Republic of Namibia

NAMIBIAN ANTIMICROBIAL RESISTANCE NATIONAL ACTION PLAN

MAY 2017

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FOREWORD

Antimicrobial resistance (AMR) is occurring everywhere in the world, compromising the ability to treat infectious diseases, as well as undermining many other advances in health and medicine. Underlying factors that drive AMR include; weak or absent surveillance and monitoring systems, inadequate systems to ensure quality and uninterrupted supply of medicines, inappropriate and irrational use of medicines including in animal husbandry, poor infection prevention and control practices, and depleted arsenals of diagnostics, medicines and vaccines as well as insufficient research and development of new products.

At the 68th World Health Assembly in May 2015, the Global Action Plan (GAP) to tackle AMR was endorsed. All countries agreed to prepare a National AMR Action Plan in line with GAP by May 2017.

In line with the global agreements, the National AMR Action Plan (NAAP) has been developed with a goal of *"ensuring, for as long as possible, continuity of successful treatment and prevention of infectious diseases with effective and safe medicines that are quality-assured, used in a responsible way, and universally accessible to all who need them"*.

The development of the NAAP was highly consultative, participatory and transparent. The development process was informed by the Global Action Plan on AMR as well as the situation analysis on AMR in Namibia which was conducted in February and March 2017 to understand the current issues related to AMR and its magnitude. Key stakeholders involved included; the Ministry of Health and Social Services, Ministry of Agriculture, Water and Forestry, Ministry of Environment and Tourism, training institutions, private healthcare facilities and development partners.

The NAAP will address 6 key strategic objectives which include; Surveillance, prevention, antimicrobial use, awareness, collaboration and communication, education and training, and research and development. Implementation of AMR activities is intended to be built around existing systems, policies and programmes. The One Health approach, in which human, animal and environmental health, agriculture and food production sectors work together, is fundamental in implementing this Action Plan to effectively respond to the threat of AMR.

We wish to express our appreciation to all partners who participated in the development of the NAAP. All relevant sectors in addition to human health, such as animal health, plant production and environmental health, should have a sense of ownership of this NAAP for successful implementation and we commit to put the necessary resources, systems and processes in place to support the implementation activities.

Minister of Health and Social Services Minister of Environment Minister of Agriculture

ACKNOWLEDGEMENTS

The Namibian Antimicrobial Resistance National Action Plan was developed through a widely consultative process involving key stakeholders from the Ministry of Agriculture, Water and Forestry, Ministry of Health and Social Services, Ministry of Environment and Tourism, private healthcare facilities, training institutions and development partners

Appreciation goes to the participants from the following ministries and institutions who attended the stakeholder consultation workshops held on 7th - 8th February 2017 and 22nd - 24th March 2017 in Windhoek:

- Ministry of Health and Social Services: Division of Pharmaceutical Services, National Medicines Regulatory Agency, Quality Assurance Division, Primary Health Care, Epidemiology Directorate Special Programs, Directorate of Epidemiology & Health Information Systems, Windhoek Central Hospital, Namibia Institute of Pathology (NIP)
- Medi-Clinic Private Hospital Windhoek
- Ministry of Agriculture, Water and Forestry: Directorate of Veterinary Services
- World Health Organization (WHO)
- Centers for Disease Control (CDC) Namibia
- United States Agency for International Development (USAID); Systems for Improved Access to Pharmaceuticals & Services (SIAPS)
- University of Namibia, School of Medicine (UNAM-School of Medicine)
- National University of Science and Technology (NUST)

Special thanks go to: Dr Kim Faure (Consultant: Center for Disease Dynamics, Economics & Policy CDDEP) who provided technical assistance in the development and finalization of the NAAP; the chapter leads; and the coordinating team led by Mr Axel Tibinyane, Ms Naita Nghishekwa, Mr. Francis Kalemeera and Dr. Apollo Basenero.

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ABRREVIATIONS

AMR	Antimicrobial Resistance
ASP	Antimicrobial Stewardship Programme
ATC	Anatomical Therapeutic Class
CDC	Centers for Disease Control and Prevention (United States)
CDDEP	Center for Disease Dynamics, Economics & Policy
CAI	Community Acquired Infection
CSO	Civil Society Organization
DDD	Defined Daily Dose
EML	Essential Medication List
FAO	Food and Agriculture Organization (United Nations)
GAP	Global Action Plan
GARP	Global Antibiotic Resistance Partnership (CDDEP)
GHSA	Global Health Security Agenda
HAI	Healthcare-associated infection
INH	Isoniazid
IPC	Infection Prevention and Control
LMICs	Low- and Middle-Income Countries
M&E	Monitoring and Evaluation
MoHSS	Ministry of Health and Social Services
MoAWF	Ministry of Agriculture, Water and Forestry
MDR TB	Multi-drug-resistant tuberculosis
NAAP	National AMR Action Plan
NMC	Notifiable Medical Condition
NIP	Namibia Institute of Pathology
OIE	World Organisation for Animal Health (United Nations)
OTC	Over-the-counter
PMIS	Pharmaceutical Management Information System

STG	Standard Treatment Guideline
TIPC	Therapeutics Information and Pharmacovigilance Centre
TWG	Technical Working Group
UNGA	United Nations General Assembly
WHA	World Health Assembly
WHO	World Health Organization (United Nations)
XDR TB	Extensively drug-resistant tuberculosis

1. EXECUTIVE SUMMARY

The National Antimicrobial Resistance Action Plan (NAAP) was developed with an understanding that everyone has a role to play in containing Antimicrobial Resistance (AMR). Different stakeholders, including prescribers, dispensers, infection control teams, hospital managers and administrators, consumers, governments, NGOs, academics, industry, and others must contribute in various ways to contain AMR.

A situation analysis to inform the development of the NAAP was conducted in February and March 2017. The process was highly consultative, participatory and transparent. A “One Health” approach was used where key stakeholders from the Ministry of Agriculture, Water and Forestry, Ministry of Health and Social Services, Ministry of Environment and Tourism, Training Institutions, private healthcare facilities and development partners, were consulted during the development process.

Based on the findings from the situation analysis, the following key objectives were identified which will be addressed in the NAAP under 6 key pillars:

1. Surveillance – to achieve monitoring capacity through surveillance to capture essential information on AMR and inform decision making
2. Prevention – to reduce the incidence of infection through effective hygiene and IPC measures
3. Antimicrobial use – to optimize the use of antimicrobial medicines in human and animal health
4. Awareness, Collaboration and Communication - to improve awareness, collaboration and communication regarding AMR
5. Education and Training - to improve understanding of AMR through education and training
6. Research and Development – to promote research and development in prevention, medicine use, indigenous knowledge systems and medicinal plants

The pathway to implementation of the NAAP focuses on priority activities for the next two years in order to tackle the multiple tasks of this NAAP. “Quick wins” were identified in areas of surveillance, prevention, rational use and training and awareness. Thereafter, activities which are considered harder to accomplish, either because they require more time, more inter-sectoral collaboration, additional resources or a change in policy will be tackled (3-5 years). These activities, although they are harder to do, are no less important and therefore their planning will occur in parallel with the “quick wins.”

A Monitoring and Evaluation (M&E) framework has been developed to assess the extent to which the desired strategic objectives of the NAAP have been achieved. Indicators have been identified for each strategic pillar. These M&E indicators have been divided into input, process, and output or outcome/impact indicators.

Implementation of AMR activities will be built on existing systems, policies and programmes. A multi-sectoral systems approach will be used where all relevant sectors in addition to human health, such as animal health, plant production and environmental health, will have a sense of ownership of the plan to ensure effective implementation.

2. INTRODUCTION

2.1 Background to AMR in Namibia

Antibiotic resistance is a global public health threat, even in higher middle income countries such as Namibia where the infectious disease burden still impacts significantly on the health, productivity and economic sustainability of the majority of its citizens. Therefore, building a sustainable and effective programme to combat AMR and preserve antibiotics for future use will allow Namibia to achieve its economic and productivity growth targets as set out in the Targeted Interventions Programme for Employment and Economic Growth, Vision 2030 and the Namibian National Development Plans.

In February 2017, a process was initiated to review the current situation of antimicrobial use and resistance patterns for Namibia. This process has highlighted a number of key strengths and weaknesses which shall be addressed in this National AMR Action Plan (NAAP). Two workshops were held to solicit inputs from the key stakeholders and more information was obtained through one-on-one interaction and using other communication platforms including emails.

