Republic of Mauritius

NATIONAL ACTION PLAN ON ANTIMICROBIAL RESISTANCE
APRIL 2024 TO MARCH 2029

MINISTRY OF HEALTH AND WELLNESS

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MESSAGE FROM THE MINISTER

Antimicrobial resistance (AMR), a global health concern, threatens the efficacy of medications we rely on to treat infections. The consequences of unchecked resistance are severe—increased mortality, prolonged illnesses, and escalating healthcare costs. Our response to this crisis requires concerted effort, cooperation, and proactive measures.

This action plan outlines a comprehensive strategy to tackle AMR head-on. It emphasizes public awareness, strengthened surveillance, improved diagnosis and treatment, responsible use of antimicrobials, international collaboration, and continuous education for healthcare professionals. Each component is vital to the success of our collective efforts.

We, as a nation, have a long-standing tradition of proactive healthcare management. Now, faced with the challenge of AMR, we must once again unite in our commitment to safeguard the health of our citizens.

In the pages that follow, detailed initiatives that require the engagement of government agencies, healthcare professionals, the agricultural sector, the environmental sector and, most importantly, each and every citizen, are highlighted. Mauritius is proud to have a national action plan on antimicrobial resistance that has been elaborated with inputs from all stakeholders and with technical assistance from the World Health Organization. I would like to thank all those who have made this National Action Plan a reality. I am grateful to the WHO for the assistance it has provided for the development of this plan and to all partner ministries for their valuable inputs.

Let us stand united against this global health threat and make Mauritius a beacon of responsible antimicrobial stewardship. Likewise, let us be committed to the health and well-being of our beloved nation.

Dr. The Honourable Kailesh Kumar Singh JAGUTPAL
Minister of Health and Wellness

APPROVAL FORM

NATIONAL ACTION PLAN ON ANTIMICROBIAL RESISTANCE APRIL 2024 TO MARCH 2029			
	NAME	**SIGNATURE**	**DATE**
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ACKNOWLEDGEMENT

The time and effort invested by the following participants who took part in the three workshops that culminated in this action plan is well appreciated. Their insightful comments and thoughtful questions enriched the discussions and provided valuable perspectives.

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ABBREVIATIONS AND ACRONYMS

ABST	Anti-Bacterial Susceptibility Test
AHC	Area Health Centres
AHVPHLP	Animal Health, Veterinary Public Health and Livestock Production Bill
AMC	Anti-Microbial Consumption
AMR	Anti-Microbial Resistance
AMS	Anti-Microbial Stewardship
AMU	Anti-Microbial Use
APD	Animal Production Division
ASF	African Swine Fever
AST	Anti-Microbial Susceptibility Test
ATCC	American Type Culture Collection
AU-IBAR	African Union Inter-african Bureau for Animal Resources
BCG	Bacille Calmette-Guérin
CABI	Centre for Agriculture and Bioscience International
CCPP	Contagious Caprine Pleuro-Pneumonia
CDC	Centres for Disease Prevention and Control
CHC	Community Health Centre
CHL	Central Health Laboratory
CME	Continuous Medical Education
CNE	Continuous Nursing Education
COI	Commission de l'Océan Indien
CPD	Continuing Professional Development
CRKP	Carbapenem-Resistant *Klebsiella Pneumoniae*
CWA	Central Water Authority
DGHS	Director General Health Services
DHIS	District Health Information Software
DHS	Director Health Services
E.N.T.	Ear, Nose and Throat

EDB	Economic Development Board
EML	Essential Medicine List
EPA	Environment Protection Act
EQAS	External Quality Assessment Services
EU	European Union
FAO	Food and Agriculture Organization
FAREI	Food and Agricultural Research and Extension Institute
FMD	Foot and Mouth Disease
FTL	Food Technology Laboratory
GAD	Government Analyst Division
GLASS	Global Antimicrobial Resistance and Use Surveillance System
HAI	Healthcare Associated Infections
HCW	Health Care Waste
HIV	Human Immunodeficiency Virus
IAEA	International Atomic Energy Agency
ICT	Infection prevention and Control Team
ICU	Intensive Care Unit
IEC	Information, Education and Communication
IOC	Indian Ocean Commission
IPC	Infection Prevention and Control
ISO	International Standard Organization
KAP	Knowledge, Attitude and Practices
LIMS	Laboratory Information Management System
LSD	Lumpy Skin Disease
LVD	Livestock and Veterinary Division
MOAIFS	Ministry of Agro Industry & Food Security
MALDI-TOF	Matrix-Assisted Laser Desorption/Ionization Time-Of-Flight
MDRO	Multi-Drug Resistant Organisms
MEPU	Ministry of Energy and Public Utilities

MIH	Mauritius Institute of Health
MMR	Measles, Mumps and Rubella
METEST	Ministry of Education, Tertiary Education, Science and Technology
MOESWCC	Ministry of Environment, Solid Waste Management and Climate Change
MOHW	Ministry of Health and Wellness
MoU	Memorandum of Understanding
MRIC	Mauritius Research and Innovation Council
MRSA	Methicillin-Resistant *Staphylococcus Aureus*
MUR	Mauritian Rupee
NAP	National Action Plan
NEL	National Environmental Laboratory
NEQAS	National External Quality Assessment Scheme
NGO	Non-Governmental Organization
NHP	Non-Human Primate
NIC	National Infection prevention and control Committee
NICD	National Institute for Communicable Diseases
NOHARM	National One Health Antimicrobial Resistance Monitoring
NPPO	National Plant Protection Office
OIE	Office International des Epizooties
PAM	Pharmaceutical Association of Mauritius
PMPA	Private Medical Practioners' Association
PMS	Performance Management System
PSC	Public Service Commission
RFP	Request for Proposal
RHD	Regional Health Director
RIC	Regional Infection prevention and control Committee
SADC	Southern African Development Community
SCE	Senior Chief Executive
SLO	State Law Office

SOP	Standard Operating Procedure
SWD	Solid Waste Division
SWM	Solid Waste Management
SWOT	Strengths, Weaknesses, Opportunities and Threats
TMPS	Trimethoprim-Sulfamethoxazole
TOR	Terms of Reference
TrACSS	Tripartite AMR Country Self-assessment Survey
TWG	Technical Working Group
UK	United Kingdom
UNDP	United Nations Development Programme
UoM	University of Mauritius
USD	United States Dollar
VRE	Vancomycin-Resistant Enterococcus
WAAW	World AMR Awareness Week
WASH	Water, Sanitation and Hygiene
WHO	World Health Organization
WMA	Wastewater Management Authority
WOAH	World Organization for Animal Health
WRU	Water Resources Unit
YR	Year

EXECUTIVE SUMMARY

The overarching goal of the National Action Plan on Antimicrobial Resistance (AMR) for Mauritius is to "ensure the continuity of successful evidence-based treatment and prevention of infectious diseases with effective, safe and rational use of medicines".

Weaknesses identified during the situational analysis include:

- Gaps in knowledge and awareness of AMR.
- Lack of resources for surveillance.
- Poor compliance with guidelines on infection prevention and control.
- Absence of antimicrobial stewardship.
- Inadequate collaboration with the private sector.
- Limited regulatory system.

The six identified strategic objectives and some of the key related interventions are:

- Strengthen governance, coordination, and collaboration for AMR NAP implementation.
    - Establish and strengthen multisectoral AMR Technical Working Group.
- Improve awareness and understanding of antimicrobial resistance through effective communication, education, and training.
    - Advocate for AMR and conduct campaigns.
    - Strengthen education and training on antimicrobial resistance of human, animal, plant, and environmental health professionals.
- Enhance AMR surveillance and diagnostic capacity in humans and animals.
    - Support surveillance of AMR capacity.
    - Strengthen laboratory capacity in both human, animal, and environmental sector.
    - Establish antimicrobial use and consumption surveillance system in human and animal sector.
    - Strengthen surveillance for antimicrobial drug residues in foods.
- Reduce the incidence of infection through effective sanitation, hygiene, and infection prevention measures.
    - Strengthen infection prevention and control program in health care settings.
    - Strengthen waste management systems in the health, agriculture, and environment sectors.

    - Strengthen good husbandry practices and bio-security interventions in animal, plant, and fishery sectors.

- Improve access and optimize use of antimicrobials agents in humans, animals, and plant health.
    - Develop legislation on prescription and sale of antimicrobials.
    - Strengthen the supply chain management system to ensure the availability of good quality antimicrobials.
    - Implement antimicrobial stewardship program in health facilities and animal health to promote prudent use of antimicrobials.
- Strengthen research, development, and sustainable investment in antimicrobial resistance.
    - Enhance research and innovation.

This National Action Plan with cost almost MUR 200 million over a period of five years with the health sector being responsible for funding 72% of the activities, the agricultural / veterinary sector contributing to 28% of the funds and the environmental sector supporting 1% of the budgeted activities.

SITUATIONAL ANALYSIS

INTRODUCTION

The threat of antimicrobial resistance (AMR) represents a global crisis that jeopardizes the effectiveness of essential drugs used to treat bacterial, viral, fungal, and parasitic infections. As Mauritius strives to safeguard its citizens and secure a prosperous future, the emergence and spread of AMR demand urgent and comprehensive attention.

Over the past decades, antimicrobial agents have revolutionized medicine, transforming once-fatal infections into manageable conditions. However, the excessive and often inappropriate use of antibiotics, antivirals, antifungals, and other antimicrobials in human and animal health, agriculture, and the environment have accelerated the development of resistant microorganisms. These resilient pathogens render existing treatments ineffective, leading to prolonged illnesses, increased healthcare costs, and even mortality.

Mauritius, like many nations, is not immune to this global health threat. The overuse and misuse of antibiotics in human healthcare, coupled with the unregulated use of antimicrobials in agriculture, veterinary medicine and aquaculture, have contributed to the rise of AMR on the island. Moreover, international travel and trade facilitate the rapid transmission of resistant strains across borders, underscoring the need for a coordinated and concerted effort to combat this menace.

Recognizing the gravity of the situation, the Government of Mauritius has taken a proactive stance by formulating a second National Action Plan on Antimicrobial Resistance. This comprehensive strategy aims not only to raise awareness about AMR but also to establish a framework for collaboration across sectors, including health, agriculture, environment, and education. By fostering a multi-pronged approach that involves healthcare professionals, policymakers, researchers, and the public, Mauritius seeks to curb the progression of AMR and protect the effectiveness of critical antimicrobial treatments.

The purpose of this National Action Plan is to provide a roadmap for confronting AMR in Mauritius. It outlines key objectives, strategies, and interventions that will guide the nation in tackling this challenge. By strengthening surveillance and monitoring systems, improving infection prevention and control practices, promoting responsible antimicrobial use in humans and animals, and investing in research and innovation, Mauritius endeavors to preserve the efficacy of antimicrobials for generations to come.

Methodology

The situational analysis on AMR in Mauritius utilized the analysis of strengths, weaknesses, opportunities and threats (SWOT) approach using a compilation of existing data. Assessment and analysis of information on antimicrobial resistance status in Mauritius was developed in accordance with the WHO's Manual for Developing National Action Plan for Antimicrobial resistance.

- April 2023 – The National IPC Committee proposed the development of a new five-year National Action Plan on AMR for the country, given the previous action plan had expired.
- May 2023 – The Ministry of Health and Wellness solicited WHO's help and sponsorship.
- June-July 2023 – A work plan was written, a concept note was finalized, a stakeholder analysis was conducted, and pre-conference meetings were held.

- August 2023 – A national workshop was organized where participants submitted their data and views. A situational analysis was carried out and the inputs of different sectors were compiled by a writing team, following which the document was forwarded to the various AMR focal points of different ministries for their comments.
- September 2023 – The draft action plan was updated by WHO's team. A second workshop was held with key stakeholders to describe essential activities that should be implemented by Mauritius in the next five years. Moreover, a monitoring and evaluation framework was formulated. Technical officers from WHO collated all the suggestions from participants.
- October 2023 – A third workshop was organized to train staff from Mauritius on how to cost action plans and to determine the funds needed to implement the action plan. WHO's team validated the findings and submitted a draft document.
- November 2023 – The action plan was edited, corrected and updated by the AMR Focal Point for Human Health and submitted to the Ministry of Health and Wellness for processing.
- February 2024 – The action plan was forwarded to the Ministry of Agro Industry & Food Security and the Ministry of Environment, Solid Waste Management and Climate Change for their comments.
- March 2024 – The document was updated based on the suggestions made and it was submitted to the Ministry of Health and Wellness for approval.

Mauritius country profile

Healthcare system

Mauritius is located in the Indian Ocean, off the south east coast of the Africa continent, about 900 kilometres east of Madagascar. The territory of Mauritius includes the island of Rodrigues situated 560 kilometres to the north east of Mauritius. In addition, there are two tiny dependencies, namely, the Agalega Islands and the Cargados Carajos. Mauritius is divided into 9 districts. The population of Mauritius as at 1st July 2022 was 1,262,523 (623,800 males and 638,500 females). The population growth rate of Mauritius has a negative tendency. The proportion of population aged 65 years and over increased from 7.2% in 2010 to 12.7% in 2021, indicating the ageing of the population; two out of every three deaths occur in this age-group (Health Statics Report 2021).

In 2021, life expectancy at birth for males was 70.3 years and for females was 77.3 years. The highest burden of disease in Mauritius is attributed to non-communicable diseases. Heart diseases and diabetes mellitus were the first two principal underlying causes of mortality in 2021, causing 2,772 (21.3%) and 2,593 (20.0%) deaths respectively. Neoplasms from all sites taken together were in the third position with 1,376 (10.6%) deaths. Like all countries, Mauritius was affected by the COVID-19 pandemic with 24,432 cases for the year 2021.

Mauritius has a strong, resilient, and equitable health system which is founded on the WHO Health System Framework. A dual-tiered system of healthcare services, comprising a government-led and funded public sector, and a thriving private sector, steers the country towards achieving its vision to "ensure healthy lives and promote well-being for all at all ages" by 2030. The public sector caters, free of any user cost, to the bulk of the healthcare needs of the population (73%). The remaining healthcare needs of the people

(27%) are managed by the private sector, on a user fee basis, either through out-of-pocket payments or payments effected by private health insurers.

The public sector comprises of primary, secondary, and tertiary healthcare facilities. In the Island of Mauritius, as at the end of 2021, there were five regional hospitals namely Dr A. G. Jeetoo Hospital, Sir S. Ramgoolam Hospital, Dr B. Cheong Hospital, Pandit J. Nehru Hospital and Victoria Hospital, and two district hospitals namely Souillac Hospital and Mahebourg Hospital. There were also 6 specialized hospitals, namely, one psychiatric hospital, one for chest diseases, one for eye diseases, one for ear, nose and throat (E.N.T.) diseases, one Cardiac Centre and a National Cancer Centre; of note, the Cardiac Centre at Candos ceased to operate in November 2021. There were also 3 Detoxication and Rehabilitation Residential Centres. The total number of beds in government health institutions was 3,803 as at the end of 2021. In the private sector, there were eighteen private health institutions with a total of 776 beds. The total number of beds in the public and private sectors was thus 4,579 i.e., 266 inhabitants per bed.

All regional and district hospitals and 5 of the 6 specialized hospitals, namely, the Psychiatric, Eye, E.N.T, New Cancer Centre and Cardiac, have an outpatient department. Outpatient services were also delivered in two community hospitals, 7 mediclinics, 20 Area Health Centres (AHC) and 114 Community Health Centres (CHCs).

Animal health

Data on the production of beef, goat meat, mutton and pork are supplied by the Mauritius Meat Authority. It is to be noted that these data represent only animals slaughtered by the Central Abattoir, including live animals imported from Rodrigues and other countries for slaughter.

In 2022, the production of beef from live cattle was 2,071 tons, which is 13.6% higher than the figure of 1,823 tons registered in 2021. Beef production from the slaughter of imported cattle, accounting for 94.1% of the total production, increased by 7.5% from 1,812 tons to 1,948 tons. Local beef production also went up from 11 tons to 123 tons.

