purchase Form:** A document used to record the purchase of veterinary medicines or supplies.

**Prescriptions:** Written instructions from a veterinarian authorizing the dispensing and use of specific medications for animal treatment.

**Prescription Form:** A document used by veterinarians to prescribe medications, often detailing dosage, duration, and usage instructions.

**Private Veterinarians:** Veterinarians who operate independently or in private practice, offering animal care services to individuals or businesses.

**Procurement Record:** Documentation of the purchase and acquisition of veterinary drugs or medical supplies for tracking and regulatory compliance.

**Prophylaxis:** Preventive treatment to ward off diseases or infections, especially in high-risk situations.

**Protocols:** Established guidelines or procedures for carrying out specific treatments or operations in veterinary practice.

**Quality Control Report:** A report that assesses the quality and safety of veterinary products, ensuring they meet required standards.

**Regulatory Bodies:** Organizations responsible for overseeing and enforcing laws and standards related to veterinary medicine and animal health.

**Reporting:** The formal documentation of activities, findings, or incidents, often required by regulatory bodies or institutions.

**Sampling:** The process of collecting specimens for testing or analysis in a laboratory setting to diagnose or monitor health conditions.

**Sales Record:** Documentation of the sale of veterinary medicines, often required for tracking and compliance with regulations.

**Situation Analysis:** An assessment of a particular issue or environment to understand its context, often used for planning interventions.

**Stakeholders:** Individuals, groups, or organizations that have an interest or concern in veterinary practices, public health, or animal welfare.

**Standard Operating Procedures (SOPs):** Detailed written instructions designed to ensure consistency in performing specific tasks or operations.

**Surveillance:** The systematic collection, analysis, and interpretation of health-related data for disease monitoring and control.

**Tentative Diagnosis:** A preliminary diagnosis based on initial clinical findings, subject to confirmation with further testing.

**Vaccination:** The administration of a vaccine to stimulate an immune response and provide protection against specific diseases.

**Veterinary Clinic/Hospital:** A facility where veterinarians provide medical care and treatment to animals.

**Veterinary Institutions:** Organizations or establishments involved in veterinary education, research, and clinical care.

**Veterinary Services:** Professional services provided by veterinarians, including diagnosis, treatment, and disease prevention in animals.

**Withdrawal Periods:** The required time between the last administration of a drug to an animal and the time its products (meat, milk, eggs) can safely be consumed by humans.