A number of key strengths and weaknesses were identified as summarised below:

1. **Infectious diseases and Surveillance:**
    - Despite limited laboratory capacity to monitor AMR, available data from the Namibian Institute for Pathology (NIP) of all pathology and microbiology tests conducted suggest that there is increasing drug resistance in humans, including significant resistance to amoxicillin, the current first line drug in the standard treatment guidelines (STG's) for most bacterial infections. Data however, needs to be sourced from Pathcare laboratories and other laboratories in the country including veterinary and agricultural laboratories. Studies that were conducted recently identified resistance of some pathogens to first line antibiotics for conditions such as meningitis, enteric and urinary tract infections (UTI), tuberculosis (TB) and malaria (*see table in the situational analysis*). A study conducted in 2016 revealed HIV drug resistance against non-nucleoside reverse transcriptase inhibitors (NNRTIs) was 13% in pre- antiretroviral therapy patients.
    - The lack of established surveillance systems of drug resistance is resulting in an incomplete picture of the true extent of the AMR problem. The NIP data and data from other laboratories will be a valuable starting point for creating a national surveillance system on AMR and to assist in distinguishing between community and hospital acquired infections.
    - In animal health, the majority of microorganism data available are for enteric diseases from routine samples obtained from export abattoirs for food safety testing. However, data from live animal enteric diseases is severely lacking as well as data from abattoirs for the local market. There have been no studies

done or published on the disease burden of enteric diseases in Namibia, and therefore there is no data available for the general livestock population. There is therefore a need for urgent commissioning of a study in this area by the Ministry of Agriculture.

- Active antibiogram surveillance programs are available only for animals which are referred to the Central Veterinarian Laboratory (CVL) to assist in diagnosis, often after antibiotic treatment has failed to produce desired results on the farm. These antibiograms do not reflect the disease burden in the general herd.
- Databases are available with rich sources of surveillance data on antimicrobial use and drug availability for the public sector in human health. However, the data has not been sufficiently analysed and reported on to alter prescribing practices or policy decisions.
- There are multiple stakeholders involved in water quality testing whose responsibilities and procedures may overlap or be duplicated. Mapping out their responsibilities is critical to improving the effectiveness of the water quality testing systems and incorporating AMR and antimicrobial residue testing.

2. Pharmaceutical Management

- Namibia has an Essential Medicines List (EML) and Standard Treatment Guidelines (STGs) developed through a robust process to which AMR data needs to be incorporated. Though Therapeutics committees are available in most facilities (77 percent), they must reach 95% of all health facilities both in private and public sector and the ministry of Agriculture should also come on board with this.
- There is good stock control and management procedures, including a pharmaceutical management information system (PMIS), however, medicine availability concerns still occur and need to be analysed.
- New training programs for staff dispensing veterinary medicines at wholesalers / retailers are being established to improve access in rural areas) and these should be fast tracked.

3. Infection Prevention and Control (IPC), Prevention, Biosecurity

- IPC implementation guidelines and training curricula are available. Nationally, there is an IPC Steering Committee with a lead IPC practitioner at MoHSS.
- Major challenges remain in terms of the lack of suitable healthcare facility infrastructure, lack of trained IPC practitioners, overcrowding, lack of supplies and resources to perform IPC tasks.
- There is currently no healthcare-associated infection (HAI) surveillance programme although the Namibian Institute for Pathology has detailed specimen data, including clinical information to support HAI/ Community Acquired Infection (CAI) surveillance.

- Vaccination coverage is 83 to 89 percent for humans i.e. i.e. 83 percent immunisation coverage for measles and 89 percent of children received the recommended Pentavalent vaccine which protects against five diseases namely diphtheria, whooping cough, tetanus, hepatitis and haemophilus influenza. This is according to 2013 WHO and UNICEF estimates). There is a controlled vaccination programme for certain zoonotic animal diseases. However, verified data from farmers is not available to clearly map out vaccination coverage. Data on hygiene, water and sanitation access are good.
- Biosecurity guidelines for animals need to be developed and implemented to reduce the need for antimicrobials. Animal traceability systems implemented include individual identification of bovine and group identification for sheep with movement permits needed, fences for foot and mouth disease and other traceability systems from farm to fork both for export and import products.

- Access to hygiene, water and sanitation facilities is good.

4. Education Research & Development

- There is a need to utilise the capacity and skills within tertiary institutions to assist with the interpretation and analysis of surveillance data. Ethical clearance challenges will need to be overcome to achieve this.
- There are many excellent research papers on AMR being produced within the universities that should be collated and presented/communicated for both prescribers and policy makers to apply the findings to change practices.
- AMR modules appear in the curricula of most healthcare professional programs with new programs for veterinarian training and pharmacists being investigated / developed as well as new cadres of health care workers being established.

Following the findings of the situation analysis, it was recommended that the four Ministries of Agriculture, Water and Forestry; Health and Social Services; Environment and Tourism; and Local Government, Rural and Urban Development work together starting with a workshop to develop and implement action plans based on this situation analysis aimed at managing antimicrobial resistance.

3. GOALS AND STRATEGIC OBJECTIVES OF NAAP

3.1 Goal of the Namibian NAAP

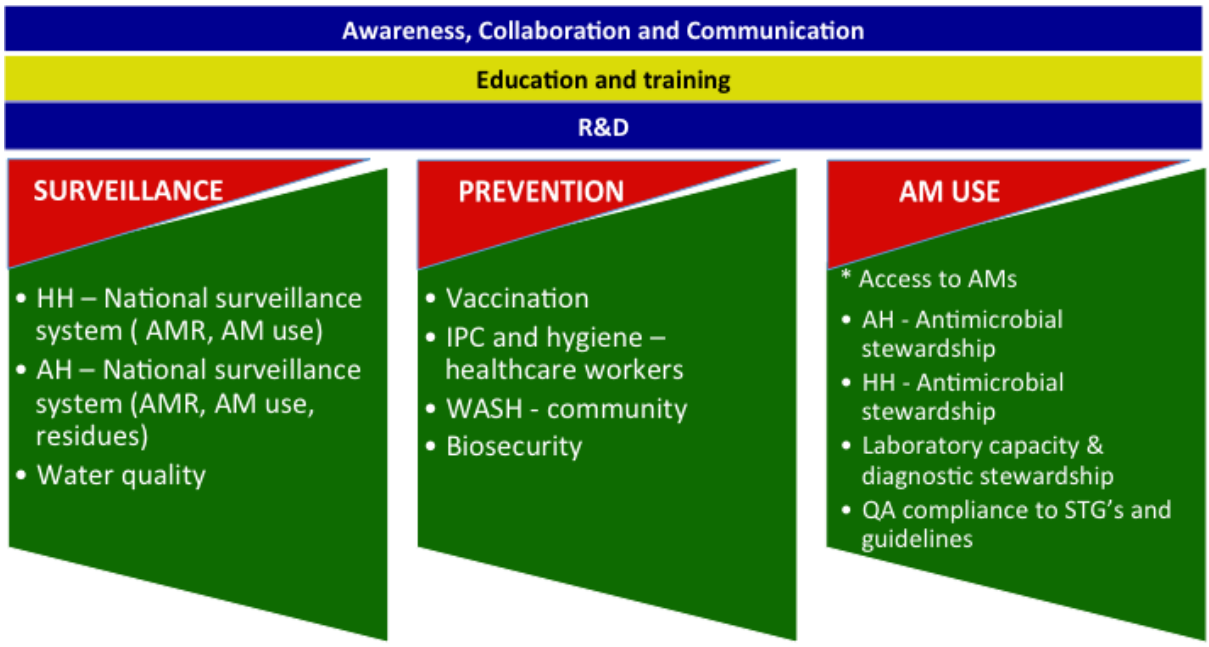
The overall goal of this NAAP is in line with the goal of the Global Action Plan which is to "*ensure, for as long as possible, continuity of successful treatment and prevention of infectious diseases with effective and safe medicines that are quality-assured, used in a responsible way, and accessible to all who need them".*

3.2 The Namibian NAAP framework

The following strategic objectives will be addressed in the NAAP framework:

1. Surveillance - achieve monitoring capacity through surveillance to capture essential information on AMR and inform decision making
2. Prevention - reduce the incidence of infection through effective hygiene and IPC measures
3. Antimicrobial use - optimize the use of antimicrobial medicines in human and animal health
4. Awareness, Collaboration and Communication - improve awareness, collaboration and communication regarding AMR
5. Education and training - improve understanding of AMR through education and training
6. Research and development – promote research and development in prevention, medicine use, indigenous knowledge systems and medicinal plants

Figure 1: The Namibian NAAP framework



The activities of the 3 pillars of awareness, collaboration and communication; education and training; and research and development are cross-cutting and will

therefore be implemented across the 3 key pillars of surveillance, prevention and antimicrobial use.

Principles of the Namibian NAAP

The following principles will guide the implementation of the NAAP:

1. Whole of society engagement and One Health: Human health, animal health, agriculture, food security and environmental sectors working together will be fundamental for containing the spread of AMR.
2. Prevention first: Prevention is cost effective.
3. Ensure access while avoiding excess: Access not only to existing and new drugs but also to health facilities, health care professionals, veterinarians, preventive technologies, diagnostic tools, knowledge, education and information is essential to human health and AMR control.
4. Incorporate and build on existing activities and plans.
5. Implement in phases by prioritising quick wins and key activities.
6. Monitor progress of implementation to inform further decision making.