The production of goat meat and mutton increased by 34.1% from 41 tons in 2021 to 55 tons in 2022. The production of pork increased by 1.6% from 574 tons in 2021 to 583 tons in 2022. The production of poultry increased by 13.4% from 49,100 tons in 2021 to 55,700 tons in 2022. Total fish production increased by 15.6% from 28,769 tons in 2021 to 33,254 tons in 2022. This increase was attributable to a rise of 15.1% in the production of other catch (like tuna and bank) from 27,629 tons in 2021 to 31,812 tons in 2022, as well as an increase of 26.5% in the production of fresh coastal fish catch from 1,140 tons in 2021 to 1,442 tons in 2022.

Many animals are kept in parks and natural reserves. The total population of livestock in Mauritius is as follows:

Species	Population
1) Poultry	6 million (Including layers for eggs)
2) Deer	70,000
3) Pigs	20,000
4) Goat	20,000 (13,500 in Rodrigues)
5) Sheep	5,000 (12,000 in Rodrigues)

6) Cattle	4,000 (8,700 in Rodrigues)
7) Honey production	625 registered beekeepers taking care of total 3,500 bee colonies
8) Captured Tuna	30,639 tons
9) Aquaculture	2,315 tons

Table 1

There are around 10 sites of aquaculture some of them being located at Grand Gaube, Poudre D'or, Quatre Sœurs, Bambous Vireux and Grande Riviere Sud Est. The main pathogens that are detected in aquaculture are *Vibrio sp.* and *Salmonella sp*.

The population of captive non-human primates is 20,000. A total of 112 veterinarians offer their services to the general public and private stakeholders. There are 12 veterinary clinics and about 19 veterinarian officers in the public sector. The department of veterinary services is organized as per figure 1.

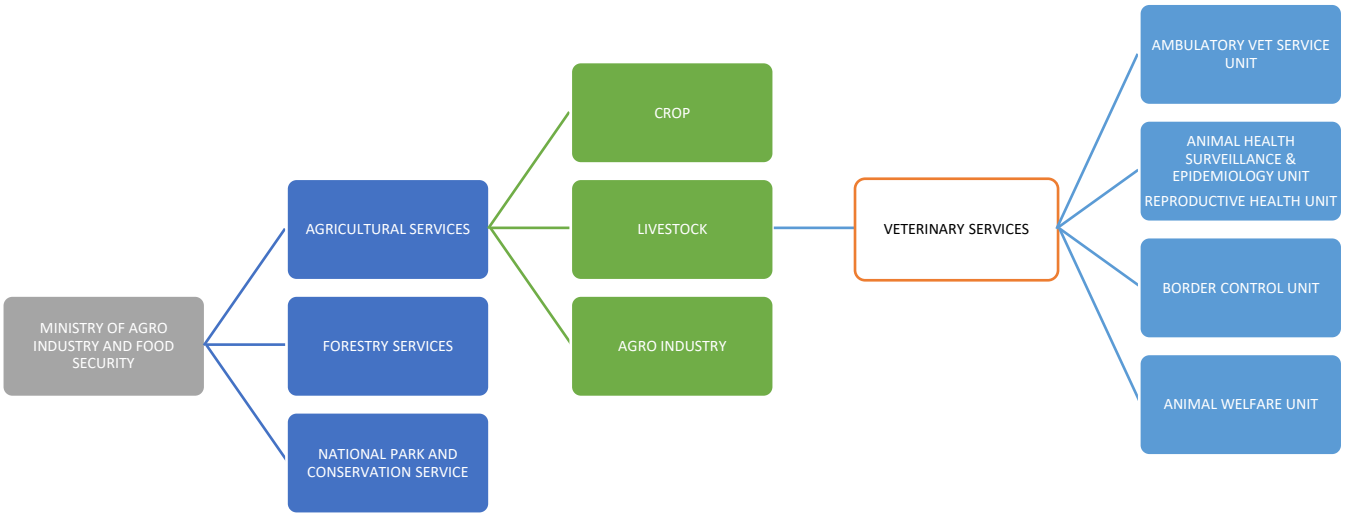


Figure 1

The Livestock and Veterinary Division (LVD) is a regulatory and service providing government body which is involved in the following activities:

- Ambulatory veterinary services which deliver 24-hour veterinary clinical assistance to the breeding community related mainly to cattle, goats, pigs and poultry.
- Animal health, surveillance and epidemiological activities.
- Reproduction – artificial insemination of dairy cattle, management of infertility, training of technical staff and animal census.
- Antemortem inspection of live animals prior to slaughter and postmortem inspection of related carcasses at the Central Abattoir.
- Border inspection control at seaport and airport during import and export of live animals.
- Issue of Import Permits for the import of products of animal origin for human consumption (e.g., meat and meat products) and for non-human consumption (e.g., hides, hunting trophies, animal feed, manure or other fertilizer of animal origin) and for the import of live animals (including pets).

- Inspection of cold storage, feed processing facilities, warehouses, meat and meat products at registered importers' premises.
- Inspection of animal quarantines/isolation facility and Animal Control Centers.
- Promoting welfare and verifying that the welfare of animals are complied with by enforcing the Animal Welfare Act.
- Incineration of euthanized stray dogs and cats.
- Issue of authorization for the import of Veterinary Medicinal Products.

The LVD is involved in both regulatory activities related to antimicrobial use and to AMR surveillance.

For the past two decades Mauritius has been affected by several WOAH listed diseases such as FMD, LSD, ASF, CCPP and Varoasis.

The endemic diseases present in Mauritius are as follows:

- Anaplasmosis
- Fowl pox
- Newcastle diseases
- Caseous lymphadenitis
- Contagious ecthyma

Food security and plant health

Plant biosecurity measures are put in place in order to protect plants against the introduction and spread of new pests and diseases. The National Plant Protection Office (NPPO) regulates the importation of plants / plant products; importation is subject to a Plant Import Permit as per Plant Protection Act (2006) so as to reduce the risk of introduction of new pests and diseases.

The NPPO facilitates the importation of beneficial microorganisms to be used as biopesticides. The latter are considered safer pest control alternatives to chemical products which are associated with several concerns with impact on human health and the environment.

Pest surveillance i.e., regular monitoring to assess the presence or absence of pests is also carried out to enable early pest eradication and improved pest management. Even if pesticides (especially fungicides) have economic, social, public health and environmental benefits, there are well-known risks associated with their use such as:

- illness or harm to humans who are exposed;
- environmental nuisance such as noise and odour;
- harm to non-target organisms including native, ornamental and agricultural plants and animals;
- pollution of land and water;
- development of resistance in pests; and
- contamination of agricultural produce, leading to trade problems and health risks of consumers.

The Ministry of Agro Industry and Food Security has implemented the Use of Pesticides Act 2018, which is being enforced by the Pesticides Regulatory Office since 2018 in order to regulate, monitor and control the use of pesticides in agriculture for adequate protection of human health and the environment. This

includes protection of pesticide users, consumers, the public and crops. A code of practice has also been developed to give proper guidance to users of pesticides to minimise risks associated with their use while providing effective pest control.

However, it should be noted that previous analysis has shown the presence of antibiotics in food items on the Mauritian market; therefore, this should be carefully monitored.

Environmental health

In the Republic of Mauritius, raw water is obtained from both surface and ground water. The Central Water Authority (CWA) then treats this raw water to meet both the Drinking Water Standards as per the Environment Protection Act and the norms of the World Health Organization. The CWA is also responsible for supply and distribution to practically the whole of the population. 99% of the population have access to potable water. In 2021, 315 Mm^3 of treated water was supplied to the public. In order to ensure that the water being supplied conforms to the established norms, the Ministry of Health and Wellness conducts independent tests daily on samples collected along the distribution lines. An average of 5,000 tests for both bacteria and physico-chemicals are undertaken annually by the Environmental Health Engineering Unit of the Ministry of Health and Wellness. The percentage of compliance on a yearly basis is on average 99%.

With a view to ensure proper sanitation throughout the Republic of Mauritius, all wastewater is collected, treated and disposed of via either the national sewage network or through on-site disposal systems. In order to sustain its rapid economic growth and preserve the country's fragile environment, Mauritius has to address environmental issues related to demographic growth and rapid changes in the use of water and land resources. In 2012, the Government approved a new Master Plan 2014-2033. The objective of the plan is to elaborate a program for the development and management of wastewater in Mauritius for a period of 20 years i.e., from 2014 till 2033. The coverage of the public sewage system in Mauritius is around 28% whereby the wastewater is channeled to sewerage treatment plants prior to safe disposal into the environment. Regarding on-site wastewater disposal systems, actions are initiated under the Public Health Act in the event the said systems are malfunctioning or overflowing. Moreover, the Republic of Mauritius has, under the Environment Protection Act, set the required standards for the safe disposal of wastewater be it onto ground, watercourse, or the sea with a view to ensure proper sanitation.

Public hygiene practices include the proper disposal of household waste, cleaning of roads and streets, keeping houses and yards clean, covering dustbins and spraying insecticides at regular intervals to ward off insects. The responsibility to sensitize the public at large with respect to public hygiene rests on different Ministries namely the Ministry of Health and Wellness as well as the Ministry of Local Government. Regular awareness campaigns are undertaken to ensure the population’s safety and enforcement actions are initiated under relevant legislations such as the Public Health Act, the Local Government Act and the Environment Protection Act whenever necessary. Furthermore, the collection of household waste is free and regular and is ensured by the local authorities.

The environment can be a source of multi-drug resistant organisms. The release of excreta contaminated with resistant bacteria into the soil or rivers can help with the transmission of such microbes. Moreover, the presence of antimicrobial agents and other pollutants in the environment can weaken or deplete the

main populations of the target bacteria thus allowing the remaining resistant strains to persist or flourish. Improper disposal of unused or expired antimicrobials in the environment as well as unrestricted bioaerosol dispersal are known to influence the spread of resistant microorganisms through wildlife, domestic animals, soil, water, and humans. In addition, climate-related factors, such as increased temperatures and altered ecosystems, may impact the prevalence and distribution of AMR in the environment.

Water, sanitation and hygiene (WASH) and wastewater factors play a role in the environmental dispersal and transmission of AMR in three main ways:

a) Dispersal via water, sludge and manure potentially resulting in the transmission of disease-causing pathogens to humans, animals and plants, thereby increasing the need for treatment with antimicrobial agents;
b) Silent transmission of resistant microorganisms with low pathogenicity that only become evident when they infect particularly vulnerable populations, or the transfer of genetic material from one less virulent organism to another microbe with greater virulence; and
c) Release of faecal and other pollutants, including antimicrobial compounds into the environment that may promote resistance by creating conditions favorable for the emergence of new resistance genes.

The Republic of Mauritius has the necessary legal and institutional framework for the WASH sector. In fact, monitoring of the water, sanitation and hygiene as well as wastewater disposal is done with a view to ensuring compliance with environmental norms. However, at present the country does not have a national assessment of antimicrobial pathogens in the environment. Also, legislations in place are more relevant to the protection of the environment rather than the prevention of the contamination of the environment with antimicrobials. On the other hand, even though the country has a regular monitoring system for drinking water quality, no mechanism is in place for monitoring antimicrobial compounds in drinking water.

Antimicrobial resistance in Mauritius

Human health

Resistance in non-typhoidal Salmonella has remained consistently low at less than 10% to ampicillin, co-trimoxazole and ciprofloxacin since 1998. However, susceptibility to ciprofloxacin in Campylobacter has steadily declined from >90% in 1998-2005 to 18% in 2022, although erythromycin susceptibility remains >95%. Shigella is very rarely isolated in Mauritius.

Almost all *Neisseria gonorrhoeae* isolated in Mauritius are non-susceptible to penicillin and ciprofloxacin, but all isolates tested in the past 5 years have been susceptible to ceftriaxone and cefixime. Susceptibility testing to azithromycin was started in 2019 and resistance of *Neisseria gonorrhoeae* to this antibiotic is only occasionally encountered.

Resistance in pneumococcus has remained stable in the past 5 years with about 35% resistance to macrolides and 50% reduced susceptibility to penicillin. High-level resistance to penicillin and resistance to levofloxacin and moxifloxacin remain very rare. Resistance in *Haemophilus influenzae* has also remained stable with >90% susceptibility to fluoroquinolones, co-amoxiclav and azithromycin.

In 2021, 43% of *S. aureus* isolated from blood cultures were MRSA (GLASS data 2021). In February 2021, 62% of MRSA isolated from hospitalized patients in all specimen types were not multi-resistant. Vancomycin resistance has not been documented.

Vancomycin-resistant enterococcus (VRE) was very rarely encountered in Mauritius prior to 2008 but in February 2021, 9% of Enterococcus from hospitalized patients were VRE.

Among *E. coli* isolated from urine in 2021, only 46% and 60% of 2,368 isolates were susceptible to ciprofloxacin and cefotaxime respectively (GLASS data 2021).

Resistance to carbapenems of *K. pneumoniae* in hospitalized patients has increased from 15% in June 2017 to 39% in February 2021. In 2021, among blood isolates, one-third were resistant to carbapenems (GLASS data 2021).

In February 2021, less than a third of isolates of *Acinetobacter spp* from hospitalized patients were susceptible to most antibiotics, except colistin.

In February 2021, only about half of *Pseudomonas aeruginosa* from hospitalized patients were susceptible to most anti-pseudomonal antibiotics with susceptibility rates of 47%, 40%, 44%, 46%, 51% to ceftazidime, ciprofloxacin, amikacin, meropenem and piperacillin/tazobactam respectively.

Susceptibility data based on routine laboratory data should, however, be interpreted with caution, particularly with community-acquired infections, as patients are often treated empirically, and the data will probably not be representative of first infections and may overestimate the true prevalence of resistance because of selection bias.

Table 2 describes the key pathogens that are considered major threats to the Mauritian population currently. The factors considered to identify these pathogens are (a) the frequency of their isolation in blood cultures, (b) the availability or lack thereof of therapeutic options to treat infection with these microorganisms and (c) the poor outcome that can be associated with infection from these microbes.

Organism	**Number of blood isolates (GLASS 2021)**
Staphylococcus aureus	433
Klebsiella	380
E.coli	317
Acinetobacter	257
Pseudomonas aeruginosa	(c. 100)

Table 2

Animal health

Resistance data on bacteria isolated from animals is limited in Mauritius. The number of samples tested for the year 2021-2022 was 56. The bar chart below represents the overall resistance rates to various antimicrobials.

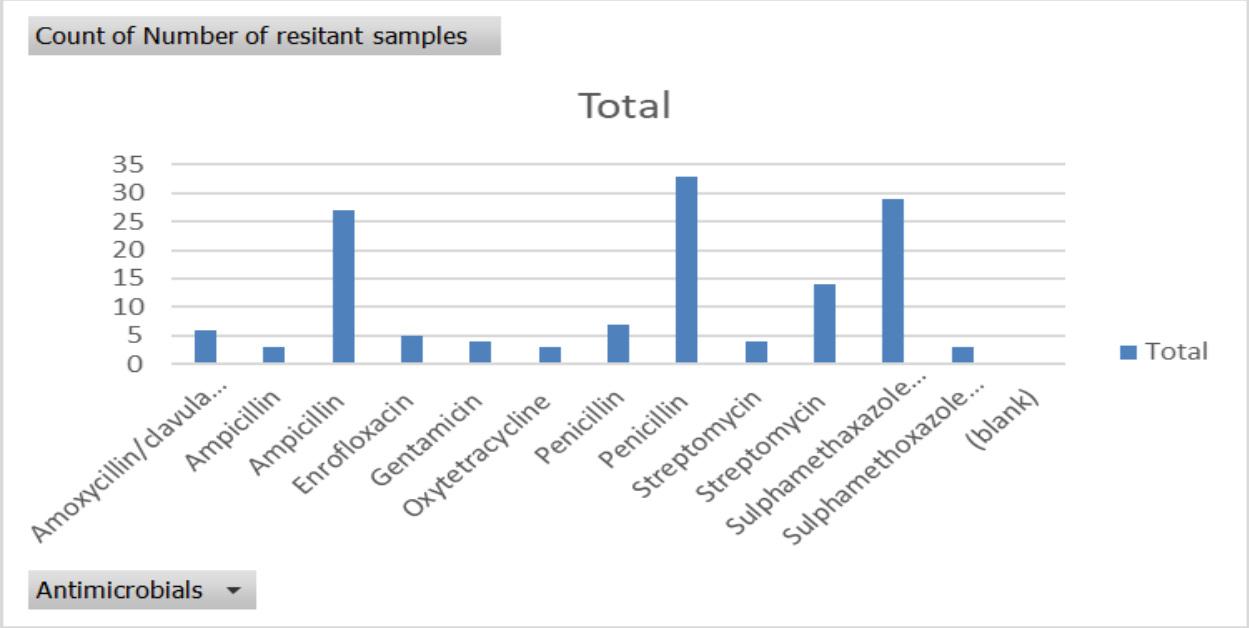


Figure 2

The table below shows the species-wise distribution of antimicrobial resistance to the pathogen *E.coli.*

	Amoxicillin and Clavulanic acid	Ampicillin	Enrofloxacin	Gentamycin	Oxytetracycline	Penicillin	Streptomycin	Sulfamethaxole /Trimetropim
Broiler	4	14	3	2	0	14	5	13
Layer	1	1	0	2	0	3	2	1
Back yard Chicken	0	1	0	0	0	1	1	1
Bat	0	1	0	0	0	1	0	0
Deer	0	2	0	0	0	1	0	1
Dog	0	1	0	0	0	1	1	1
Duck	0	1	0	0	1	1	1	1
Goat	0	1	0	0	0	3	0	0
Layers	0	1	0	0	0	3	0	0
Migratory / sea bird	0	1	0	0	1	1	1	0
Sheep	0	3	1	0	0	2	1	2
NHP	0	0	0	0	0	0	0	1

Table 3

The bar chart below illustrates the resistance rate among various categories of animals.

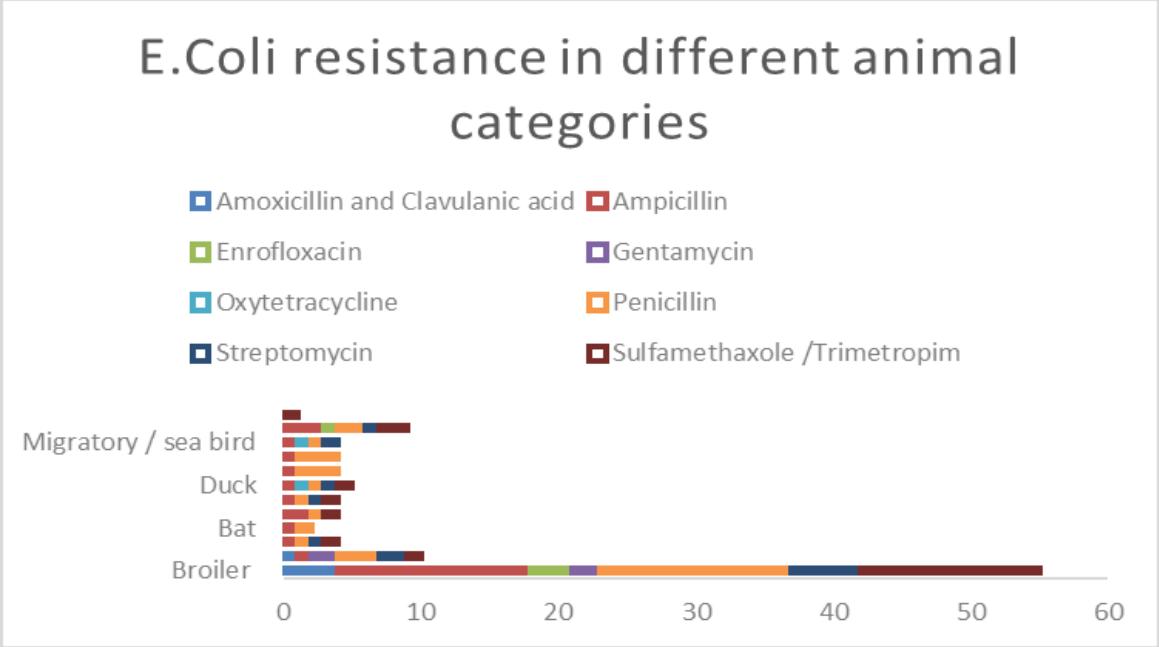


Figure 3

There is currently no official mechanism for reporting antimicrobial use and AMR data from the private sector to the LVD. Some internal data is nonetheless available. There is, however, no routine antimicrobial surveillance being conducted by the private sector. Antimicrobial susceptibility testing is usually made for specific cases where treatment advocated is not working.

One case study on non-human primates showed the following antimicrobial susceptibilities:

ABST PERFORMED	*Salmonella sp.*	*Shigella sp.*	*Yersinia sp.*
Amoxicillin (Resistant)	2	1	2
Azithromycin (Resistant)	0	1	0
Enrofloxacin (Resistant)	0	0	0
TMPS (Resistant)	2	4	2
Oxytetracycline (Resistant)	2	3	0
Total	6	9	6

Table 4

Pillars of the national antimicrobial resistance response

Status of NAP Version 1 Implementation

The following table lists some of the activities in the first NAP that were completed or for which progress was stalled.

Activities	Status
Install and train key personnel in the use of WHONET and the WHO Antimicrobial Consumption Tool	Training in WHONET was conducted in January 2020. The WHO Antimicrobial Consumption Tool is not in use. Development of Laboratory Information Management System is in progress, and it is

	expected that it will be based on WHONET for the Bacteriology Department.
Designate a dedicated system administrator to collate and report on resistance data/trends from human, animal and environmental health sectors	Not done
Participate in GLASS	Done since 2021 with support from WHO. 2020 and 2021 data have been submitted. A data collector sponsored by the WHO Country Office helps with data collection.
Achieve accreditation for laboratories to process human, animal and environmental samples, specifically bacterial identification and AST.	Not done due to a shortage of staff. However, the National Environmental Laboratory (NEL) is accredited to ISO 17025:2017 (for the detection and enumeration of total coliform bacteria and *Escherichia coli*).
Ascertain the surveillance capacity of the Central Health, Animal Health, Food Technology, Government Analyst Division and National Environmental Laboratory.	Surveillance capacity of AMR by Central Health Lab (CHL) is adequate but additional capacity is needed for genotypic testing of bacteria
Institute Memorandum of Understanding (MoU) between laboratories to define role and responsibilities of each	Not done
Recruit and train qualified personnel for AMR	Not done
Designate a National Reference Laboratory for surveillance of antimicrobial use and resistance in human, animal and environmental health sectors with standard operating procedures and external quality assessment.	Not done Standard Operating Procedures (SOP) are incomplete at CHL. CHL participates in External Quality Assessment Services (EQAS).
Review the membership and terms of reference (ToR) of the National IPC Committee.	Completed
Review and update the national IPC policy and guidelines for IPC in health care facilities and communities.	Completed
Identify and empower dedicated personnel for the implementation of IPC policy and guidelines in healthcare facilities and communities.	Staff has been trained; dedicated staff present in all hospitals; Regional IPC Committees meet in all hospitals except at Victoria Hospital

Run campaigns on hygiene, hand washing and food security.	Several campaigns on hand washing / food security have been carried out in the context of COVID-19 and outbreaks of gastroenteritis
Progressively implement surveillance of hospital-acquired infections in all hospitals.	Done in 2018 for 4 hospital-acquired infections at Dr A. G. Jeetoo Hospital. Also done for ventilator-associated pneumonia in 2021 and for central line associated bloodstream infections in 2022 nationwide. Due to start surveys on surgical site infections and catheter-associated urinary tract infections with help from the WHO Country Office.

Table 5

AMR Governance and Coordination Mechanisms

A steering committee was expected to monitor the first national action plan on AMR, but this did not materialize. Mauritius does not have an AMR Coordinating Center, an AMR Unit or a National AMR Reference Laboratory and antimicrobial stewardship teams have not been set up in its hospitals yet.

However, the One Health Steering Committee for AMR and Zoonosis met for the first time in mid-2023 and it is expected to oversee the implementation of activities of the second action plan on AMR.

Moreover, the National IPC Committee was recently formed in 2021 and it meets every three to four months. A Regional IPC Committee meets every two to three months in most regional hospitals. An IPC team is responsible for IPC activities in each region.

Multisectoral collaboration with all partners is a necessary pre-requisite for success. Improved governance and coordination at the level of the LVD will help with gathering resources to build its capacity to calculate the Population Correction Unit for different types of antimicrobials used for each species of animals, to trace the quantity of antimicrobials imported, and the quantity of antimicrobials used in each category such as livestock, game animals, pets and competition animals and to carry out the monitoring of residues for priority antimicrobials.

AMR Awareness & Knowledge

The National IPC Guidelines were approved and disseminated at the end of 2021 while SOPs on IPC were finalized and disseminated in 2022. Regular assessments are carried out by IPC teams of the regional hospitals and dispensaries. About 7,500 hospital staff were trained in IPC from mid-2021 till March 2023. The following two figures compare the scores of Mauritius in IPC from 2021 and 2022 – they show a significant improvement from 50% to 76% within a period of 12 months.

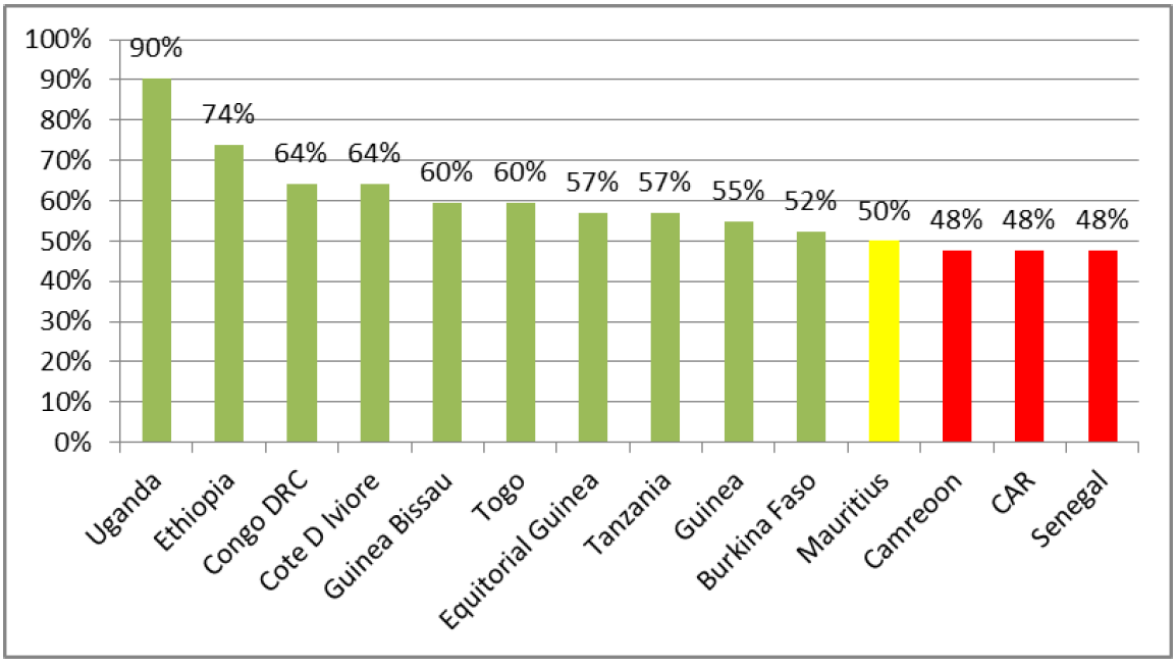


Figure 4: IPC performance of Mauritius based on WHO scorecard in March 2021 compared to other African countries.

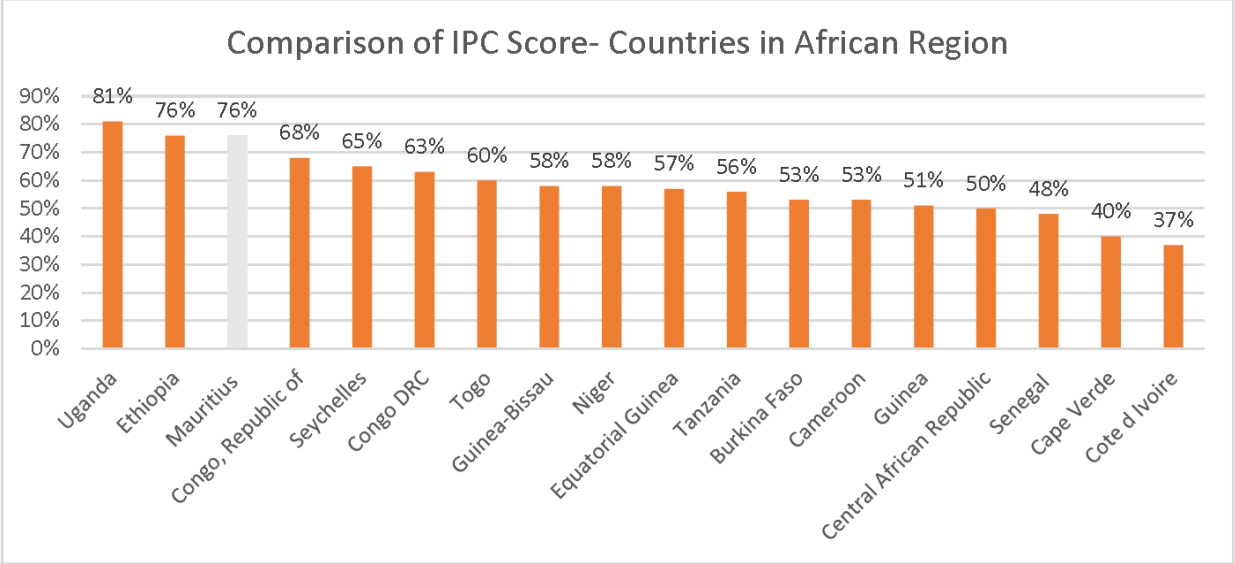


Figure 5: IPC performance of Mauritius based on WHO scorecard in July 2022 compared to other African countries.

Since 2021, the national IPC focal point has provided several Continuous Medical Education (CME) courses on AMR. Through reports, meetings, workshops and training sessions, information on AMR, antibiograms and resistance rates are regularly disseminated. More doctors and nurses appear to be aware about the threat of AMR compared to the period before 2021. In addition, several healthcare workers are participating in a course on IPC and antimicrobial stewardship (AMS) that is being delivered by the Mauritius Institute of Health (MIH) in collaboration with the University of Bordeaux, France.

The population has been sensitized regarding the importance of vaccination and campaigns have been carried out for various vaccines. However, more work is required in order to improve the vaccination rate.

For instance, among children in 2021, the immunization coverage rate for the BCG vaccine was 81.8% (which represents a decrease from 86.8% in 2017) and for MMR was 58.8% (which is a decrease from 81% in 2017). The number of influenza vaccines administered in 2017 was 130,000 and this dropped to 118,001 in 2021. Notably, all healthcare workers have been vaccinated against COVID-19 except those with contraindications.

Training in biosafety was carried out in collaboration with the Indian Ocean Commission (IOC) in mid-2022. Moreover, a biosafety officer has been identified for the tuberculosis laboratory and he handles lab biosafety operations from time to time.

The LVD conducted a training program for livestock breeders which included AMR in the year 2016. In 2021, a sensitization and awareness workshop was also carried out during the World Antibiotic Awareness Week.

Surveillance, Laboratory and Diagnostic Capacity

Mauritius submitted its 2020 and 2021 data to the Global Antimicrobial Resistance and Use Surveillance System (GLASS) in 2021 and 2022 respectively. A "GLASS Report for the Years 2020 and 2021 for Mauritius" was written by the national IPC focal point. The conclusions of the report were as follows: "infection prevention and control measures and principles of antimicrobial stewardship should be implemented in the country", "when more human resources are available, additional data from Rodrigues and the private sector should be collected", and "data validation is required to ensure that an accurate picture is depicted".

The human labs at Candos and Jeetoo are able to (a) process samples for bacteriological examination including GLASS organisms / antibiotics, (b) carry out annual comprehensive surveillance of AMR in *S. pneumoniae, H. influenzae, Salmonella spp., Campylobacter spp.* and *Neisseria gonorrhoeae*, (c) conduct periodic surveillance (for one selected month every two to three years) of AMR in *S. aureus, E. coli, Klebsiella spp., Pseudomonas aeruginosa, Acinetobacter spp., Enterococcus spp.* from all sites in hospitalized patients, and in *Enterobacterales* from urine from all patients and (d) the national IPC focal point does surveillance of high-priority multi-drug resistant organisms (MDRO) in ICUs of the country.