Each strategic pillar and their proposed strategic objectives and interventions are described below.

3.3 Strategic Pillar: Surveillance

The key purpose of this pillar is to achieve monitoring capacity through surveillance to capture essential information on AMR and inform decision making.

The strategic objectives for surveillance are:

- To implement an integrated and coordinated national surveillance program for human and animal health.
- To improve laboratory capacity to ensure quality AMR data.
- To improve water quality testing and testing of food products of animal origin to ensure that no antimicrobials and residues are present.
- To ensure pathogens isolated from drinking water and food products are monitored for AMR.

3.3.1 Implement an integrated and coordinated national surveillance program for human and animal health

This strategic objective is composed of multiple parts both for animal and human health; antimicrobial resistance surveillance and surveillance of antimicrobial use.

The following priority interventions are proposed:

AMR:

a. Analyse the existing AMR data both from public and private laboratories for decision making purpose including standardising case definitions, identifying

key organisms and reporting to relevant bodies for both human and animal health.

b. Develop and implement a database system for input and organization of antibiogram results for interpretation of resistance patterns for human and animal health.
c. Increase the sample sizes from herds where a clinical case of a specific disease is identified and to increase samples for antimicrobial resistance monitoring to inform future guidelines.
d. Form an expert committee consisting of animal and human microbiology experts to interpret antimicrobial resistance profiles and assist with the development and adaptation of treatment guidelines.
e. Link and share information with international data sharing and collaboration networks on AMR and antimicrobial use (WHONet, GLASS, FAO, OIE).

AM USE

a. Strengthen antimicrobial use data from the private sector as done by the public sector by making use of information from sources inter alia medical aid claims and antimicrobial sales data for human health.
b. Create and implement a data source system for animal antimicrobial use by obtaining information from veterinary wholesalers.
c. Conduct surveys on antimicrobial usage patterns and practices to supplement routinely collected data (Incorporate AM use in national health surveys or during farm visits).
d. Improve completeness, capturing and analysis of antimicrobial use data from the animal health declaration form.
e. Strengthen knowledge of clinicians on accurate diagnostic tests and specimen types to be submitted as well as the interpretation of results.

Responsible organizations/Institutions:

- Ministry of Agriculture, Water & Forestry
  - Directorate Veterinarian Services (DVS)
  - Central Veterinary Laboratory
  - Animal Disease Control
  - Epidemiology
- Ministry of Health & Social Services
  - Epidemiology
  - Namibia Institute of Pathology
  - Pharmaceutical services

Monitoring and evaluation indicator: Surveillance system established for AMR in Humans and Animals

3.3.2 Improve laboratory capacity to ensure quality AMR data

Laboratory capacitation is required in order to gather the necessary data required to perform surveillance and diagnostic tests. This includes ensuring there are sufficient resources, skills and equipment to perform the required tests at the point of care for the patient and animal.

The following priority interventions are proposed:

a. Strengthen laboratory capacity in both the public and private sector for improved volume of diagnostic and surveillance testing.
b. Improve the timeliness of reporting and the interpretation of reports.

Responsible organizations/Institutions:

- Ministry of Agriculture, Water & Forestry
  - Directorate Veterinarian Services (DVS)
  - Central Veterinary Laboratory
- Ministry of Health & Social Services
  - Namibia Institute of Pathology

Monitoring and evaluation indicator: % improvement in report interpretation timelines

3.3.3 Improve water quality testing and testing of food products of animal origin to ensure that no antimicrobials and residues are present

The following priority interventions are proposed:

a. Develop a sampling strategy and testing standards for antimicrobial residues in water and food products.
b. Determine the resources (equipment, reagents, staff and finances) and capacities required for food products sampling and analysis.
c. Ensure that the Food Safety Bill is promulgated in order to give powers to inspectors to carry out inspections and sampling for antimicrobial residues.

Responsible organizations/Institutions:

- Ministry of Health & Social Services
  - Public & Environmental Health Division
  - Namibia Institute of Pathology
- Ministry of Agriculture, Water & Forestry
  - Central Veterinary Laboratory
  - Nam-Water
- Ministry of Rural and Urban Development
  - Local Authorities
- Ministry of Fisheries and Marine Resources

- Ministry of Environment & Tourism
- Ministry of Industrialization, Trade & SME Development
- Namibia Standards Institution (NSI)

Monitoring and evaluation indicator: Food Bill promulgated

3.3.4 Ensure pathogens isolated from drinking water and food products are monitored for AMR

The following priority interventions are proposed:

a. Develop standards for pathogen characterization and antimicrobial resistance testing in drinking water and food products sent for routine and regulatory testing.
b. Determine the resources (equipment, reagents, staff and finances) and capacities required for characterization of pathogens and AMR monitoring.
c. Establish coordination between all relevant ministries and stakeholders involved in AMR monitoring in water and food products.

Responsible organizations/Institutions:

- Ministry of Health & Social Services
    - Public & Environmental Health Division
    - Namibia Institute of Pathology
- Ministry of Agriculture, Water & Forestry
    - Central Veterinary Laboratory
    - Nam-Water
- Ministry of Rural and Urban Development
    - Local Authorities
- Ministry of Industrialization, Trade & SME Development
    - Namibia Standards Institution (NSI)
    - Private Laboratories

Monitoring and evaluation indicator: Surveillance system established for antimicrobial use in both animal and human health.

3.4 Strategic Pillar: Prevention

The key purpose of prevention is to reduce the incidence of infection through effective hygiene, infection prevention and control measures, biosecurity and community access to water, sanitation and hygiene facilities and practices.

The strategic objectives for prevention are:

- To establish mechanisms for coordinating and strengthening Infection Prevention and Control (IPC) initiatives at all levels of healthcare to prevent the spread of disease.
- To strengthen biosecurity measures on farms and country borders to prevent the spread of disease.
- To adopt and sustain a community based total sanitation approach to water, sanitation and hygiene (WASH).
- To strengthen the tracking and recording of controlled disease vaccinations in animals and expand vaccination in humans.

3.4.1 To establish mechanisms for coordinating and strengthening Infection Prevention and Control (IPC) initiatives at all levels of healthcare to prevent the spread of disease.

The most important disease threat in health facilities is posed by micro-organisms that have become resistant to antibiotics. Infections with such bacteria are a huge and rapidly growing problem not only in our hospitals but also in more everyday infections in the community. Reducing healthcare associated infections therefore contributes significantly to reducing AMR.

The following priority interventions are proposed:

a. Strengthen and expand governance structures including IPC committees and IPC trained coordinators at all levels of healthcare.
b. Ensure healthcare workers are familiar with the content of guidelines and protocols on IPC in all healthcare facilities.
c. Ensure availability of commodities and supplies for IPC.
d. Monitor and evaluate the implementation of IPC practices (developing key performance indicators) through health facility audits.
e. Establish feedback mechanisms on the outcome of the audits and implement continuing quality improvement initiatives.

Responsible organizations/Institutions:

- Ministry of Health and Social Services
    - Directorate of Quality Management,
    - Pharmaceutical Services,
    - Health care facility teams,
    - Directorate Health Information and Research, and
    - National IPC Steering Committee which has key stakeholders from private healthcare institutions, training institutions and community based organisations.

Monitoring and evaluation indicator: *Rate of HAI in healthcare facilities*

3.4.2 To strengthen biosecurity measures on farms and borders to prevent the spread of disease

Strengthening biosecurity measures leads to reduction in disease transmission and therefore the animal disease burden through movement control and the prevention of illegal cross border movements. This leads to a reduction in the use of antimicrobials and hence a reduction in AMR.

The following priority interventions are proposed:

a. Ensure borders and farm boundaries are secure.
b. Strengthen infection control measures at country entry points.
c. Implement management measures to control movement of animals and animal products.
d. Strengthen surveillance systems for identified diseases.

Responsible organizations/Institutions:

- Ministry of Agriculture Water and Forestry,
    - Directorate of Veterinary Services,
- Ministry of Safety and Security (Namibian Police),
- Namibian National Farmers Union,
- National Agricultural Union,
- Ministry of Health and Social Services,
- Public and Environmental Health Division- PHC,
- Ministry of Environment and Tourism (wild life and parks),
- Ministry of Urban and Rural Development (Local and Traditional Authorities)

Monitoring and evaluation indicator: % compliance on farm biosecurity guidelines

3.4.3. To adopt and sustain a community based total sanitation approach to water, sanitation and hygiene (WASH)

WASH involves implementing mechanisms to ensure availability of safe water and appropriate sanitation facilities including education on appropriate hygiene principles. Implementation of WASH leads to prevention of water and hygiene related illnesses, which reduces the disease burden and the use of antimicrobials and therefore reduces AMR.