CHL presents data in CMEs and provides data to MOHW when required e.g., for action plans, for submission to regional or international organisations, for workshops and for speeches. The national IPC focal point produces regular reports on multi-drug resistant organisms in various hospitals. The data is used for guiding empirical treatment and for triggering and monitoring IPC measures.

Two labs in MOHW (for the Island of Mauritius) and one in Rodrigues conduct microbiological tests. AST is done consistently on significant isolates. There are no stock outs of reagents in the public sector. Tests are free of charge. However, the lab's human resources are limited i.e., even though there is sufficient staff for antimicrobial susceptibility tests (AST) by disc diffusion, there isn't enough staff for more time-consuming tests such as genotypic tests. The labs have excellent performance in the NICD/WHO AFRO EQAS, scoring 99-100% regularly.

Five to ten private labs perform AST in Mauritius. Stock-outs of a few antibiotics may occur temporarily. Clinicians in the private sector use the private labs' diagnostic capacity most of the time, even though

patients pay for the tests. However, the quality of the tests is variable. At least one private laboratory participates in the UK microbiology NEQAS/Proficiency Testing.

There are other laboratory surveillance programs such as those for HIV, malaria, influenza, salmonellosis, bacterial meningitis and cancer cases, as well as the surveillance of COVID-19 cases. The number of hospital and health centres attendances for respiratory tract and gastrointestinal infections are also recorded. Each surveillance program has its specificities and no linkage with AMR surveillance is being considered.

There is currently no donor-funded activity to build AMR surveillance capacity. There are a few small projects funded by IOC to study the genetic mechanisms of resistance in specific organisms.

It should be noted that there is an acute shortage of laboratory staff with no dedicated staff for surveillance. The laboratory is not computerized although the introduction of LIMS in the Bacteriology Department is in preparation and expected to be in use within the next 2 years. The bacteriology laboratory is well-equipped, but repairs can be challenging with parts having to be ordered from abroad and with limited local biomedical technical capacity.

Of note, laboratory capacity has improved with support from the Food and Agriculture Organization (FAO) and IOC for AST (disc diffusion tests). However, due to budget constraints, reagents (antibiotic discs) cannot be purchased for regular AMR surveillance of certain organisms.

Access and Optimal Use of Antimicrobials

Human health

Antimicrobials are freely available in the public sector although disruptions in supplies are frequent and can affect the management of patients. The number of commercial drug stores and pharmacies in the public sector are:

- Hospitals (Regional/District/Specialized): 14
- Mediclinics: 7
- Area Health Centres: 20
- Community Health Centres: 114

Those in the private sector are as follows:

- Number of Pharmaceutical wholesalers: 47
- Number of Retail Pharmacies: 402
- Number of Private Clinics: 18

In the Republic of Mauritius, the sale of antimicrobials is allowed only after the presentation of a duly signed prescription by a healthcare provider although enforcement of this practice is variable.

The following table lists the antibiotics whose quality were tested by the Government Analyst Division (GAD) in 2022 till the start of 2023.

S. No	Antimicrobial compound	Brand	Compliant
1	Amoxycillin capsules B.P 500mg	Amoxy 500 kopran	YES
2	Cloxacillin Sodium Oral Suspension	Klox	YES
3	Cotrimoxazole Tablets BP 960mg, Trimethroprim 160 mg and Sulfamethoxazole 800mg	Macleods Pharmaceuticals	YES
4	Cotrimoxazole tablets BP 960mg	Cotrimoxazole tablets BP 960mg Macleods	YES
5	Moxacil 500mg Capsules amoxicillin	Moxacil	YES

Table 6

While data on antibiotic consumption and use has been gathered through various surveys (some of which have been published), such data remains inadequate, and surveillance should be more frequent.

Animal health

Data on antimicrobial use can be collected from the Open Data Kit-MOAIFS. All ambulatory cases attended by field veterinarians are captured onto this software and data can be retrieved annually. The following pie chart shows the percentage of cases according to pathologies recorded in 2022. Digestive system pathologies are the ones that require the use of antimicrobials, and the majority of cases are related to digestive system.

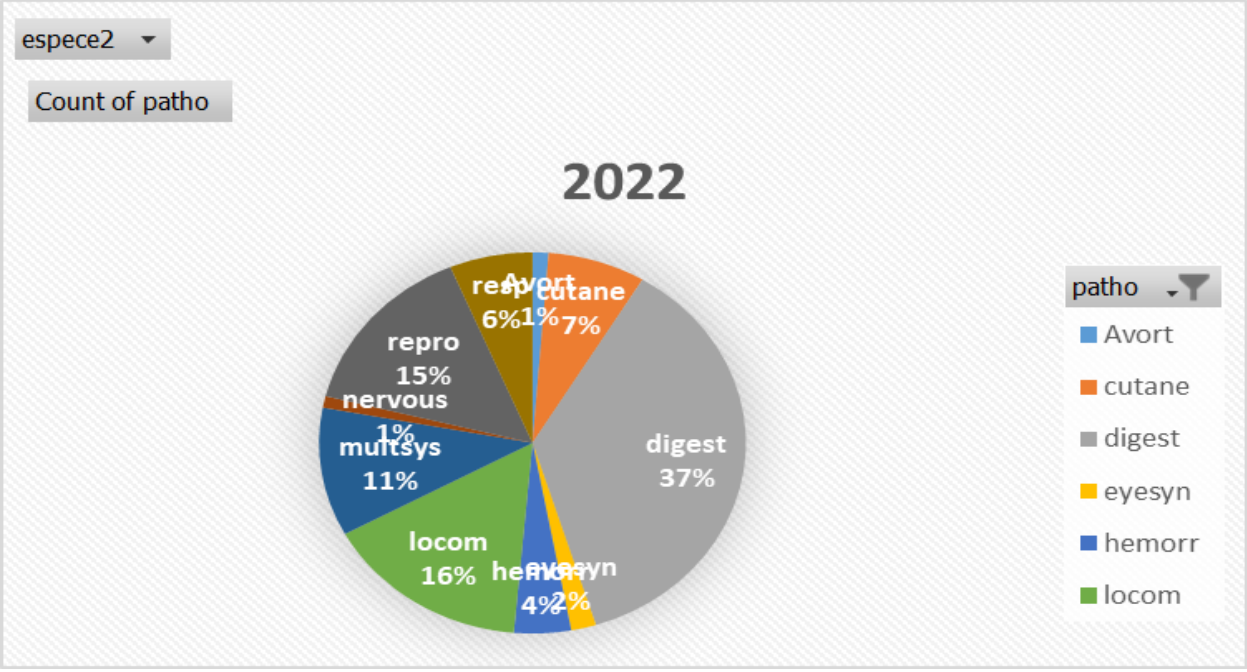


Figure 6: For the year 2022 - number of cases reported at the LVD = 2,498.

The list of antimicrobials used in the public sector are:

1. Oxytetracycline 50%
2. Trisulmycine
3. Tetracolivit
4. Colisol 20%
5. Amprolium 20%
6. Vetospray
7. Duplocillin
8. Gentamicin
9. Oxydone forte 20%
10. Draxxin
11. Penstrep
12. Kanapen
13. Cloxaben
14. Marbocyl

The list of antimicrobials used in the private sector are:

1. Marbofloxacin
2. Amoxicillin
3. Sulphamethoxazole/Trimethoprim
4. Doxycycline
5. Tylosin
6. Metronidazole
7. Azithromycin
8. Enrofloxacin
9. Gentamicin
10. Oxytetracycline
11. Ceftiofur
12. Toltrazuril

Legal framework

No regulations are presently available to regulate the use of antimicrobials in humans, livestock production and wildlife. However, the Pharmacy Act does require that antibiotic prescriptions be signed by a registered practitioner.

Animal health

Noteworthy laws that concern the management of animals in Mauritius include:

- THE ANIMAL DISEASES ACT 1925
- THE ANIMAL WELFARE ACT 2013
- VETERINARY COUNCIL ACT 2020
- MAURITIUS VETERINARY ASSOCIATION ACT, No 7 of 1974
- ARTIFICIAL INSEMINATION OF ANIMALS (CONTROL) ACT
- THE ANIMAL FEED CONTROL ACT 1977
- ANIMAL (POULTRY) FEED CONTROL REGULATIONS 1978

It is expected that the new Animal Health, Veterinary Public Health and Livestock Production Bill will help to reinforce good husbandry practices once it is enacted. For example, it prevents the use of antimicrobials as growth promoters.

Environmental health

The main institutions responsible for the supply of clean water, sanitation aspects as well as public hygiene in the Republic of Mauritius are as follows:

- The Water Resources Unit for the collection and storage of raw water;
- The Central Water Authority for the treatment and distribution of potable water;
- The Wastewater Management Authority for the collection, treatment and disposal of wastewater;
- The Ministry of Health & Wellness for ensuring proper sanitation and independent monitoring of drinking water quality, and public hygiene; and
- The Ministry of Environment for the general protection of the environment.

In order to ease the implementation of measures regarding clean water and sanitation, the Republic of Mauritius has the necessary legislations to support the above institutional framework. The relevant legislations are namely:

- The Environmental Protection Act (including the Drinking Water Quality Standards),
- The Public Health Act,
- The Food Act / Food Regulations,
- The Rivers & Canals Act,

- The Central Water Authority Act,
- The Wastewater Management Authority Act, and
- The Local Government Act.

Healthcare waste includes all the waste generated by medical activities. It embraces activities of diagnosis as well as preventive, curative and palliative treatments in the field of human and veterinary medicine. In other words, all the waste produced by a medical institution, a medical research facility or a laboratory is considered healthcare waste.

In Mauritius, as per Government Notice No157 of 2001, 1st Schedule, Regulation 2:

- Human or animal healthcare and research related to such healthcare, and
- Waste from diagnosis, treatment or prevention of disease and natal care,

are categorized as hazardous waste.

Accordingly, the enforcing agency under the Environment Protection Act (EPA) in relation to solid waste and hazardous wastes (including healthcare waste) is the Ministry of Local Government.

At present, the Ministry of Local Government, being the enforcing agency for hazardous waste, has as at to date, not yet come up with a comprehensive legislative control system for the management and disposal of healthcare waste in Mauritius.

However, waste management, including management of disposal sites such as Mare Chicose and La Chaumière where there are hazardous cells, has always been under the responsibility of the Solid Waste Division (SWD). The SWD is now under the aegis of the Ministry of Environment, SWM & CC.

In the absence of a comprehensive legislative control system for the management of healthcare waste, the Ministry of Health and Wellness has the responsibility to dispose of its waste (i.e., medical waste at the level of public health institutions) as per best practice available in order to minimize health risk.

Incineration of some healthcare waste generated by public health institutions is undertaken in incinerators located within hospitals' premises. However, to better protect the environment, we should consider other means of disposal of biohazardous waste e.g., on-site waste treatment systems that can sterilize or process medical waste within the hospital premises. These systems may use various technologies, including steam sterilization, to render the waste safe for disposal.

The healthcare waste (HCW) that is generated follows a well-identified stream from its point of generation until its final disposal and treatment.

Segregation is one of the most important steps to successfully manage HCW. Given the fact that only a percentage of the HCW is hazardous, treatment and disposal costs are greatly reduced if proper segregation is performed. Segregating hazardous from nonhazardous waste also reduces the risks of infecting workers handling HCW.

A color-coding system is in place which aims at ensuring an immediate and non-equivocal identification of the hazards associated with the type of HCW that is handled or treated.

Type of waste	Color of container and markings	Type of container
Highly infectious waste	Yellow, marked 'highly infectious'	Strong, leak-proof plastic bag or container
Other infectious waste, pathological and anatomical waste	Yellow	Leak-proof plastic bag or container
Sharps	Yellow, marked 'sharps'	Puncture proof container
Radioactive waste	–	Lead box, labeled with the radioactive symbol
General health care waste	Black	Plastic bag

Table 7: Chemical waste may be kept in brown bags. Pharmaceutical waste is discarded in yellow bags at MOHW.

Indicators of performance on AMR

Mauritius has not been using national indicators to monitor progress in AMR regularly – such indicators have only been recently approved by MOHW in 2023. The next figure illustrates Mauritius's performance on the internationally used TrACSS indicator.

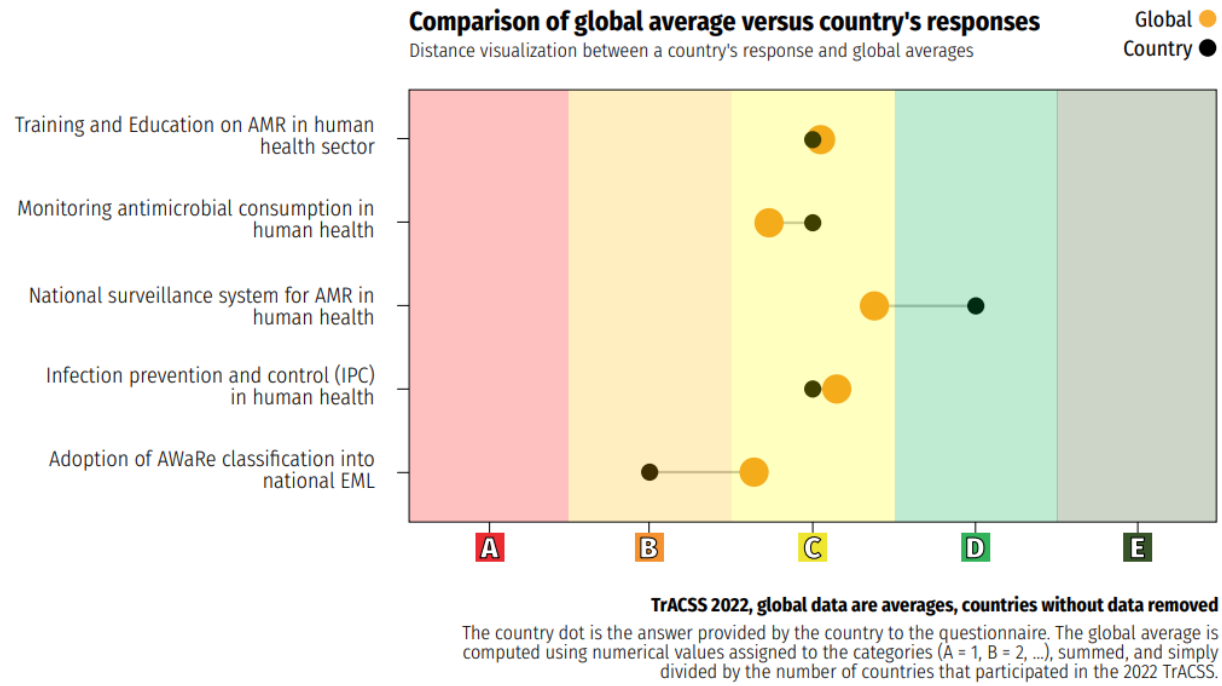


Figure 7

Based on TrACS 2022, the performance in IPC in human health is slightly lower than the global average, mostly due to weaknesses in the animal, plant and environmental sectors, while the surveillance of AMR and antimicrobial consumption (AMC) is now above the global average.

Mauritius has improved from stage B in 2018 (i.e., limited capacity) to stage C in 2022 (i.e., developed ability).

Research, investment, and development

While Mauritian epidemiological surveillance data are published at times by local experts, proper research and development is not routinely carried out in the country. In the veterinary sector, if funds are needed for such activities, support is usually received from international funding institutions such as the IOC, FAO, WOAH and IAEA.

Island of Rodrigues

Rodrigues has a population 44,421 and faces a high burden of non-communicable diseases like cardiovascular diseases (37.7%), cancer (16.7%) and diabetes (12.7%) (Health Statistics, 2021). Its healthcare infrastructure consists of one main hospital (Queen Elizabeth Hospital), two Area Health Centers and 12 Community Health Centers. It has 1 doctor per 1,587 inhabitants, 1 dentist per 22,214 inhabitants and 1 Nurse/midwife per 190 inhabitants.

Surveillance of multi-drug resistant organisms is done on an ad hoc basis with the last survey in 2022 showing a prevalence of 6% and an incidence rate of 1.1 per 100 beds per month (for high priority multi-drug resistant organisms).

Rodrigues has made significant progress in terms of implementation of IPC in its healthcare facilities recently. For instance, a Regional IPC Committee (RIC) has been set up and training on IPC is an ongoing process. Nevertheless, multiple challenges are faced due to a lack of coordination and human resources. To better prepare Rodrigues to confront the health risks associated with multi-drug resistant organisms, a One Health platform needs to be developed, the RIC should be reinforced, and the governance mechanism for AMR has to be strengthened.

AMR Situation in Mauritius: Strengths, Weaknesses, Opportunities and Threats (SWOT) Analysis

Table x: Human health and food security analysis

Strengths	Weaknesses
Awareness and education • Awareness is present among prescribers regarding the indications for antibiotic use • Clinical guidelines on treatment of common infections were written and approved in 2021 • CMEs and CNEs on AMR have been conducted **Surveillance** • Comprehensive surveillance of *Salmonella spp, Shigella spp, Campylobacter spp, N. gonorrhoea, S pneumoniae* and *Haemophilus influenzae.* • Periodic surveillance of *E. coli, P. aeruginosa* and *S. aureus* is conducted every 2-3 years for a duration of one month. • Ad hoc data collector for GLASS is available since 2021 • CHL is equipped with MALDI-TOF for identification of bacterial species • Laboratory is equipped with an automated identification and antibiotic susceptibility testing (AST) system – Walkaway • NOHARM surveillance of AMR in ICUs of the country is on-going • Laboratories implement internal quality control using ATCC strains and have scored 100% on external quality assurance conducted by WHO/NICD. • CHL has qualified technical staff • GAD is ISO certified 17025 **IPC (Infection prevention and control)** • Guidelines / SOPs available • NIC / RIC / ICT functional • Training on IPC conducted • Dedicated staff for IPC available in most hospitals • Good vaccination coverage **Optimal use of antimicrobials** • Import of therapeutic substances, including antibiotics is regulated for human health • AMC data analyzed in an ad hoc manner in the public sector **Research, investment, and development**	**Awareness and education** • Poor awareness among public about AMR • Insufficient knowledge among prescribers • Insufficient media coverage of AMR to public **Surveillance** • Staff not trained to do genotyping of AMR at CHL • Staff not trained to do antibiotic residues in food samples at GAD • Manual recording of surveillance results with associated data extraction and analysis represents a challenge • Bacteriology department of CHL is not ISO-accredited • Lack of data sharing on AMR between different sectors • Lack of data from private sector on AMR **IPC (Infection prevention and control)** • Poor understanding and compliance with existing guidelines • Lack of information about the implementation of IPC in private • Licensing of private clinics does not require IPC assessment • Inadequate segregation of clinical waste at the level of hospitals. **Optimal use of antimicrobials** • No antimicrobial stewardship team or unit present • Unregistered antibiotics is occasionally found on the private market • Lack of AMU / AMC data from the private sector • Lack of accountability when antibiotics are misused • Non-availability of certain antibiotics in WHO EML (e.g., nitrofurantoin and ceftazidime-avibactam) • Lack of quality control of antibiotics available in private and public sector **Research, investment, and development** • Minimal epidemiological, clinical or basic science research on AMR

• Surveillance on AMR being carried out periodically	• Lack of staff trained/ interested in research
Opportunities	**Threats**
Awareness and education • CPD for nursing is now part of Nursing Council Act • One Health Committee is established • There is strong political leadership commitment **Surveillance** • New food regulations will include standard on antibiotic residues on food • Central Health Laboratory may be designated as the National Reference Laboratory for AMR. • LIMS under development **IPC** • Diploma in IPC ongoing • Implementing IPC training as part of PMS **Optimal use of antimicrobials** • Concentration of active ingredient of some increasing number of antibiotics will be tested by GAD • Electronic Medication Management system will be put in place **Research, investment, and development** • CAP Research and EDB interested to help with research in Mauritius • Mauritius Research and Innovation Council and local universities can help with research activities • Funds are available from external organizations to conduct research e.g, IOC and Africa CDC	**Awareness and education** • Pressure on doctors by patients to prescribe antibiotics • Pressure on pharmacists by patients to dispense antibiotics **Surveillance** • Shortage of trained staff on the job market to be employed in CHL / GAD • Only one microbiologist is available in CHL **IPC** • Frequent shortage of equipment & disinfectants • Lengthy procurement & administrative procedures **Optimal use of antimicrobials** • Recording of inventory of antimicrobials not optimal • Stock out of antibiotics does occur • Weak regulatory system for antibiotic dispensing **Research, investment, and development** • Research not considered as a priority by authorities

Table 2: Animal health analysis of the strengths, weaknesses, opportunities, and threats on AMR

Strengths	Weaknesses
Awareness and education • Relatively good awareness amongst veterinary officers of AMR • Existing policy to carry out awareness workshops on AMR **Surveillance** • Laboratory capacity to carry out ABST is available • Awareness about ABST is high **IPC (Infection prevention and control)** • Animal Disease Act (1925) under mandate of LVD helps to better control diseases **Optimal use of antimicrobials** • Import of therapeutic substances including antimicrobials requires a permit and mandatory approval from the Ministry of Health and Wellness (MOHW).	**Awareness and education** • Lack of awareness amongst the public at large about AMR • Lack of funding to carry out yearly workshops on AMR **Surveillance** • Lack of logistic facilities like transport facility • No antimicrobial residue monitoring • Lack of designated laboratory for aquatic health to do surveillance • Inadequate funding for regular surveillance **IPC (Infection prevention and control)** • Animal Disease Act (1925) needs to be updated • Animal Health, VPH & Livestock Production Bill is only a draft. **Optimal use of antimicrobials** • Lack of human resources for the monitoring and analysis of data on the use of antimicrobials • Inadequate AMC and AMU surveillance data **Research, investment, and development** • No R&D on AMR
Opportunities	**Threats**
Awareness and education • Financial and technical support from international institutions e.g., IOC, SADC, CABI, EU funded products, AU-IBAR, WOAH, FAO, UNDP, and IAEA, are available. **Surveillance** • Improvement on existing facilities is possible **IPC** • Awareness of alternate methods of disease control such as vaccination, use of pro-biotics, and reducing infection, for example via a mastitis control programme and ensuring lack of bacterial contamination in feed. **Optimal use of antimicrobials** • Availability of guidelines **Research, investment, and development** • Commitment of international organization in supporting R&D for combating antimicrobial resistance including WHO, FAO, OIE, Africa Centres for Disease Prevention and Control (CDC)	**Awareness and education** • Emerging and reemerging diseases • Malicious and intentional use of antimicrobials for money-driven businesses **Surveillance** • The burden of disease can be increased by the introduction of new diseases **IPC (Infection prevention and control)** • The AHVPHLP bill has not been enacted • Political commitment may be insufficient **Optimal use of antimicrobials** • Priority shifts to disease diagnosis in case of new outbreaks

Table x: Environmental health analysis of the strengths, weaknesses, opportunities, and threats on AMR

Strengths	Weaknesses
• The National Environmental Laboratory (NEL) and the Wastewater Management Authority Laboratory are already undertaking the monitoring of river water quality and treated wastewater quality respectively. • Environmental monitoring is carried out 4 times per year by the NEL and includes boreholes (groundwater), rivers (surface water) & leachate monitoring at Mare Chicose. • Ongoing pesticide residues analysis.	• Lack of resources, expertise, logistics as well as necessary legal framework, AST and antibiotic residue testing is not undertaken. • Lack of awareness among environmental professionals • Absence of legal frameworks, regulations, and legislations with respect to AMR in the environment • Inadequate treatment facilities for solid and liquid wastes and other waste disposals • Lack of inclusion of AMR in local standards like EPA, effluent discharge, etc. • Lack of education on the responsible use of antimicrobials in the environment including its impact • Lack of data on AMR in the environment • Limited resource for AMR detection, monitoring and disposal in the environment • Limited capacity of environment professionals on AMR • Inadequate segregation of wastes • Lack of AMR-related research conducted in the Environment sector
Opportunities	**Threats**
• Collaboration of Government / Parastatal laboratories to carry out AST and Antibiotic Residue Testing • In the long term, to determine the efficacy of our water and wastewater treatment technologies at removing antibiotic residues and antimicrobial compounds, and the use of these information for the recommendations of more advance treatment technologies • Availability of awareness campaigns and education at all levels. • Availability of new technologies	• Spread of AMR is beyond our control • Effect of climate change on AMR • Environment is complex ecosystem

AMR STAKEHOLDERS MAPPING AND ANALYSIS

Sector	Stakeholders	Area of engagement	Level of engagement	Level of influence
Human Health	Cabinet	Governance & coordination	Low	High
	SCE + DGHS + DHS + RHDs	Governance & coordination	Low	High
	One Health Steering Committee	Governance & coordination	High	High
	Focal person – AMR	All strategic objectives	High	Low
	Microbiology laboratory	Surveillance	High	Low
	Pharmacy board	Governance & coordination	High	High
	Pharmacovigilance	Surveillance, Access & optimizing use of AM	High	Low
	Prescribers, Pharmacists, Nurses, End users, Suppliers	Access and optimizing use of antimicrobials Awareness & Education	High	Low
	COI, WHO, FAO, AFRICA CDC, other partners	Governance & coordination	High	High
	Media	Awareness & Education	Low	High
	Academia	Research & development	High	Low
	Medical associations	Awareness & Education	Low	High
	Management of private clinics	Governance & coordination	Low	High
	National IPC committee	IPC WASH & Sanitation	High	High
Sector	**Stakeholders**	**Area of engagement**	**Level of engagement**	**Level of influence**
Animal health	MOAIFS (regulatory body)	Governance & Coordination, AMR awareness & Education	High	High
	Policy makers	Governance & Coordination	Low	High
	LVD	AMR awareness & Education, Surveillance and diagnostic capacity, Access and Optimizing use of antimicrobials	High	High
	APD	AMR awareness & Education	High	High
	FAREI	AMR awareness & Education	High	High
	Academia	AMR awareness & Education, research, and development	High	Low
	Media	AMR awareness & Education	Low	High
	METEST	AMR awareness & Education	Low	High

	NGO's and Civil society	AMR awareness & Education	High	Low
	MOAIFS (regulatory body)	Surveillance and diagnostic capacity	High	High
	Vets (Public and Private)	AMR awareness & Education, Surveillance and diagnostic capacity	High	High
	Pharmacy Board	Optimizing use of antimicrobials	High	High
	Suppliers, Importers	Optimizing use of antimicrobials	High	Low
	Veterinarians	AMR awareness & Education, Optimizing use of antimicrobials	High	High
	Feed Companies	Optimizing use of antimicrobials	Low	Low
	Chemist/Pharmacies	Optimizing use of antimicrobials	Low	Low
Sector	**Stakeholders**	**Area of engagement**	**Level of engagement**	**Level of influence**
Environment	MEPU • CWA • WRU • WMA	Surveillance, Governance & Coordination	High	Low
	MOHW • Environmental Health and Engineering Unit	Surveillance (Monitoring of potable water)	High	Low
	MOESWCC • NEL • Policy and planning division • Environmental law and prosecution Division • Information and education Division • Pollution and prevention Division • Police of Environment • Solid waste management division	Surveillance (Monitoring of river water quality) Governance and coordination AMR awareness & Education	High	High
	International organizations and development partners • United Nations Environment Program	Surveillance and research	High	Low

STRATEGIC FRAMEWORK

Vision

To protect human, animal and environment from the consequences of antimicrobial resistance in Mauritius.

Mission

To effectively contain antimicrobial resistance while ensuring the availability of effective and safe antimicrobials that are quality assured, used in a responsible way, and accessible to all who need them.

Goal

The overarching goal of the AMR national action plan for Mauritius is to "ensure the continuity of successful evidence-based treatment and prevention of infectious diseases with effective, safe and rational use of medicines".

The goal will be achieved through the six strategic objectives outlined below, which align with the global action plan on antimicrobial resistance. The plan further defines the strategic interventions and activities linked to each of the six strategic objectives.

Strategic objectives

- **Strategic objective 1:** Strengthen governance, coordination, and collaboration for AMR NAP implementation.
- **Strategic Objective 2:** Improve awareness and understanding of antimicrobial resistance through effective communication, education, and training.
- **Strategic Objective 3:** Enhance AMR surveillance and diagnostic capacity in humans and animals.
- **Strategic Objective 4:** Reduce the incidence of infection through effective sanitation, hygiene, and infection prevention measures.
- **Strategic Objective 5:** Improve access and optimizing use of antimicrobials agents in humans, animals, and plant health.
- **Strategic Objective 6:** Strengthen research, development, and sustainable investment in antimicrobial resistance.

Guiding principles

The Mauritius AMR National action plan reflects the following principles outlined in WHO's Global Action Plan on AMR.

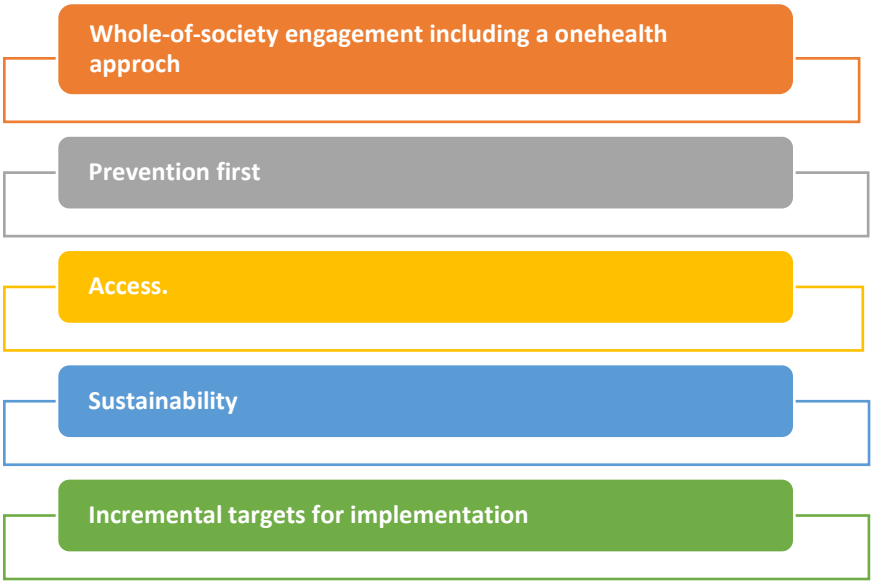


Figure 8

The following guiding principles have informed the drafting of this action plan which is tailored to the unique context of Mauritius:

1. Multisectoral collaboration.
2. One Health approach.
3. Data-driven and evidence-based decision-making.
4. Health system strengthening and safeguarding public health.

GOVERNANCE AND COORDINATION

Effective multisectoral coordination and collaboration require a robust governance structure across sectors for sustainable implementation of the AMR national action plan. Other than a stand-alone One Health Steering Committee on AMR and Zoonosis, such a framework currently does not exist. Hence, it is proposed that the future AMR governance mechanism comprises of a National AMR Technical Working Group, an AMR Secretariat led by the National AMR Focal Person and three sub-technical working groups (representing human health, agriculture/animal health and environment) to address the strategic objectives of the national action plan. Once established, coordination of the implementation of the AMR national action plan shall be the responsibility of the national AMR TWG under the One Health Committee which shall be duly mandated, authorized, funded, and empowered in decision-making by the relevant Ministries and constituencies as appropriate.