The following priority interventions are proposed:

a. To develop a WASH strategy that incorporates the community based total sanitation approach.
b. Ensure sanitation facilities are available within communities.
c. Ensure continuing health promotion on WASH.

Responsible organizations/Institutions:

- Ministry of Agriculture Water and Forestry
    - Directorate of Water Supply and Sanitation Coordination,
- Ministry of Health and Social Services
    - PHC: Public and Environmental Health Division and IEC Subdivision,
- Relevant Development Partners,
- Ministry of Urban and Rural Development
- Local and Traditional Authorities

Monitoring and evaluation indicator: % of population with access to improved sanitation systems

3.4.4 To strengthen the tracking and recording of controlled disease vaccinations in animals and expand vaccination in humans

Vaccination has been shown to reduce the disease burden and the need for antimicrobials, therefore, expanding existing vaccination programmes to cover more preventable diseases and more of the population of humans and animals will have a significant impact on AMR.

The following priority interventions are proposed:

a. Expand existing vaccination programmes in both humans and animals to cover more preventable diseases.
b. Increase current vaccination coverage in both humans and animals.
c. Strengthen vaccine pharmacovigilance both in humans and animals.
d. Strengthen information systems management in relation to vaccination.

Responsible organizations/Institutions:

- MoHSS;
    - Directorate of Primary Health Care Services
    - Family Health Division- EPI program
    - Directorate of Tertiary Health Care,
    - Pharmaceutical Services,
    - Directorate Health Information and Research

- Ministry of Agriculture Water and Forestry
    - Directorate of Veterinary Services

Monitoring and evaluation indicator: *% of vaccination coverage*

3.5 Strategic Pillar: Antimicrobial Use

The key outcome of responsible antimicrobial use is to reduce iNAAPpropriate use in humans and animals and therefore limit the emergence of AMR.

The strategic objectives for rational use are:

a. To ensure that antimicrobials of high quality are continuously available in adequate quantities to meet the health needs of the population in all parts of the country at the lowest possible cost.
b. To ensure that all antimicrobials meet the minimum standard requirements for safety, efficacy and quality at all times.
c. To ensure rational and appropriate use of antimicrobials at the health facility and community level in both human and animal health sectors.
d. To ensure that antimicrobial use patterns and practices are monitored and evaluated.

3.5.1 To ensure that antimicrobials of high quality are continuously available in adequate quantities to meet the health needs of the population in all parts of the country at the lowest possible cost

The following priority interventions are proposed:

- Regulate the suppliers of antimicrobials to ensure authorised procurement of antimicrobials. Only approve suppliers whose capacity has been evaluated to ensure that it meets the stringent requirements for supply as determined by the National Medicines Regulatory Agency by conducting an annual evaluation.
- Enforce the use of Information Technology and Communication (ITC) to optimise efficiency and availability of current data to facilitate efficient supply planning.
- Avail price information for antimicrobials in order to improve procurement of antimicrobials at the lowest possible cost.

Responsible organizations/Institutions:

- Ministry of health and Social Services-pharmaceutical Services –Medicines Regulatory Authority
- Namibia Association of Medical Aid Funds

Monitoring and evaluation indicator:

- Percentage of authorized suppliers for antimicrobials
- Percentage of suppliers using appropriate Information Technology to inform supply
- Percentage of deviation of local exit prices throughout the supply chain from international prices

3.5.2 To ensure that all antimicrobials meet the minimum standard requirements for safety, efficacy and quality at all times

The following priority interventions are proposed

a. Conduct a skills needs assessment to determine the capacity requirements of the National Medicines Regulatory Agency in the areas of registration and pharmacovigilance for both human and animal health.
b. Implement the recommendations of the skills assessment.
c. Ensure that all health care workers, both in human and animal health, are trained on pharmacovigilance.

Responsible organizations/Institutions:

- Ministry of Health and Social Services
- Pharmaceutical Services
- Medicines Regulatory Authority

Monitoring and evaluation indicator:

- Percentage reduction in turnaround time for registration of antimicrobials
- Percentage of recommendations from skills needs assessment implemented
- Percentage of registered health care workers trained on pharmacovigilance

3.5.3 Ensure rational and appropriate use of antimicrobials at the health facility and community level in both human and animal health sectors.

The following priority interventions are proposed

a. Periodically review and update the STGs for human health
b. Develop STGs for high economic impact conditions for food animals
c. Disseminate STGs to all health care providers
d. Train all health care providers on STGs
e. Train and certify animal health retailers on dispensing of over the counter antimicrobials
f. Monitor and evaluate compliance to STGs
g. Regulate prescriptions for antimicrobials to ensure prescriptions are from legal prescribers

Responsible organizations/Institutions:

- Ministry of Health and Social Services
    - Pharmaceutical Services
    - Essential Medicines and Standard Treatment guidelines Committee
- Ministry of Agriculture Water and Forestry
    - Directorate of Veterinary Services

Monitoring and evaluation indicator:

- Percentage of HCWs who received STG
- Percentage compliance to treatment guidelines
- Percentage of registered health care workers trained on standard treatment guidelines
- Percentage of retailers that have staff trained and certified on dispensing over the counter antimicrobials

3.6 Strategic Pillar: Awareness, collaboration and communication

Improving awareness, collaboration and communication is key to reducing use and improves responsible antimicrobial use and reduces AMR.

The strategic objectives for awareness, collaboration and communication are:

a. To establish a structure for multi-sectoral collaboration, governance and communication on AMR.
b. To promote awareness on AMR in both human and animal health sectors at the health facility and community level.
c. To ensure on-going awareness of IPC, WASH, biosecurity and vaccination through effective communication and collaboration.

3.6.1 To establish a governance structure for multi-sectoral collaboration and communication on AMR

The following priority interventions are proposed:

a. Identify existing governance structures into which an AMR multi-sectoral committee may be positioned.
b. Nominate and appoint key stakeholders as representative members for the AMR multi-sectoral committee.
c. Designate a secretariat within a Ministry to oversee the operations of the AMR multi-sectoral committee.

3.6.2 To promote awareness on AMR in both human and animal health sectors at the health facility and community level

The following priority interventions are proposed

a. Develop and disseminate education materials for the public on antimicrobial resistance through written, audio visual and spoken media.

b. Incorporate the WHO World Antibiotic Awareness Week into the annual ministerial health day calendars.
c. Train health care workers and farmers to advocate for antimicrobial resistance during other national campaigns.

Responsible organizations/Institutions:

- Ministry of Health and Social Services
  - PHC-Health promotion
  - Public relations office
- Ministry of Agriculture

3.6.3 To ensure on-going awareness of IPC, WASH, biosecurity and vaccination through effective communication and collaboration

The following priority interventions are proposed:

a. Develop IEC materials for health education.
b. Identify, train and equip health educators.
c. Involve the media and other key stakeholders with ongoing campaigns.
d. Integrate awareness messages on prevention as part of existing international and local health and agriculture awareness days.
e. Monitor and evaluate the coverage of awareness campaigns.

Responsible organizations/Institutions:

- MoHSS;
  - Directorate of Primary Health Care Services
  - Family Health Division- EPI program and IEC subdivision
  - Quality Management Directorate (IPC unit)
  - Directorate of Tertiary Health Care
  - Pharmaceutical Services
  - Directorate Health Information and Research
- Ministry of Agriculture Water and Forestry
  - Directorate of Veterinary Services
- Ministry of Information and Communication Technology (Audio-visual and print media), Ministry of Rural and Urban Development, Ministry of Education

3.7 Strategic Pillar: Education and training

Education and training is key to improving understanding of AMR and drug prescribing practices.

The strategic objectives for education and training are:

a. To ensure the incorporation of rational antimicrobial use and integration of IPC, WASH, vaccination and biosecurity in all health professional curricula for both human and animal health sectors.
b. To maintain the skills and knowledge of health workers in IPC, WASH, diagnostic tests, vaccination and biosecurity through in-service training and CPD activities.
c. To educate farmers and agriculture retailers on the use and application of antimicrobials.
d. To ensure IPC practitioners are trained and qualified in all health facilities.

3.7.1 To ensure the incorporation of rational antimicrobial use and integration of IPC, WASH, vaccination and biosecurity in all health professional curricula for both human and animal health sectors.

The following priority interventions are proposed:

a. Collaborate with health professional councils on the issue of inclusion of rational antimicrobial use, IPC, WASH, vaccination and biosecurity in the health professional curricula

3.7.2 To maintain the skills and knowledge of health workers in IPC, WASH, diagnostic tests, vaccination and biosecurity through in-service training and CPD activities

The following priority interventions are proposed:

a. Collaborate with the health professional councils to include strategies against antimicrobial resistance as mandatory topics for CPD.
b. Mandate the health professional councils to make it compulsory for institutions of higher learning to provide CPD programmes on AMR.
c. Strengthen the knowledge of clinicians on accurate diagnostic tests, samples to take, isolate requirements and interpretation of results.
d. Formally educate farmers and retailers on the use and application of antimicrobials.
e. Mandate the directorate of veterinary services to put in place a properly structured training programme for farmers and retailers on the use and application of antimicrobials.

3.7.3 To ensure IPC focal persons are trained and qualified as IPC practitioners in all health facilities

a. Liaise with Health Professional Councils of Namibia (HPCNA) to recognise, register, and regulate the practice of IPC practitioners.

b. Train HPCNA staff that inspect healthcare facilities in IPC so that they are able to competently assess IPC practices when they inspect healthcare facilities.
c. Identify and train healthcare workers as IPC practitioners.
d. Ensure adequate IPC practitioners per healthcare facility according to WHO guidelines.

Responsible organizations/Institutions:

- MoHSS;
    - Quality Management Directorate (IPC unit)
    - Directorate of Human Resource Management
    - Directorate of Policy Planning
    - Regional Health Directorates
    - National Health Training Centre
- Ministry of Higher Education
    - Training and Innovation
- Health Professions Councils of Namibia

3.8 Strategic Pillar: Research and Development

The strategic objectives for R&D are:

a. To promote research and development in IPC, WASH, biosecurity and vaccines, medicine use, indigenous knowledge systems and medicinal plants

The following priority interventions are proposed:

a. To generate research on IPC practices in health care facilities, biosecurity on farms and vaccination programmes.
b. To understand community behaviours around WASH.
c. To study the potential impact of indigenous knowledge systems and medicinal plants on AMR.

4. PRIORITISATION

The pathway to implementation should focus on priority activities for the next two years in order to tackle the multiple tasks of this NAAP in such a way that "quick win" interventions can be identified and implemented while longer term, more difficult interventions are planned and developed over time.

The following "quick wins" were identified during the NAAP drafting workshops and are considered the most important aspects of the NAAP to implement and focus attention on in the very short term:

Quick Wins	
Surveillance: a. Surveillance of AMR – human and animal health b. Surveillance of AMU for human use c. Lab capacity strengthening to increase surveillance	**Prevention:** a. IPC structures strengthening b. Improving vaccination coverage – human and animal health c. Monitoring of pathogens in food and water for AMR
Rational Use Appropriate use of antimicrobials: a. STG review for human health planned and funded	**Training and awareness** a. Incorporation of antimicrobial use and other strategies into curricula of healthcare professionals b. In-service training and CPD activities on AMR c. Training farmers and retailers on antimicrobial use and administration as part of a voluntary process

Thereafter, the activities which are considered harder to accomplish, either because they require more time, more inter-sectoral collaboration, additional resources or a change in policy will be tackled. These activities, although they are harder to do, are no less important and therefore their planning should occur in parallel to the "quick wins."

Important activities requiring long-term work

Surveillance:

a. Surveillance on antimicrobial use in animals

b. Residue testing and surveillance for animals and animal products

Prevention:

a. Coordination of stakeholders from ministries involved in food safety

b. IPC strengthening and coordination (practices, ICP training and posts)

c. Strengthening biosecurity measures

d. Total sanitation approach to WASH

e. Expanding vaccination in humans and animals

f. Antimicrobial residue monitoring in water and food

Rational Use

Availability of antimicrobials – skills, training and pharmacovigilance systems

Appropriate use of antimicrobials:

a. Development of STG's for animal health

b. Training on STG's

c. Monitoring of compliance to STG's and guidelines

d. Certificated training for retailers and farmers on antimicrobial use

Quality of antimicrobials

a. Regulate the suppliers

b. LMIS set standards

c. Annual evaluation,

d. Price assessments

Training and awareness

a. Training of IPC practitioners

b. Governance structure for multisectoral collaboration and communication

c. Awareness on AMR

d. Ongoing awareness on IPC/WASH/ prevention

5. IMPLEMENTATION PLANS

The implementation of the NAAP will occur over a number of years, therefore the interventions and activities are broken into short term (less than 2 years), medium term (2 – 5 years) and long term (> 5 years).

HA – Human Health; AH – Animal Health

5.1 Surveillance

Strategic Objective: To implement an integrated and coordinated national surveillance program for human and animal health			
Intervention	**Activity**	**Timeframe**	**Responsible organization/ department**
AMR			
a. To achieve monitoring capacity through surveillance to capture essential information on AMR and inform decision making	To define the case definitions for AMR data for both humans and animals.	2017/18	NIP,MOHSS, DVS
	Identify key organisms for surveillance and reporting (HH)	2017/18	NIP,MOHSS-Epidemiology division
	Identify key organisms for surveillance and reporting (AH)	2017/18	DVS-ADC
	To extract existing data using the case definition and key organisms and send to epidemiology division (HH)	2017/18	NIP MOHSS-Epidemiology division
	To extract existing data using the case definition and key organisms and send to epidemiology division (AH)	2017/18	CVL-Epidemiology
b. To develop and implement a data base system for input and organization of antibiogram results for interpretation of resistance pattern for AH and HH.	To identify data base systems and ensure both public and private laboratories report routinely to the database (HH and AH)	2018/19	MOHSS-Epidemiology division
	Input the data into the system (HH and AH)	2018/19	MOHSS-Epidemiology division DVS- Epidemiology
	Extract the data for analytical purposes and provide them to epidemiology for development of reports.	2018/19	MOHSS-Epidemiology division DVS- Epidemiology
c. **Increase sample size from the herd where a**	Identify a standardized random sampling method (AH).	2018/19	DVS- Epidemiology

Strategic Objective: To implement an integrated and coordinated national surveillance program for human and animal health			
Intervention	**Activity**	**Timeframe**	**Responsible organization/ department**
clinical case of a specific disease is identified to increase samples for AMR monitoring (To inform future guidelines).	Implementation of the random sampling method	2018/19	DVS- Epidemiology
d. To form an expert committee consisting of animal and human of microbiology expert to interpret the AMR profile and assist with the development and adaptation of treatment guidelines.	Identify expert committee members	2017/18	NIP,MOHSS, DVS
	Appointment expert committee and draft Terms of reference and scope of work	2017/18	NIP,MOHSS, DVS
	Analysis and interpretation data by the expert committee.	2017/18	NIP,MOHSS, DVS
e. To link and share information with international data sharing and collaboration networks on AMR and AM use (WHO net, GLASS, FAO, OIE).	Register with WHO GLASS to submit data (HH) by submitting an approval for the submission of data (HH)	2017/18	MOHSS
	Compile data annually and submit it(HH and AH)	2018/19	MOHSS & DVS
	Register with the required international collaboration network on AM use (HH)	2017/18	MOHSS
	Register with the required international collaboration network on AMR (AH)	2017/18	DVS
AM USE			
a. Strengthen the antimicrobial use from the private sector as done by the public sector by making use of information from sources inter	Identify medical aid schemes and sales data	2017/18	MOHSS
	Extract information on AM use	2017/2018	MOHSS
	Analyze the data	2018/2019	MOHSS

Strategic Objective: To implement an integrated and coordinated national surveillance program for human and animal health			
Intervention	**Activity**	**Timeframe**	**Responsible organization/ department**
alia medical aid claims and sales data for HH.			
b. Create and implement a data source system for antimicrobial use by obtaining information from the veterinary wholesalers.	Identify veterinary wholesalers	2017/18	DVS
	Extract information on AM use	2017/18	DVS
	Analyze the data	2017/18	DVS
c. Conduct surveys to supplement routinely collected data	**I**ncorporate AM use in national health surveys or during farm visits.	2018/19	MOHSS & DVS
d. Improve completeness of the antimicrobial use section of the animal health declaration form	Create awareness on the completion of the animal health declaration form.	2018/19	DVS-ADS
	Strengthen verification process that its adhered to.		DVS-Epidemiology
e. To strengthen knowledge of clinicians on the accurate diagnostic test and specimen type to be submitted as well as the interpretation of results.	In-house trainings of clinicians	2017/18	NIP,MOHSS,DVS

Strategic Objective: To improve the laboratory capacity to ensure quality AMR data			
Intervention	**Activity**	**Timeframe**	**Responsible organization/ department**
a. To strengthen laboratory capacity for improved volume of diagnostic and surveillance testing.	Assess current capacity	2017/18	CVL, NIP
	Determine additional resources required to increase capacity		CVL, NIP
	Determine most suitable plan to improve capacity.	2017/18	CVL, NIP

Strategic Objective: To improve the laboratory capacity to ensure quality AMR data			
Intervention	**Activity**	**Timeframe**	**Responsible organization/ department**
	Implement improved capacity	2018/19	CVL, NIP
b. To improve the timeliness of reporting and the interpretation of reports.	To identify key causes of delay result reporting (AH and HH)	2017/18	NIP,CVL
	Take corrective actions against delayed results.(AH and HH)	2017/18	NIP,CVL