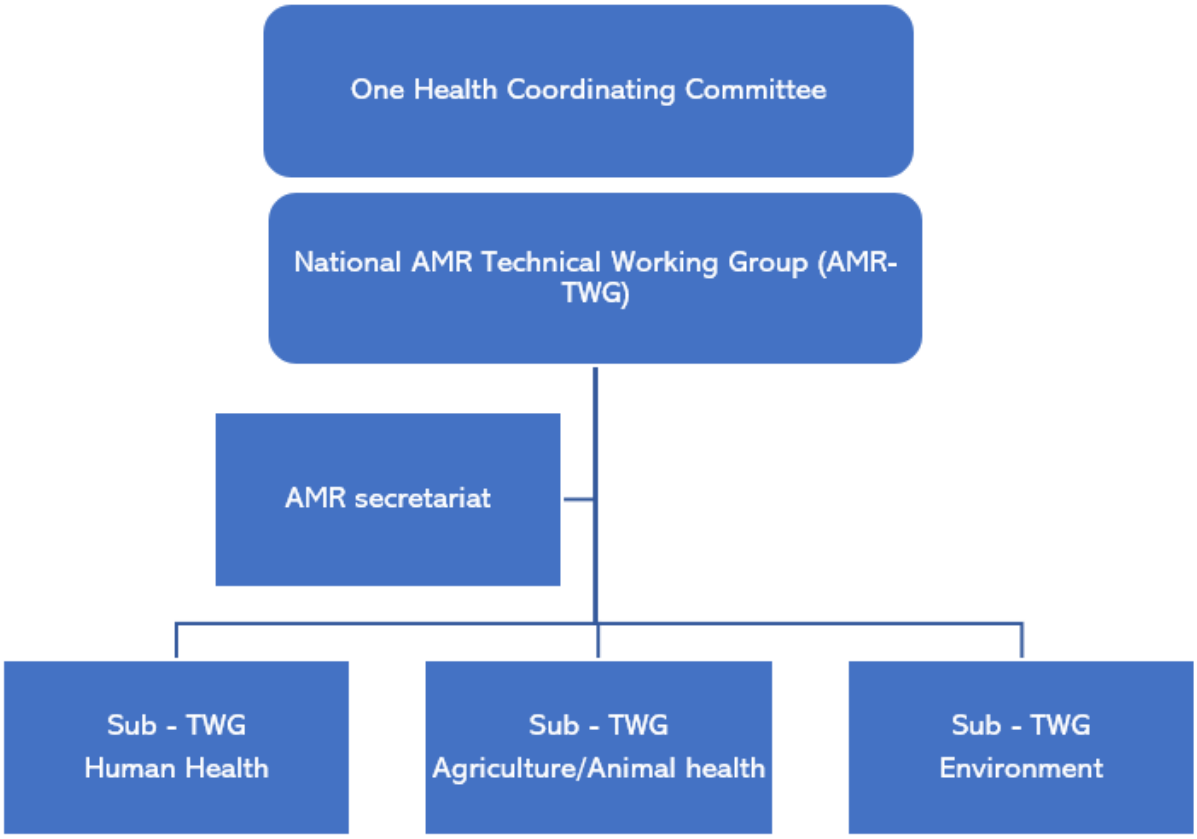


Figure 9: Proposed governance mechanism for AMR in Mauritius.

STRATEGIC PLAN

The overarching goal of the AMR national action plan for Mauritius is to ensure the continuity of successful evidence-based treatment and prevention of infectious diseases with effective, safe, and rational use of medicines. To achieve this goal strategic objectives and interventions have been defined, which align with the global action plan on antimicrobial resistance.

Strategic objectives	Strategic interventions
1. Strengthen governance, coordination, and collaboration for AMR NAP implementation	1.1 Establish and strengthen multisectoral AMR Technical Working Group (AMR-TWG) 1.2 Monitor and evaluate AMR NAP implementation 1.3 Strengthen leadership capacity to ensure effective functioning of the AMR Technical Working Group
2. Improve awareness and understanding of antimicrobial resistance through effective communication, education, and training.	2.1 Establish an evidence-based public communications on AMR targeting human health, animal health and environment sector. 2.2 Advocate for AMR and conduct campaigns

	2.3 Strengthen education and training on antimicrobial resistance of human, animal, plant, and environmental health professionals 2.4 Incorporate AMR as a component of Continuing Professional Development (CPD)
3. Enhance AMR surveillance and diagnostic capacity in human and animal.	3.1 Support surveillance of AMR capacity 3.2 Strengthen laboratory capacity in both human, animal, and environmental sector 3.3 Establish AMU/AMC Surveillance system in human and animal sector 3.4 Strengthen Surveillance for Antimicrobial Drug Residues in Foods
4. Reduce the incidence of infection through effective sanitation, hygiene, and infection prevention measures.	4.1 Strengthen infection prevention and Control (IPC) program in health care settings. 4.2 Prevent and monitor health care-associated infections at human and veterinary health facilities 4.3 Strengthen waste management systems in the health, agriculture, and environment sectors 4.4 Strengthen good husbandry practices and biosecurity interventions in animal, plant, and fishery sectors. 4.5 Strengthen vaccination campaigns to enhance prevention and control of diseases and infections in human and animal health.
5. Improve access and optimizing use of antimicrobials agents in humans, animals, and plant health.	5.1 Develop legislation on prescription and sale of antimicrobials 5.2 Strengthen the supply chain management system to ensure the availability of quality antimicrobials. 5.3 Implement Antimicrobial Stewardship program in health facilities and animal health to promote prudent use of antimicrobials. 5.4 Conduct Knowledge, Attitude and Practices (KAP) studies and other surveys on optimizing the use of antimicrobials
6. Strengthen research, development, and sustainable investment in antimicrobial resistance	6.1 Enhance research and innovation 6.2 Resource mobilization

OPERATIONAL PLAN

Activity	Unit	Quantity	Lead implementer	Collaborators	Indicator	Timeframe					Comments
						YR 1	YR 2	YR 3	YR 4	YR 5	
Strategic objective 1: Strengthen governance, coordination, and collaboration for AMR NAP implementation											
Strategic intervention 1.1. Establish and strengthen multisectoral AMR Technical Working Group (AMR-TWG)											
Activity 1.1.1. Define membership and approve TOR for the AMR Technical Working Group (AMR-TWG) with dedicated secretariat.	TOR	1	MOHW	MOESWCC, MOAIFS, Medical Council, PMPA, PAM, Vet Assoc	Approved TOR	X					
Activity 1.1.2. Organize quarterly AMR Technical Working Group (AMR-TWG) meetings to review AMR NAP implementation across sectors.	Meetings	12 (3/Year)	MOHW	AMR TWG	Meeting report		X	X	X	X	
Activity 1.1.3: Ensure the AMR secretariat has an office and all necessary equipment to carry out its activities	Office / equipment	5	MOHW	AMR TWG	Items available		X				Include 1 printer, internet and 2 computers
Strategic intervention 1.2. Monitor and evaluate AMR NAP implementation											
Activity 1.2.1. Conduct annual review of the AMR NAP implementation.	Reviews	4	AMR TWG	WHO, FAO, WOAH, COI	Review Report		X	X	X	X	
Activity 1.2.2. Conduct evaluation of AMR NAP implementation by external organizations	Evaluation	2	FAO, WHO, WOAH, COI	AMR TWG	Evaluation Report			X		X	
Strategic intervention 1.3. Strengthen leadership capacity to ensure effective functioning of the AMR Technical Working Group											
Activity 1.3.1. Organize AMR multisectoral coordination and leadership skills training for AMR Technical Working Group (AMR-TWG) members.	Training sessions	2	WHO	FAO, WOAH, COI	% of trained members in each sector	X		X			
Activity 1.3.2. Organize regional neighboring countries experience sharing platforms on best practices in the prevention and containment of AMR.	Workshop or meeting	1	AMR TWG	WHO, SADC, COI	Report			X			

Activity	Unit	Quantity	Lead implementer	Collaborators	Indicator	Timeframe					Comments
						YR 1	YR 2	YR 3	YR 4	YR 5	
Strategic Objective 2: Improve awareness and understanding of antimicrobial resistance through effective communication, education, and training.											
Strategic intervention 2.1. Establish an evidence-based public communications on AMR targeting human health, animal health and environment sector.											
Activity 2.1.1. Conduct KAP study on AMR awareness among professionals in human health and animal health.	Survey	2	One Health platform	AMR TWG	Reports and publications		X			X	1 for each sector
Activity 2.1.2 Conduct and disseminate KAP study on AMR awareness among the general public /stakeholders	Survey	1	One Health	AMR TWG	Report and publication			X			
Activity 2.1.3. Develop and disseminate national communication strategy for AMR.	Report	2	One Health	AMR TWG	Endorsed strategy				X		Disseminate survey results
Strategic intervention 2.2. Advocate for AMR and conduct campaigns											
Activity 2.2.1. Develop and disseminate IEC materials for diverse stakeholders in human, animal, and environmental health sectors.	IEC materials developed	3 (1 per ministry)	One Health	MoHW, MOESWCC, MoAIFS	Number of IEC materials developed			X			
Activity 2.2.2. Commemorate World AMR Awareness Week	Campaigns	10	One Health	MoHW, MOESWCC, MoAIFS, Media		X	X	X	X	X	1 for MoAIFS and 1 for MOHW each year
Activity 2.2.3. Conduct advocacy and sensitization meetings on AMR for private stakeholders	Meetings	1	One Health	MoHW, MOESWCC, MoAIFS	Meeting session			X			

Activity 2.2.4. Assist media for the dissemination of AMR key messages to the public	Meetings	5	AMR TWG	Media and other relevant stakeholders	Number of meetings	X	X	X	X	X	
Strategic intervention 2.3. Strengthen education and training on antimicrobial resistance of human, animal, plant, and environmental health professionals											
Activity 2.3.1. Conduct working session to advocate health promotion on AMR and related topics at secondary & tertiary level	Working sessions	1	One Health	MoHW, MOESWCC, MoAIFS	Number of working sessions		X				
Activity 2.3.2 Conduct competitions on AMR for secondary school students	No of competitions	1	One Health	Min of Education	Number of competitions			X			
Strategic intervention 2.4. Incorporate AMR as a component of Continuing Professional Development (CPD)											
Activity 2.4.1. Conduct CPD on AMR for healthcare professionals	Training sessions	10	AMR TWG	Councils	Training sessions conducted	X	X	X	X	X	
Activity 2.4.2. Conduct in-service training programs on AMR for professionals in the veterinary, and environment sectors	Sessions	10	MOESWCC, MoAIFS	Vet associations	Number of Sessions	X	X	X	X	X	

Activity	Unit	Quantity	Lead implementer	Collaborators	Indicator	Timeframe					Comments
						YR 1	YR 2	YR 3	YR 4	YR 5	
Strategic objective 3: Enhance AMR surveillance and diagnostic capacity in human and animal											
Strategic intervention 3.1. Support surveillance of AMR capacity											
Activity 3.1.1. Establish a national surveillance plan/mechanism with roles and responsibilities clearly defined including data sharing between sectors to generate actionable data	Plan	1	One Health committee	AMR TWG Laboratories	Approved plan or TOR		X				
Activity 3.1.2. Develop/review Standard Operating Procedures (SOPs) for surveillance of AMR in food, agriculture, veterinary medicine, environment, and wildlife, consistent and harmonized with international standards	SOP	1	One Health	AMR TWG, MOESWCC, MOAIFS	Approved SOP	X					
Activity 3.1.3. Recruit and train data collectors for surveillance of AMR	Data collector	1	MoHW	Civil service Affairs, PSC	No of data collectors		X				
Activity 3.1.4. Analyze, disseminate, and share surveillance data and information to facilitate decision making on diagnoses and treatments in clinical public health, veterinary practice, environment and wildlife laboratories and food technologies	Antibiograms	10	AMR TWG	One Health Other ministries Partners	Number of reports	X	X	X	X	X	1 per year each for MOHW and MoA
Activity 3.1.5. Establish mechanisms to collect AMR data from private health care settings (as part of requirement for obtaining/ renewing license)	Legislation	1	MoHW	Private labs & clinics	Law enacted					X	MoU or SOP may be accepted
Strategic intervention 3.2. Strengthen laboratory capacity in both human, animal, and environmental sector											

Activity	Unit	Quantity	Lead implementer	Collaborators	Indicator	Timeframe					Comments
						YR 1	YR 2	YR 3	YR 4	YR 5	
Activity 3.2.1. Recruit and build capacity of staff working in laboratories from all sectors	Staff	Human: 3 Vet: 2 Env: 1	One health	Civil service, PSC, MOESWCC, MoAIFS	No of staff recruited				X	X	
Activity 3.2.2. Strengthen public and private laboratories with standardized capacity for diagnostic stewardship, culture, AST, and antibiotic residue testing in the country	Training sessions	1	One Health	Central Lab, MOESWCC, MoAIFS	No of sessions		X				
Activity 3.2.3. Training of laboratory staff on running EQAS	Training sessions	1	MoHW	WHO	No of session				X		
Activity 3.2.4. Achieve ISO accreditation for microbiology laboratory in human health sector	Accreditation	1	MoHW	WHO	Certificate				X		
Activity 3.2.5. Designate CHL as reference lab for AST	Designation	1	MoHW	MOESWCC, MoAIFS	Designation as ref lab					X	
Activity 3.2.6. Test for AMR organisms and antibiotic residues in the environment	Tests	2	MOESWCC	MoHW	No of tests		X		X		
Strategic intervention 3.3. Establish AMU/AMC Surveillance system in human and animal sector											
Activity 3.3.1. Enroll in GLASS AMU and AMC (human sector)	Whether data are entered	1	MOHW	CHL and private lab	Entry of first data set	X					
Activity 3.3.2. Design and implement a national antimicrobial use surveillance plan that defines activities and roles consistent with international surveillance standards (human sector)	Plan	1	MOHW	Health care professionals	Endorsed plan		X				
Activity 3.3.3. Conduct antimicrobial consumption and use monitoring survey and ensure their dissemination to decision makers (human sector)	Annual report	4	Pharmacy unit of MOHW	Staff of the respective department	Survey data and statistics		X	X	X	X	In public hospitals

Activity	Unit	Quantity	Lead implementer	Collaborators	Indicator	Timeframe					Comments
						YR 1	YR 2	YR 3	YR 4	YR 5	
Activity 3.3.4: Develop and strengthen legislation to gather AMR data from private sector and to make certain MDRO notifiable (human sector)	Legislation	1	MOHW	SLO, staff of respective department	Law passed					X	
Strategic intervention 3.4. Strengthen Surveillance for Antimicrobial Drug Residues in Foods											
Activity 3.4.1. Carry out two national surveys to monitor antimicrobial residues in foods and animal feeds	Survey	2	Min. of Agro	FTL, MOHW, GAD and LVD	Survey report		X		X		
Activity 3.4.2. Amend food regulations to recognize surveillance data by other laboratories	Regulation	1	Min. of Agro	FTL, GAD, LVD and Food Inspectorate	Availability of regulation		X				
Activity 3.4.3. Support the use of standard procedures in accordance with international standards including the Codex Alimentarius for monitoring of antimicrobial residues in foods	Standard Operating Procedures	1	Min. of Agro	FTL, GAD, LVD and Food Inspectorate	Availability of SOPs			X			
Activity 3.4.4. Collaborate with the WHO/FAO Codex Alimentarius and other international efforts to generate and share actionable data	Email correspondence	Continuous	MOHW, MOA, MOESWCC, and Min of Blue Econ	National CODEX Committee	Data sharing platform		X	X			

Activity	Unit	Quantity	Lead implementer	Collaborators	Indicator	Timeframe					Comments
						YR 1	YR 2	YR 3	YR 4	YR 5	
Strategic Objective 4: Reduce the incidence of infection through effective sanitation, hygiene, and infection prevention measures.											
Strategic intervention 4.1. Strengthen infection prevention and Control (IPC) program in health care settings.											
Activity 4.1.1. Update human health sector National IPC guidelines and including private institution	Guideline	1	NIC	IPC Writing Committee Private sector	Approved guidelines	X					
Activity 4.1.2. Develop & disseminate IPC SOPs for veterinary, food/environment sectors	SOPs	4	One Health	MOESWCC, MoAIFS Private clinics	Approved SOPs			X			
Activity 4.1.3. Conduct assessments on adherence of IPC standards in private human health sector & veterinary/environment sectors	Assessments	5 in each sector	One Health	MOESWCC, MoAIFS Private clinics	Assessment reports	X	X	X	X	X	
Activity 4.1.4. Celebrate global handwashing day in schools	Campaigns	4	MOHW	MOESWCC, ICT	Number of campaigns		X	X	X	X	
Activity 4.1.5. Develop legislation to include a minimum IPC score as requirement for renewal of license for private health care institutions.	Legislation	1	NIC	Private institutions	Law enacted					X	
Activity 4.1.6: Create isolation rooms in public healthcare facilities for AMR patients	Isolation rooms	5% of total beds	MOHW	WHO	No. of rooms built	X	X	X			
Activity 4.1.7: Expand outbreak surveillance and notification for AMR in the public	Monthly report	48	MOHW	WHO	No. of reports		X	X	X	X	Reports can be a dashboard

healthcare system to locations outside the ICUs											
Strategic intervention 4.2. Prevent and monitor health care-associated infections at human and veterinary health facilities											
Activity 4.2.1. Sensitization of HCW of vet section on HAI	Sessions	2	MoAIFS	Private vets	Number of sensitization campaigns		X			X	
Activity 4.2.2. Training of vet professionals in HAI surveillance	Training sessions	1	MoAIFS	Health facilities Private Vets	Number of sessions			X			
Activity 4.2.3: Screen some admitted patients or staff for certain MDRO	Protocol	1	MOHW	Health facilities	Approved screening protocol				X		
Activity 4.2.4: Implement decolonization of some patients or staff who are colonized with certain MDRO	Protocol	1	MOHW	Health facilities	Approved decolonization protocol				X		
Strategic intervention 4.3. Strengthen waste management systems in the health, agriculture, and environment sectors											
Activity 4.3.1. Develop and disseminate waste management guideline outside healthcare setup	Guidelines	1	One Health	MOESWCC WMA local government	Approved guideline			X			
Activity 4.3.2. Promote and enforce health facilities/ laboratories to have a method of autoclaving waste prior to disposal	Autoclaving facilities	5	One Health	MoHW, MOESWCC WMA	Approved system/ process of autoclaving		X	X	X	X	
Activity 4.3.3. Develop guidelines on proper disposal of unused and expired antimicrobials.	Guidelines	1	TWG AMR	Pharmacy board, MOESWCC	Approved guidelines		X				
Activity 4.3.4. Finalize IPC guidelines for zoo and sanitary/ phytosanitary inspectors at	Guidelines	1 for plant and	MoAIFS	MOESWCC	Approved guidelines		X				

ports of entries/exits (feeds, live animals, animal byproducts and agricultural products)		1 for animal sectors									
Strategic intervention 4.4. Strengthen good husbandry practices and bio-security interventions in animal, plant, and fishery sectors.											
Activity 4.4.1. Conduct assessment of knowledge, attitudes, behavior, and practices on good husbandry practice.	Assessment	1	One Health	MoAIFS	Assessment report			X			
Activity 4.4.2. Develop guideline on good biosecurity measures in fishery sector.	Guidelines	1	Fisheries division		Approved guidelines		X				
Activity 4.4.3. Reinforce sensitization campaigns on good biosecurity practices in the agricultural, livestock and aquaculture production industries.	Campaigns	5	One Health	MoAIFS (NPPO)	Number of campaigns	X	X	X	X	X	
Strategic intervention 4.5. Strengthen vaccination campaigns to enhance prevention and control of diseases and infections in human and animal health.											
Activity 4.5.1. Organize sensitization campaigns to the public on the use of vaccines in animals	Campaigns	2	Vet section	AMR TWG	Number of campaigns conducted		X			X	
Activity 4.5.2. Develop vaccination guidelines for adults	Guideline	1	MoHW	WHO	Approved guideline			X			
Activity 4.5.3. Legislation to make vaccines compulsory for some listed diseases during specific outbreaks	Legislation	1	MoHW		Availability of legislation				X		

Activity	Unit	Quantity	Lead implementer	Collaborators	Indicator	Timeframe					Comments
						YR 1	YR 2	YR 3	YR 4	YR 5	
Strategic objective 5: Improve access and optimizing use of antimicrobials in humans, animals, and plants health											
Strategic intervention 5.1. Develop legislation on prescription and sale of antimicrobials											
Activity 5.1.1. Enforce the pharmacy act regarding the prescription and records of antibiotic sale	Private pharmacies	2 per week	One Health	Pharmacy board/ regulatory unit	No. of private pharmacies checked	X	X	X	X	X	Should check all the pharmacies at least once in 5y
Activity 5.1.2. Update the pharmacy act regarding the prescription & sale of antimicrobials	Endorsed document	1	One Health	Pharmacy board	Act updated		X				
Activity 5.1.3. Establish body for veterinary medicinal products that can also regulate use and distribution of antimicrobials	Established regulatory body	1	One Health	MoAIFS	Functioning body		X				
Activity 5.1.4. Develop prescribing/ treatment guidelines in animals for public and private setups	Guidelines handbook	1	AMR TWG	MoAIFS	Approved guidelines		X				
Activity 5.1.5. Develop regulations/ guidelines on the use of growth promoters and use of microbial agents as feeds additives.	Guidelines handbook	1	One Health	MoAIFS, MOHW	Approved guidelines		X				
Strategic intervention 5.2. Strengthen the supply chain management system to assurance the availability of quality antimicrobials.											
Activity 5.2.1. Review the listed antibiotics in the public sector based on the WHO EML	Drug list	1	MoHW	Pharmacy board	Approved list		X				Can be part of national antibiotic guidelines
Activity 5.2.2. Develop antimicrobial stewardship program for the human health	Program	1	One Health	AMR committee	Approved program	X	X	X	X	X	Include AMS teams and ToR

Activity 5.2.3. Review and strengthen the existing quality management system for the supply of medicines, covering manufacturing, production, storage and transport including quality of the end product	Guideline / no. of checks	5	Pharmacy board	Pharmaceutical companies and MPA; all stakeholders of MOH	Approved guideline and no. of checks		X	X	X	X	Should check the quality of at least 50% of antibiotics in public hospitals each year
Strategic intervention 5.3. Implement Antimicrobial Stewardship program in health facilities and animal health to promote prudent use of antimicrobials.											
Activity 5.3.1. Set up stewardship committees with membership and ToR for animal health	AMS committee	1	One health committee	MoAIFS, Pharmacy board	ToR of committee approved	X					
Activity 5.3.2. Monitor the use/ consumption of antimicrobials in private clinics and in animals	Surveys	4	AMR TWG	Pharmacy board	Reports		X	X	X	X	
Activity 5.3.3: Train staff to reduce the rate of contamination of blood culture bottles	Training session	2	MOHW	CHL	No. of training sessions		X			X	
Strategic intervention 5.4. Conduct KAP studies and other survey on optimizing the use of antimicrobials											
Activity 5.4.1. Conduct KAP studies to assess the drivers of inappropriate antimicrobial use among the public, health care workers.	Survey	1	AMR TWG	MoHW	Reports		X				
Activity 5.4.2. Conduct epidemiological research on the burden and risk of AMR and antimicrobial use in animals	Survey	2	AMR TWG	MoAIFS	Report			X		X	
Activity 5.4.3. Initiate an international collaboration with a foreign academic/university for knowledge sharing on AMR / AMS	MoU	1	One Health	WHO, UoM	Approved MoU		X				A signed contract is acceptable

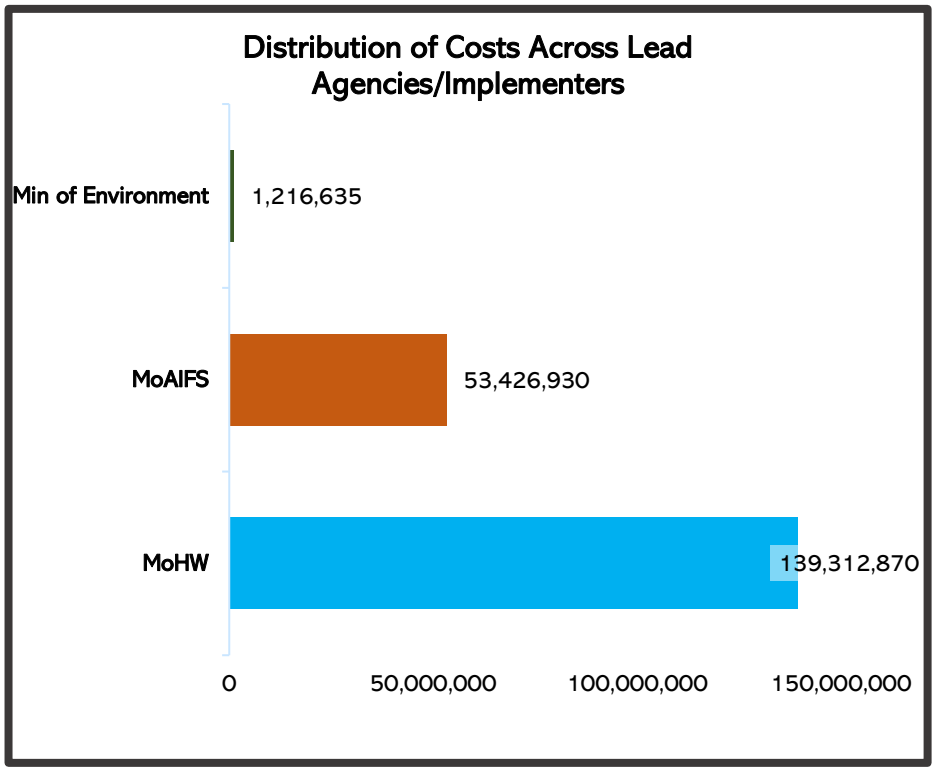
Activity	Unit	Quantity	Lead implementer	Collaborators	Indicator	Timeframe					Comments
						YR 1	YR 2	YR 3	YR 4	YR 5	
Strategic objective 6: Strengthen research, development, and sustainable investment in antimicrobial resistance											
Strategic intervention 6.1. Enhance research and innovation											
Activity 6.1.1. Identify collaborating partners for research	Database	1	One Health	AMR TWG WHO	Database list		X				
Activity 6.1.2. Prioritize research areas in AMR	Database	1	One Health	AMR TWG	Database list		X				
Activity 6.1.3. Collaborate with Research and Innovation Council and local academic institutions to develop research proposals on AMR	MoU	1	One Health	AMR TWG MRIC UoM	MoU		X				An approved project proposal is acceptable
Strategic intervention 6.2. Resource mobilization											
Activity 6.2.1. Establish database of potential funding partners with an interest in AMR	Database	1	One Health	AMR TWG Private partners	Database		X				
Activity 6.2.2. Conduct mobilization meeting for multisectoral stakeholders and partners	Meetings	1	One Health	AMR TWG Private partners	Meeting		X				
Activity 6.2.3. Advocate, lobby and share information and RFPs for funding of AMR research	Meetings	5	One Health	AMR TWG Private partners	Reports	X	X	X	X	X	

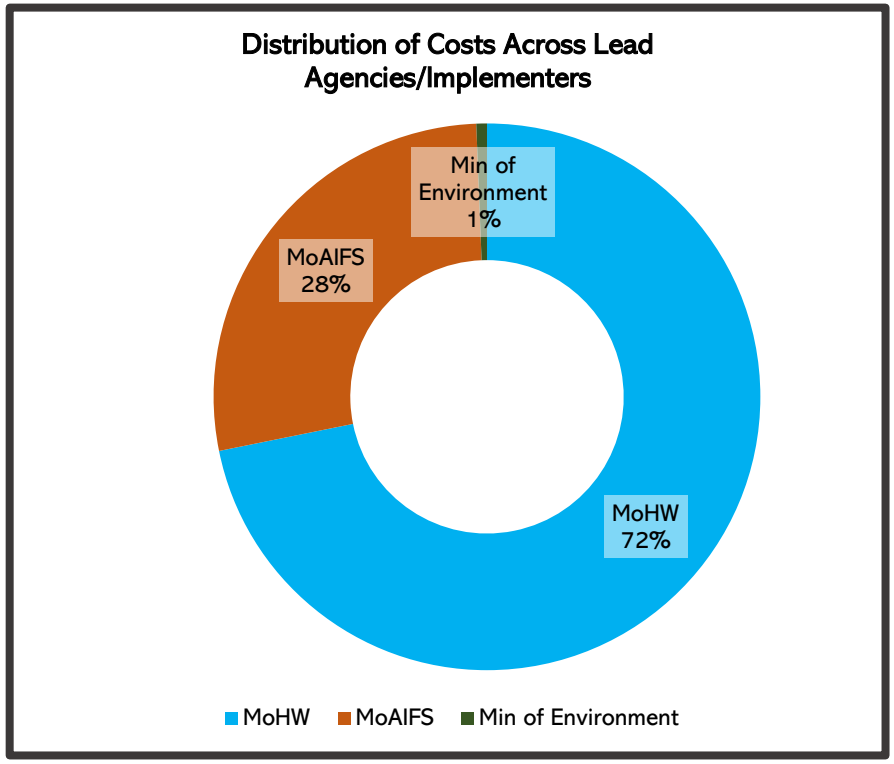
COSTED OPERATIONAL PLAN

The Republic of Mauritius AMR NAP 2.0 was costed using the WHO Costing and Budgeting Tool for AMR National Action Plans. Prioritization of activities in the operational plan was conducted and all activities across the six strategic objectives were costed. The total budget for the AMR NAP 5-year operational plan was 193,956,435.00 Mauritian Rupee (USD 4,310,143); a detailed breakdown of the costed document to activity-level costs for each strategic intervention is found below.

STRATEGIC OBJECTIVE	LEAD AGENCY/IMPLEMENTER			
	MoHW	MoAIFS	Min of Environment	Total Cost
Strategic objective 1: Strengthen governance, coordination, and collaboration for AMR NAP implementation	13,753,875	1,183,325		**14,937,200**
Strategic objective 2: Improve awareness and understanding of antimicrobial resistance through effective communication, education, and training.	6,387,370	1,182,260	420,610	**7,990,240**
Strategic objective 3: Enhance AMR surveillance and diagnostic capacity in human, animal, and environmental health sectors	9,869,625	18,547,485	318,525	**28,735,635**
Strategic objective 4: Reduce the incidence of infection through effective sanitation, hygiene, and infection prevention measures.	61,102,500	2,709,110	474,500	**64,286,110**
Strategic objective 5: Improve access and optimizing use of antimicrobials in humans, animals, and plants health	47,294,000	29,530,250		**76,824,250**
Strategic objective 6: Strengthen research, development, and sustainable investment in antimicrobial resistance	905,500	274,500	3,000	**1,183,000**
Total Cost	**139,312,870**	**53,426,930**	**1,216,635**	**193,956,435**

Total budget:193,956,435.00 Mauritius Rupee (USD 4,310,143)





Elaborated Summary of Cost of Activities across Lead Agency/ Implementer

STRATEGIC OBJECTIVES, INTERVENTIONS, AND ACTIVITIES	LEAD AGENCY/IMPLEMENTER			
	MoHW	MoAIFS	Min of Environment	Total Cost
Strategic objective 1: Strengthen governance, coordination, and collaboration for AMR NAP implementation				
Strategic intervention 1.1: Establish and strengthen multisectoral AMR Technical Working Group (AMR-TWG)				
Activity 1.1.1: Define membership and approve TOR for the AMR Technical Working Group (AMR-TWG) with dedicated secretariat.	61,000			61,000
Activity 1.1.2: Organize quarterly AMR Technical Working Group (AMR-TWG) meetings to review AMR NAP implementation across sectors.	686,000			686,000
Activity 1.1.3: Ensure the AMR secretariat has an office and all necessary equipment to carry out its activities	7,140,000			7,140,000
Strategic intervention 1.2: Monitor and evaluate AMR NAP implementation				
Activity 1.2.1: Conduct annual review of the AMR NAP implementation.	1,038,000			1,038,000
Activity 1.2.2: Conduct evaluation of AMR NAP implementation by external organizations	1,183,325	1,183,325		2,366,650
Strategic intervention 1.3: Strengthen leadership capacity to ensure effective functioning of the AMR Technical Working Group				
Activity 1.3.1: Organize AMR Multisectoral coordination and leadership skills training for AMR Technical Working Group (AMR-TWG) members.	1,048,050			1,048,050
Activity 1.3.2: Organize regional neighboring countries experience sharing platforms on best practices in the prevention and containment of AMR.	2,597,500			2,597,500
Strategic objective 2: Improve awareness and understanding of antimicrobial resistance through effective communication, education, and training.				
Strategic intervention 2.1: Establish an evidence-based public communications on AMR targeting human health, animal health and environment sector.				
Activity 2.1.1: Conduct and disseminate KAP study on AMR awareness among professionals in human health, animal health and environment sector.	1,506,650			1,506,650
Activity 2.1.2: Conduct and disseminate KAP study on AMR awareness among the general public /stakeholders	567,500			567,500
Activity 2.1.3: Develop and disseminate national communication strategy for AMR.	767,770			767,770
Strategic intervention 2.2: Advocate for AMR and conduct campaigns				