Strategic Objective: To improve water quality testing and testing of food products of animal origin to ensure that no antimicrobials and residues are present.			
Intervention	**Activity**	**Timeframe**	**Responsible organization/department**
a. Develop a sampling strategy and testing standards for antimicrobial residue in water and food products	Development of a sampling plan for water	2017/18	MOAWF – Directorate of Water supply
	Development of a sampling plan for food products	2017/18	Primary Health Care Director, PEHS – MoHSS Director of Veterinary – MOAWF
	Select and validate testing methods	2017/18	Primary Health Care, PEHS – MoHSS, (NIP) Directorate of Veterinary – MOAWF, (CVL)
	Communicate and implement the monitoring of antimicrobial residue	2018/19	Primary Health Care, PEHS – MoHSS, (NIP) Directorate of Veterinary – MOAWF, (CVL)
b. Determine the resources (equipment, reagents, staff and finances) and capacities required for food products sampling and analysis	Carry out a gap analysis for required resources	2017/18	Primary Health Care, PEHS – MoHSS, (NIP) Directorate of Veterinary – MOAWF, (CVL)
	Mobilize for resources required for antimicrobial residue monitoring	2017/18	Primary Health Care, PEHS – MoHSS, (NIP) Directorate of Veterinary – MOAWF, (CVL)
c. Ensure that the Food Safety Bill is promulgated	Submit Draft Food Safety Bill to cabinet for approval	2017/18	Primary Health Care - MoHSS

in order to give powers to inspectors to carry out inspections and sampling for antimicrobial residues	Draft regulation that cover antimicrobial residue monitoring in water and food products	2018/19	Chief Vet. Officer, Directorate of Veterinary – MOAWF Primary Health Care – MoHSS

Strategic Objective: To ensure pathogens isolated from drinking water and food products are monitored for AMR.			
Intervention	Activity	Timeframe	Responsible organization/ department
f. Develop standards for pathogens characterization and antimicrobial resistance testing in drinking water and food products sent for routine and regulatory testing	Select and validate testing methods	2017/18	Primary Health Care, PEHS – MoHSS, (NIP) Directorate of Veterinary – MOAWF, (CVL)
	Communicate and implement the monitoring of antimicrobial residue	2018	Primary Health Care, PEHS – MoHSS, (NIP) Directorate of Veterinary – MOAWF, (CVL)
g. Determine the resources (equipment, reagents, staff and finances) and capacities required for characterization of pathogens and AMR monitoring	Carry out a gap analysis for required resources	2018	Primary Health Care, PEHS – MoHSS, (NIP) Directorate of Veterinary – MOAWF, (CVL)
	Mobilize for resources required for antimicrobial residue monitoring	2018/19	Primary Health Care, PEHS – MoHSS, (NIP) Directorate of Veterinary – MOAWF, (CVL)
h. Establish coordination between all relevant ministries and stakeholders involved in AMR monitoring in water and food products	Establish a committee to coordinate activities between different ministries and relevant stakeholders on AMR monitoring in water and food Products	2017/18	Permanent Secretary - MoHSS

5.2 Prevention

Strategic Objective: To establish mechanisms for coordinating and strengthening Infection Prevention and Control (IPC) initiatives at all levels of healthcare to prevent spread of disease.			
Intervention	**Activity**	**Timeframe**	**Responsible organization/department**
a. Strengthen and expand governance structure: IPC committees, IPC focal person/coordinator at all levels of healthcare	Identify the additional Stakeholders for the National IPC Committee and add to membership	2017	MoHSS, Quality Management Directorate – IPC Unit
	Understand the current gaps in the effective functioning of IPC committees by consulting with the IPC focal people	2017	MoHSS, Quality Management Directorate – IPC Unit, Regional Health Directorate
	Establish active IPC committees at Health Care facilities	2017/18	MoHSS, Quality Management Directorate – IPC Unit, Regional Health Directorate
	Engage Health Care Managers in supporting and monitoring IPC practices and ensuring dedicated time is given to IPC Focal people to do their work.	2017/18	MoHSS, Quality Management Directorate – IPC Unit, Regional Health Directorate
b. Ensure healthcare workers are familiar with the content of guidelines and protocols on IPC in all healthcare facilities.	Make the IPC guidelines and protocols are available and accessible	2017/18	MoHSS, Quality Management Directorate – IPC Unit, Regional Health Directorate
	Train healthcare workers on content of IPC guidelines and	2017/18	MoHSS, Quality Management Directorate – IPC Unit, Regional Health Directorate

	protocols		
	Assess IPC knowledge through practical and knowledge assessments	2018/19	MoHSS, Quality Management Directorate – IPC Unit, Regional Health Directorate
c. Ensure availability of commodities and supplies for IPC	Identify the required commodities and supplies and specifications thereof for effective IPC implementation	2017/18	MoHSS, Quality Management Directorate – IPC Unit
	Estimate the volumes of commodities required	2017	MoHSS, Quality Management Directorate – IPC Unit, Regional Health Directorates
	Procure the necessary commodities and supplies	2017/18	Tertiary Healthcare and Clinical Support Services
	Establish and monitor stock control measures for IPC commodities and supplies	2017/18	Tertiary Healthcare and Clinical Support Services, Regional Health Directorates
d. Monitor and evaluate the implementation of IPC practices (developing key performance indicators)	Facilities to use the ICAT once a year and submit results to QA Directorate – IPC unit	2018/19	Regional Health Directorates
	Develop a self assessment tool that facilities use quarterly and submit results to QA Directorate – IPC unit	2017/18	QA Directorate – IPC unit
	Define core indicators for reporting IPC activities	2017/18	QA Directorate – IPC unit

	quarterly		
e. Establish feedback mechanism on outcome of the audits and implementing continuing quality improvement initiatives	Give feedback during committee and IPC meetings on the outcome of IPC audits	2017/18	
	Analyze the IPC data and determine facilities for support visits and for QI initiatives implementation to address the identified gaps	2017/18	

Strategic Objective: To strengthen biosecurity measures on farms and borders to prevent spread of disease			
Intervention	Activity	Timeframe	Responsible organization/ department
a. Ensure borders and farm boundaries are secure	Maintain fences along the zonal and international border demarcations.	2017/18	Ministry of Agriculture Water and Forestry, Directorate of Veterinary Services, Ministry of Works and Transport
	Inspect the farms, zone demarcation and international borders for fencing compliance	2017/18	Ministry of Agriculture Water and Forestry, Directorate of Veterinary Services, Ministry of Land Reform
	Impose restrictions on movement from non-compliant farms	2017/18	Ministry of Agriculture Water and Forestry, Directorate of Veterinary Services
b. Strengthen infection control measures at entry points	Install disinfection baths at entry points along the zonal and international borders	2018/19	Ministry of Agriculture Water and Forestry, Directorate of Veterinary Services,
	Conduct inspection of animals, animal products and other infectious material at international borders	2017/18	Ministry of Agriculture Water and Forestry, Directorate of Veterinary Services,

	Inspect for compliance on import requirements	2017/18	Ministry of Agriculture Water and Forestry, Directorate of Veterinary Services, Ministr of Safety and Security (Police)
	Establish laboratory capacity at international borders	2018/19	Ministry of Agriculture Water and Forestry, Directorate of Veterinary Services,
	Build quarantine facilities along international borders	2018/19	Ministry of Agriculture Water and Forestry, Directorate of Veterinary Services,
	Continue awareness campaigns regarding requirements for import of animals and products		Ministry of Agriculture Water and Forestry, Directorate of Veterinary Services,
c. Implement management measures to control movement of animals and animal products	Inspect for compliance with animal movement permit system	2018/19	Ministry of Agriculture Water and Forestry, Directorate of Veterinary Services,
	Impose restrictions in case of violations	2018/19	Ministry of Agriculture Water and Forestry, Directorate of Veterinary Services,
d. Strengthen surveillance systems for identified diseases	Implement surveys on identified diseases.	2018/19	Ministry of Agriculture Water and Forestry, Directorate of Veterinary Services,

Strategic Objective: To adopt and sustain a community based total sanitation approach to WASH			
Intervention	Activity	Timeframe	Responsible organization/ department
a. To develop WASH strategy that incorporates the community based total sanitation approach	Form a technical working group to develop the WASH strategy	2017	MoHSS (PHC-Public and Environmental Health), Ministry of Agriculture Water and Forestry (Directorate of Water Supply and Sanitation Coordination)
	Finalize and disseminate the WASH strategy conduct trainings	2017/18	MoHSS (PHC-Public and Environmental Health), Ministry of Agriculture Water and Forestry (Directorate of Water Supply and