Activity 2.2.1: Develop and disseminate IEC materials for diverse stakeholders in human, animal, and environmental health sectors.	54,500			54,500
Activity 2.2.2: Commemorate World AMR Awareness Week	1,397,475			1,397,475
Activity 2.2.3: Conduct advocacy and sensitization meetings on AMR for private stakeholders	786,375			786,375
Activity 2.2.4: Assist media for the dissemination of AMR key messages to the public	412,500			412,500
Strategic intervention 2.3: Strengthen education and training on antimicrobial resistance of human, animal, plant, and environmental health professionals				
Activity 2.3.1: Conduct working session to advocate health promotion on AMR and related topics at secondary & tertiary level	181,000			181,000
Activity 2.3.2: Conduct competitions on AMR for secondary school students	563,600			563,600
Strategic intervention 2.4: Incorporate AMR as a component of Continuing Professional Development (CPD)				
Activity 2.4.1: Conduct CPD on AMR for healthcare professionals	150,000			150,000
Activity 2.4.2: Conduct in-service training programs on AMR for professionals in the veterinary, and environment sectors		1,182,260	420,610	1,602,870
Strategic objective 3: Enhance AMR surveillance and diagnostic capacity in human, animal and environmental health sectors				
Strategic intervention 3.1: Support surveillance of AMR capacity				
Activity 3.1.1: Establish a national surveillance plan/mechanism with roles and responsibilities clearly defined including data sharing between sectors to generate actionable data	577,275			577,275
Activity 3.1.2: Develop/review Standard Operating Procedures (SOPs) for surveillance of AMR in food, agriculture, veterinary medicine, environment, and wildlife, consistent and harmonized with international standards	259,500			259,500
Activity 3.1.3: Recruit and train data collectors for surveillance of AMR	660,000			660,000
Activity 3.1.4: Analyze, disseminate, and share surveillance data and information to facilitate decision making on diagnoses and treatments in clinical public health, veterinary practice, environment and wildlife laboratories and food technologies	610,000			610,000

Activity 3.1.5: Establish mechanisms to collect AMR data from private health care settings (as part of requirement for obtaining/ renewing license)	96,000			96,000
Strategic intervention 3.2: Strengthen laboratory capacity in human, animal, and environmental sector				
Activity 3.2.1: Recruit and build capacity of staff working in laboratories from all sectors	1,800,000	5,280,000		7,080,000
Activity 3.2.2: Strengthen public and private laboratories with standardized capacity for diagnostic stewardship, culture, AST, and antibiotic residue testing in the country	1,505,500	5,500		1,511,000
Activity 3.2.3: Training of laboratory staff on running EQAS	315,775			315,775
Activity 3.2.4: Achieve ISO accreditation for microbiology laboratory in human health sector	850,275			850,275
Activity 3.2.5: Designate CHL as reference lab for AST	347,775			347,775
Activity 3.2.6: Test for AMR organisms and antibiotic residues in the environment			318,525	318,525
Strategic intervention 3.3: Establish AMU/AMC Surveillance system in human and animal sector				
Activity 3.3.1: Enroll in GLASS AMU and AMC	353,610			353,610
Activity 3.3.2: Design and implement a national antimicrobial use surveillance plan that defines activities and roles consistent with international surveillance standards	1,286,430	913,545		2,199,975
Activity 3.3.3: Conduct antimicrobial consumption and use monitoring survey and ensure their dissemination to decision makers	947,985	2,277,500		3,225,485
Activity 3.3.4: Develop and strengthen legislation to gather AMR data from private sector and to make certain MDRO notifiable	259,500			259,500
Strategic intervention 3.4: Strengthen Surveillance for Antimicrobial Drug Residues in Foods				
Activity 3.4.1: Carry out two national surveys to monitor antimicrobial residues in foods and animal feeds		9,487,775		9,487,775
Activity 3.4.2: Amend food regulations to recognize surveillance data by other laboratories		91,500		91,500

Activity 3.4.3: Support the use of standard procedures in accordance with international standards including the Codex Alimentarius for monitoring of antimicrobial residues in foods		481,665		481,665
Activity 3.4.4: Collaborate with the WHO/FAO Codex Alimentarius and other international efforts to generate and share actionable data		10,000		10,000
Strategic objective 4: Reduce the incidence of infection through effective sanitation, hygiene, and infection prevention measures.				
Strategic intervention 4.1: Strengthen infection prevention and Control (IPC) program in health care settings.				
Activity 4.1.1: Update human health sector National IPC guidelines and including private institution	10,000			10,000
Activity 4.1.2: Develop & disseminate IPC SOPs for veterinary, food and environment sectors	85,000	229,000		314,000
Activity 4.1.3: Conduct assessments on adherence of IPC standards in private human health sector & veterinary/environment sectors	250,000	250,000		500,000
Activity 4.1.4: Celebrate global handwashing day in schools	235,000			235,000
Activity 4.1.5: Develop MoU to include a minimum IPC score as requirement for renewal of license for private health care institutions.	20,000			20,000
Activity 4.1.6: Create isolation rooms in public healthcare facilities for AMR patients	40,000,000			40,000,000
Activity 4.1.7: Expand outbreak surveillance and notification for AMR in the public healthcare system to locations outside the ICUs	1,260,000			1,260,000
Strategic intervention 4.2: Prevent and monitor health care-associated infections at human and veterinary health facilities				
Activity 4.2.1: Sensitization of HCW of vet section for HAI		127,000		127,000
Activity 4.2.2: Training of human and vet professionals in HAI surveillance		122,000		122,000
Activity 4.2.3: Screen admitted patients or staff for certain MDRO	605,000			605,000
Activity 4.2.4: Implement decolonization of patients or staff who are colonized with certain MDRO	375,000			375,000
Strategic intervention 4.3: Strengthen waste management systems in the health, agriculture, and environment sectors				
Activity 4.3.1: Develop and disseminate waste management guideline outside healthcare setup			474,500	474,500

Activity 4.3.2: Promote and enforce health facilities/ laboratories to have a method of autoclaving waste prior to disposal	18,000,000			18,000,000
Activity 4.3.3: Develop guidelines on proper disposal of unused and expired antimicrobials.	7,500			7,500
Activity 4.3.4: Finalize IPC guidelines for zoo and sanitary/ phytosanitary inspectors at ports of entries/exits (feeds, live animals, animal byproducts and agricultural products)		61,000		61,000
Strategic intervention 4.4: Strengthen good husbandry practices and bio-security interventions in animal, plant, and fishery sectors				
Activity 4.4.1: Conduct assessment of knowledge, attitudes, behavior, and practices on good husbandry practice		200,000		200,000
Activity 4.4.2: Develop guideline on good biosecurity measures in fishery sector.		329,110		329,110
Activity 4.4.3: Reinforce sensitization campaigns on good biosecurity practices in the agricultural, livestock and aquaculture production industries		805,000		805,000
Strategic intervention 4.5: Strengthen vaccination campaigns to enhance prevention and control of diseases and infections in human and animal health.				
Activity 4.5.1: Organize sensitization campaigns to the public on the use of vaccines in animal health		525,000		525,000
Activity 4.5.2: Develop vaccination guidelines for adults	255,000			255,000
Activity 4.5.3: Legislation to make vaccines compulsory for some listed diseases during specific outbreaks among animals		61,000		61,000
Strategic objective 5: Improve access and optimizing use of antimicrobials in humans, animals, and plants health				
Strategic intervention 5.1: Develop legislation on prescription and sale of antimicrobials				
Activity 5.1.1: Enforce the Pharmacy Act regarding the prescription and records of antibiotic sale	16,921,000			16,921,000
Activity 5.1.2: Update the Pharmacy Act regarding the prescription & sale of antimicrobials	2,500,000			2,500,000

Activity 5.1.3: Establish body for veterinary medicinal products that can also regulate use and distribution of antimicrobials		6,240,000		6,240,000
Activity 5.1.4: Develop prescribing/ treatment guidelines in animals for public and private setups		91,500		91,500
Activity 5.1.5: Develop regulations/ guidelines on the use of growth promoters and use of microbial agents as feeds additives.		81,250		81,250
Strategic intervention 5.2: Strengthen the supply chain management system to assure the availability of quality antimicrobials.				
Activity 5.2.1: Review the listed antibiotics in the public sector based on the WHO EML	18,000			18,000
Activity 5.2.2: Develop antimicrobial stewardship programs for the human health sector	75,000	22,500		97,500
Activity 5.2.3: Review and strengthen the existing quality management system for the supply of medicines, covering manufacturing, production, storage, transport including ensuring good quality of the end-product	15,001,500	23,080,000		38,081,500
Strategic intervention 5.3: Implement Antimicrobial Stewardship program in health facilities and animal health to promote prudent use of antimicrobials.				
Activity 5.3.1: Set up stewardship committees with membership and ToR in the animal sector.	7,500	15,000		22,500
Activity 5.3.2: Monitor the use/ consumption of antimicrobials in private health facilities and in animals	11,732,000			11,732,000
Activity 5.3.3: Train staff to reduce the rate of contamination of blood culture bottles	60,000			60,000
Strategic intervention 5.4: Conduct KAP studies and other survey on optimizing the use of antimicrobials				
Activity 5.4.1: Conduct KAP studies to assess the drivers of inappropriate antimicrobial use among the public and health care workers.	300,000			300,000
Activity 5.4.2: Conduct research on the burden and risk of AMR and antimicrobial use	429,000			429,000
Activity 5.4.3: Initiate an international collaboration with a foreign academic/university for knowledge sharing on AMS	250,000			250,000
Strategic objective 6: Strengthen research, development, and sustainable investment in antimicrobial resistance				

Strategic intervention 6.1: Enhance research and innovation				
Activity 6.1.1: Identify collaborating partners for research	1,500			1,500
Activity 6.1.2: Prioritize research areas in AMR	1,500			1,500
Activity 6.1.3: Collaborate with Research and Innovation Council and local academic institutions to develop proposal on AMR	445,000			445,000
Strategic intervention 6.2: Resource mobilization				
Activity 6.2.1: Establish database of potential funding partners with an interest in AMR			3,000	3,000
Activity 6.2.2: Conduct mobilization meeting for multisectoral stakeholders and partners	457,500			457,500
Activity 6.2.3: Advocate, lobby and share information and RFPs for funding of AMR research		274,500		274,500
Total Cost	**139,312,870**	**53,426,930**	**1,216,635**	**193,956,435**

MONITORING AND EVALUATION

This section introduces mechanisms for Monitoring and Evaluation of the AMR National Action Plan and provides a Key Performance Indicator matrix to monitor the plan. A list of key performance indicators have been selected by the stakeholders to track progress towards implementation of Strategic Objectives, Strategic Interventions, and Key Activities. A total of 31 key performance indicators have been selected to monitor progress towards implementation of the planned strategic interventions and corresponding key activities.

The AMR NAP results chain: mapping the causal pathways connecting the inputs, activities and outputs with the outcomes and impact goals

Inputs	Activities	Outputs	Outcomes	Impacts
• Stakeholder engagement • Funding • Technical support from Quadripartite • Country situational analysis • Proposed legislation and policy framework on AMR • Human resources • Leadership & political commitment	• AMR awareness campaigns • Training of professionals on AMR • Strengthening surveillance system • IPC sensitization workshops • Conducting AMR research studies • Dissemination of IEC materials	• Availability of CPD programs that include AMR • Trained professionals • Availability of AMR advocacy materials • Increased number of research studies on AMR • IPC measures in human and animal health facilities • Good animal health management practice • AMR Surveillance • Enacted legislation and regulation to prevent environmental contamination	• Improved awareness of AMR among farmers, veterinary and health workers, food industry, general public • Strengthened knowledge and evidence base used for policy and practice decisions • Reduced incidence of infection in health facilities, farms, and communities	• Reduced levels and slower development of resistance • Continued ability to treat infectious diseases with effective and safe medicines • Reduced impact of infectious diseases on human and animal health and economic development

Key Performance Indicator Matrix

Strategic Objectives	Indicator	Type of Indicator	Data Source	Frequency of data collection	Baseline	Year Target (2024 -2028)				
						2024	2025	2026	2027	2028
Strengthen governance, coordination, and collaboration for AMR NAP implementation	Functional multisectoral AMR Technical Working Group (AMR-TWG) for sustainable AMR NAP implementation	Outcome	ToR	Annually	0	1				
	AMR secretariat established to coordinate AMR NAP implementation	Output	ToR	Annually	0	1				
	Number of AMR NAP implementation progress assessment conducted	Output	M&E / progress report	Annually	0		1	1	1	1
	Number of meetings of the AMR TWG	Process	AMR TWG reports	Annually	0		3	3	3	3
Improve awareness and understanding of antimicrobial resistance through effective communication, education, and training.	Number of KAP study on AMR awareness among the general public (for human health & vet)	Output	Survey report	One time	0		2			2
	Number of KAP study on AMR awareness among general public	Output	Survey report	One time	0			1		1
	Number of ministries/ institutions/organizations commemorating World AMR Awareness Week (WAAW)	Output	Media and AMR TWG report	Annually	1	2	2	2	2	2
	Number of AMR awareness activities conducted to advocate AMR (excluding lectures/ training/ WAAW)	Output	Reports, attendance sheets, photos and / or IEC materials	Annually	0	1	1	6	1	1

	Number of human health professionals trained on AMR through in-service trainings	Output	Attendance sheets	Annually	10	10	10	10	10	10
	Number of veterinary professional training on AMR through in-service trainings	Output	Attendance sheets	Annually	0	1	1	1	1	1
	Number of laboratories participating in EQAS for AST	Output	Institutions reports	One time	3					10
	Number of labs (food & environment) doing AST	Output	Institution reports	One time	0					2
Enhance AMR surveillance and diagnostic capacity in human and animal.	Number of ISO accreditation microbiology laboratories in human health sector for AST	Output	Institutions reports/AMR TWG report	One time	0					1
	Surveys to monitor antimicrobial residues in foods and animal feeds	Output	Reports	Biennial	0		1		1	
	Percentage of bloodstream infections due to methicillin-resistant staphylococcus aureus among patients seeking care and blood sampled	Outcome	Published surveillance reports	Annually	50%					35%
	Percentage of bloodstream infections due to CRKP among patients seeking care and blood sampled	Outcome	Published surveillance reports	Annually	35%					25%
	Annual submission of AMR data to WHO-GLASS	Output	AMR TWG report/Surveillance report	Annually	1	1	1	1	1	1

	Number of assessments conducted on adherence of IPC standards in private human health sector & veterinary and environment sectors	Output	Assessment report	Biennial	0		5			10
	Number of IPC awareness campaigns conducted to promote IPC in schools	Output	AMR TWG report/Campaign report	Annually	0	0	1	1	1	1
Reduce the incidence of infection through effective sanitation, hygiene, and infection prevention measures.	Number of veterinary officers trained on Healthcare Associated Infections (HAI) surveillance	Output	Training reports	One time	0					20
	Availability of guidelines on proper disposal of unused and expired antimicrobials	Output	Institutions report	One time	0		1			
	Availability of updated IPC guidelines for zoo sanitary/ phytosanitary inspectors at ports of entries/exits (feeds, live animals, animal byproducts and agricultural products)	Output	Institutions report	Annually	1		1			
	Number of sensitization campaigns on good biosecurity practices in the agricultural, livestock and aquaculture production industries.	Output	Institutions and AMR TWG reports	Annually	1	1	1	1	1	
	Influenza vaccine coverage in human health among at risk individuals as per national protocol	Outcome	DHIS2	Annually	NA	10%	20%	30%	40%	50%

	Availability of AMU data from private human health sector & public veterinary sector	Output	Report	Annually	0		1	1	1	1
	Availability of veterinary standard treatment guidelines (public sector)	Output	AMR TWG report/institutional report	One time	0				1	
Improve access and optimizing use of antimicrobials agents in humans, animals, and plant health.	Availability of regulations/ guidelines restricting the use of certain antibiotics as growth promoters and use of antimicrobial agents as feeds additives.	Output	Law	One time	0				1	
	Availability of updated national Essential Medicine List (EML) regarding antibiotics	Output	Guideline	One time	0		1			
	Number of human and animal health care facilities implementing antimicrobial stewardship program	Output	Facility report	Annually	0	1	5	6	6	6
Strengthen research, development, and sustainable investment in antimicrobial resistance	List of prioritized areas in antimicrobial resistance in human, animal, and environment sector	Output	List	One time	0		1			
	Number of AMR funding proposals developed in collaboration with Research and Innovation Council and local academic institutions	Output	Proposals	Annually	0			1		1