			Sanitation Coordination)
	Implement the WASH strategy	2018/19	MoHSS (PHC-Public and Environmental Health), Ministry of Agriculture Water and Forestry (Directorate of Water Supply and Sanitation Coordination)
b. Ensure Sanitary facilities are available within the communities	Review the sanitation facilities coverage and prioritise	2017/18	MoHSS (PHC-Public and Environmental Health), Ministry of Agriculture Water and Forestry (Directorate of Water Supply and Sanitation Coordination)
	Assess the resources required for building the sanitation facilities	2017/18	MoHSS (PHC-Public and Environmental Health), Ministry of Agriculture Water and Forestry (Directorate of Water Supply and Sanitation Coordination)
	Build the sanitation facilities	2018/19	Ministry of Agriculture Water and Forestry (Directorate of Water Supply and Sanitation Coordination) and MoHSS (PHC-Public and Environmental Health),

Strategic Objective: To strength the tracking and recording of controlled disease vaccinations in animals and expand vaccination in humans			
Intervention	Activity	Timeframe	Responsible organization/ department
a. Expand existing vaccination programme in both humans and animals to cover more preventable diseases	Identify the key preventable diseases that are currently not part of the routine vaccination program	2017	MoHSS; Directorate of Primary Health Care Services, Family Health Division- EPI program Ministry of Agriculture Water and Forestry, Directorate of Veterinary Services

	Assess cost implications for implementing the vaccination program for these key preventable diseases and source funding	2017/18	MoHSS; Directorate of Primary Health Care Services, Family Health Division- EPI program Ministry of Agriculture Water and Forestry, Directorate of Veterinary Services
	Prioritize and implement vaccinations	2018/19/2020	MoHSS; Directorate of Primary Health Care Services, Family Health Division- EPI program Ministry of Agriculture Water and Forestry, Directorate of Veterinary Services
b. Increase the current vaccination coverage in both humans and animals	Gather baseline data on vaccination coverage in humans	2017/18	MoHSS; Directorate of Primary Health Care Services, Family Health Division- EPI program
	Gather baseline data on vaccination coverage in animals	2017/18	Ministry of Agriculture Water and Forestry, Directorate of Veterinary Services
	Determine gaps and strategy to address the gaps in both human and animal health	2018/19	MoHSS; Directorate of Primary Health Care Services, Family Health Division- EPI program Ministry of Agriculture Water and Forestry, Directorate of Veterinary Services
	Ensure cold chain is maintained for effectiveness of the vaccines	2017/18	MoHSS; Directorate of Primary Health Care Services, Family Health Division- EPI program Ministry of Agriculture Water and Forestry, Directorate of Veterinary Services
c. Strengthen vaccine pharmacovigila	Continue monitoring for unwanted side effects that occur	2017/18/19/2020	MoHSS, Pharmaceutical Services,

nce both in humans and animals	after use of the vaccines		
	Rapid response to the community so as to prevent antagonism of the EPI program	2017/18	MoHSS, Pharmaceutical Services,
	Inform the health care workers on the importance of requesting post-mortem examination in the event that someone dies after vaccination	2017/18	MoHSS, Pharmaceutical Services,
d. Strengthen information systems management in relation to vaccination	Collect accurate information on vaccination from the farms	2018/19	Ministry of Agriculture Water and Forestry, Directorate of Veterinary Services
	Analyze the information and keep an up to date database on vaccinations coverage	2018/19	MoHSS; Directorate of Primary Health Care Services, Family Health Division- EPI program Ministry of Agriculture Water and Forestry, Directorate of Veterinary Services

5.3 Rational Use

Strategic Objective: To ensure that antimicrobials of high quality are continuously available in adequate quantities to meet the health needs of the population in all parts of the country at the lowest possible cost			
Intervention	**Activity**	**Timeframe**	**Responsible organization/department**

a. Regulate the suppliers of antimicrobials to ensure authorised procurement of antimicrobials	Revise the regulations pertaining to the supply of pharmaceuticals and related substances to ensure that they are adequate	2018/19	Ministry of Health and Social Services – Pharmaceutical services- National medicines regulatory agency-
	Conduct an annual evaluation of pharmaceutical suppliers	2018/19	Ministry of Health and Social Services – Pharmaceutical services- National medicines regulatory agency
b. Enforce the use of Information Technology and Communication (ITC) to optimise efficiency and availability of current data to facilitate efficient supply planning	Set minimum standard requirements for the information system	2018/19	Ministry of Health and Social Services – Pharmaceutical services- National medicines regulatory agency
	Conduct an annual monitoring and evaluation visits of pharmaceutical suppliers to ensure routine use of information systems	2018/19	Ministry of Health and Social Services – Pharmaceutical services- National medicines regulatory agency
	Publish data on pharmacies that are compliant		Ministry of Health and Social Services – Pharmaceutical services- National medicines regulatory agency
c. Avail price information for antimicrobials in order to improve procurement of antimicrobials at the lowest possible cost	Obtain local and international price indexes for antimicrobials	2018/19	Ministry of Health and Social Services – Pharmaceutical services- National medicines policy coordination
	Conduct an annual assessment of prices	2018/19	Ministry of Health and Social Services – Pharmaceutical services- National medicines policy coordination
	Disseminate report on findings	2018/19	Ministry of Health and Social Services – Pharmaceutical services- National medicines policy coordination

<u>Strategic Objective:</u> To ensure that all antimicrobials meet the minimum standard requirements for safety efficacy and quality at all times.			
Intervention	**Activity**	**Timeframe**	**Responsible organization/department**
a. Conduct a skills needs assessment to determine the capacity	Conduct a skills needs assessment to determine the capacity	2018/19	Ministry of Health and Social Services – Pharmaceutical services- National medicines

requirements of National Medicines Regulatory Agency in the areas of registration and pharmacovigilance for both Human and Animal Health.	requirements of National Medicines Regulatory Agency in the areas of registration and pharmacovigilance for both Human and Animal Health.		regulatory agency-
b. Implement recommendations of the skills assessment	Implement recommendations of the skills assessment	2019	Ministry of Health and Social Services – Pharmaceutical services- National medicines regulatory agency-
c. Ensure that all health care workers both HH and AH are trained on pharmacovigilance	Develop training materials on pharmacovigilance for HH and AH	2018/19	Ministry of Health and Social Services – Pharmaceutical services- National medicines regulatory agency-
	Conduct training on pharmacovigilance for all health care	2018/19	Ministry of Health and Social Services – Pharmaceutical services- National medicines regulatory agency-

Strategic Objective: Ensure rational and appropriate use of antimicrobials at health facility and community levels in both human and animal health sectors			
Intervention	Activity	Timeframe	Responsible organization/department
a. Periodically review and update the Standard Treatment Guidelines for Human Health	Review and update the Standard Treatment Guidelines for Human Health	2018/19/2020	Ministry of Health and Social Services – Pharmaceutical services- National medicines policy coordination
b. Develop Standard treatment guidelines for high economic impact conditions for food animals in Namibia	Determine which conditions STG's are required and set up expert working groups to develop guidelines	2018/19	Ministry of Agriculture water and forestry- Directorate of Veterinary Services
	Develop STG's for high economic impact conditions for food animals	2018/19	Ministry of Agriculture water and forestry- Directorate of Veterinary Services

	in Namibia		
c. Disseminate standard treatment guidelines to all health care providers	Disseminate STG's to all health care providers	2018/19	Ministry of health and Social Services – Pharmaceutical services- National medicines policy coordination ; Ministry of Agriculture water and forestry- Directorate of Veterinary Services
d. Train all health care providers on standard treatment guidelines	Develop training materials on STGs for HH and AH	2019/2020	Ministry of health and Social Services – Pharmaceutical services- National medicines policy coordination ; Ministry of Agriculture water and forestry- Directorate of Veterinary Services
	Conduct training on STGs for all health care providers	2019/2020	Ministry of health and Social Services – Pharmaceutical services- National medicines policy coordination ; Ministry of Agriculture water and forestry- Directorate of Veterinary Services
e. Train and certify animal health retailers on dispensing of over the counter antimicrobials	Develop a curriculum for the training of retailers	2018/19	Ministry of Agriculture water and forestry- Directorate of Veterinary Services
	Develop training materials for training of retailers	2018/19	Ministry of Agriculture water and forestry- Directorate of Veterinary Services
	Train and certify animal health retailers on dispensing of over the counter antimicrobials	2018/19	Ministry of Agriculture water and forestry- Directorate of Veterinary Services
f. Monitor and evaluate compliance to standard treatment guidelines	Conduct a biennial assessment to determine levels of compliance to guidelines	2019/2020	Ministry of health and Social Services – Pharmaceutical services- National medicines policy coordination ; Ministry of Agriculture water and forestry- Directorate of Veterinary Services
g. Regulate prescriptions for antimicrobials to ensure	Conduct a biennial assessment to determine levels	2019/2020	Ministry of Health and Social Services – Pharmaceutical services- National medicines

prescriptions are from legal prescribers	of compliance to regulations		regulatory agency

5.4 Awareness, collaboration and communication

Strategic Objective: • To establish a structure for multisectoral collaboration, governance and communication on AMR			
Intervention	Activity	Timeframe	Responsible organization/department
a. Identify existing governance structures into which an AMR multisectoral committee may be positioned	Determine most suitable structure for governance on AMR	2017/18	MOHSS, MOAWF
b. Nominate and appoint the key stakeholders as representative members for the AMR multisectoral committee	Identify all key stakeholders for AMR	2017/18	MOHSS, MOAWF
	Determine those that will be nominated for members of the governance structure	2017/18	MOHSS, MOAWF
	Nominate and appoint governance structure	2017/18	MOHSS, MOAWF
c. Designate a secretariat within a Ministry to oversee the operations of the AMR multisectoral committee	Identify and designate the secretariat based on the ministry supporting the governance structure	2017/18	MOHSS, MOAWF

d. Ensure functionality of governance structures	Determine budget for meetings	2017/18	MOHSS, MOAWF
	Set annual work plan and meeting schedule	2017/18	MOHSS, MOAWF
	Provide secretariat services and document discussions at meetings	Ongoing	MOHSS, MOAWF

Strategic Objective: To promote awareness on AMR in both human and animal health sectors at health facility and community levels.			
Intervention	Activity	Timeframe	Responsible organization/department
a. Develop and disseminate education materials for the public on AMR through written, audio visual and spoken media	Develop key messages collaboratively for animals and humans (AMR, AMU, withdrawal period, carcass disposal)	2017/18	NSTAG/ governance structure TWG
	Determine communication media and strategy – embed in existing communication plans	2017/18	MOH – PHC, pharmaceutical services, MOAWF – division epidemiology
	Engage opinion leaders on advocacy for the prevention of antimicrobial resistance in humans and animals	2018/19	MOH – PRO, MOAWF – PRO
	Implement the communication plan	2018/19	MOH – PRO, MOAWF – PRO
b. Incorporate the WHO national AMR	Draft submission to	2018/19	MOAWF – directorate Veterinarian services (traceability and advisory),

awareness week into the annual ministerial calendars.	PS of MOHSS, MOAWF on inclusion of WAAW into calendars		MOH – pharmaceutical services
c. Train health care workers and farmers to advocate for AMR during other national campaigns.	Develop materials and engage with PHC directorate on key messages to communicate to healthcare workers and patients	2018/19	MOH –PHC
	Engage the Therapeutics committee in hospitals and IPC nurses in private hospitals on key messages to communicate to healthcare professionals	2018/19	MOH –pharmaceutical services
	Develop materials on key messages to veterinarian workers and farmers and community	2018/19	MOAWF - directorate Veterinarian services (traceability and advisory)
	Engage with state vets and animal health technicians on key messages to veterinarian workers and farmers and community	2018/19	MOAWF - directorate Veterinarian services (animal disease control)

Strategic Objective: To ensure on-going awareness of IPC, WASH, Biosecurity and Vaccination through effective communication and collaboration			
Intervention	Activity	Timeframe	Responsible organization/department
a. Develop IEC materials for health	Develop key messages for	2018/19	MoHSS (PHC-Public and Environmental Health, IEC

education	education materials		department), Ministry of Agriculture Water and Forestry (Directorate of Water Supply and Sanitation Coordination)
	Develop IEC materials on WASH	2018/19	MoHSS (PHC-Public and Environmental Health, IEC department), Ministry of Agriculture Water and Forestry (Directorate of Water Supply and Sanitation Coordination)
b. Identify, train and equip health educators	Identify, train and equip health educators	2018/19	MoHSS (PHC-Public and Environmental Health, IEC department), Ministry of Agriculture Water and Forestry (Directorate of Water Supply and Sanitation Coordination)
c. Involve the media and other key stakeholders with ongoing campaigns	Draw up a plan for health promotion activities	2018/19	MoHSS (PHC-Public and Environmental Health, IEC department), Ministry of Agriculture Water and Forestry (Directorate of Water Supply and Sanitation Coordination)
d. Integrate awareness messages on prevention as part of existing international and local health and agriculture awareness days	Determine existing programs where messages can be incorporated and implemented	2018/19	MoHSS (PHC-Public and Environmental Health, IEC department), Ministry of Agriculture Water and Forestry (Directorate of Water Supply and Sanitation Coordination)
e. Monitor and evaluate the coverage of awareness campaigns	Conduct KAP study of community awareness	2018/2019	MoHSS (PHC-Public and Environmental Health, IEC department), Ministry of Agriculture Water and Forestry (Directorate of Water Supply and Sanitation Coordination)

5.5 Education and training

Strategic Objective: To ensure incorporation of rational antimicrobial use and integration of IPC, WASH, Vaccination and biosecurity in all health professional curricula for both human and animal health sectors.			
Intervention	**Activity**	**Timeframe**	**Responsible organization/department**
a. Collaborate with health professionals	Meet with health professional training	2017/18	MoHSS/ Pharmaceutical Services

councils on the issue of inclusion of rational antimicrobial use, IPC, WASH, vaccination and biosecurity in the health professional curricula	institutions to review the existing curricula and identify areas where IPC, WASH, vaccination and biosecurity can be added or strengthened		
	Document the findings from the meeting with the health professional training institutions	2017/18	MoHSS/ Pharmaceutical Services
	Organize a meeting with the Health Professionals Councils to present the findings and discuss the way forward	2017/18	MoHSS/ Pharmaceutical Services
	Councils incorporate the discussed items in the existing curricula	2018/19	Health professional councils
	Health professional councils monitor the implementation of the curricula, including focus on IPC, WASH, vaccination and biosecurity	2018/19/2020	Health professional councils

<u>Strategic Objective:</u> To maintain the skills and knowledge of health workers in IPC, WASH, diagnostic tests, vaccination and biosecurity through in-service training and CPD activities			
Intervention	**Activity**	**Timeframe**	**Responsible organization/department**
a. Collaborate with the health professional councils to	Identify gaps in the use of antimicrobials to guide the	2017/18	MoHSS/ Institutions of higher learning

include strategies against AMR as mandatory topics for CPD	development of training material		
	Develop training curricula/ materials	2018/19	Institutions of higher learning
	Seek CPD accreditation from the health professionals council and liaise with councils to make the trainings mandatory	2018/19	Institutions of higher learning
	Conduct training	2018/19/2010	Institutions of higher learning
	Assess effect and impact of the training on antimicrobial use and prevention of AMR	2019/2020	Institutions of higher learning
b. Work with the health professional councils and institutions of higher learning to provide CPD programmes	Publish the critical areas that require CPD points acquisition	2018/2019	Health professional councils
	Meet with institutions of higher learning and the health professionals councils to discuss how they can effect CPD trainings	2018/2019	Health professional councils
c. Strengthen the knowledge of clinicians on selecting the correct diagnostic test, right samples to take, isolate requirements and interpretation of results	Prepare standard operating procedures on sample collection and management	2018/2019	NIP/ CVL
	Train clinicians on diagnostic tests, isolate requirements, and interpretation of tests through CPD	2018/2019	MoHSS/ MOAWF

	Audit lab requests		NIP / CVL
d. To formally educate farmers and retailers on the use and application of antimicrobials	Liaise with the directorate of veterinary services to put in place properly structured training programmes for farmers and retailers on the use and application of antimicrobials	2018/2019	DVS (Directorate of Veterinary Services)
	Meet with the directorates responsible for veterinary services to discuss the intervention of training farmers and retailers	2018/2019	CVO (Chief Veterinary Officer)
	Assess the knowledge gaps and/or training needs of the farmers and retailers	2018/2019	DVS (Directorate of Veterinary Services)
	Develop the training materials	2018/2019	DVS
	Conduct training	2018/2019	DVS
	Assess the effect of the training on the use of antimicrobials	2018/2019	DVS

<u>Strategic Objective:</u> To ensure that all IPC practitioners are trained and qualified			
Intervention	**Activity**	**Timeframe**	**Responsible organization/department**
a. Liaise with Health Professional	Present the IPC training programme to the council and	2018/19	UNAM/ MoHSS

councils of Namibia to recognise, register, and regulate the practice of IPC practitioners	seek recognition of this specialty by the council		
	Develop a training material for the IPC programme	2018/19	UNAM/MoHSS
	Identify/ recruit trainers of IPC Conduct training of IPC practitioners	2018/19	UNAM/ MoHSS
	Audit the IPC practices	2018/19	MoHSS/Institutions of higher learning
	Liaise with the Health Professionals Council of Namibia on the development of a postgraduate course in IPC	2018/19	UNAM/MoHSS
	Develop a postgraduate course for IPC training	2019/2020	UNAM
	Conduct training of specialized IPC practitioners	2020/2021	UNAM

6. MONITORING AND EVALUATION

Monitoring and Evaluation (M&E) aims to assess the extent to which the desired strategic objectives of the NAAP have been achieved.

Monitoring assesses the progress made with planned activities occurring against target dates whilst evaluation assesses the impact of achieving the intended goal(s), objectives and targets.

An indicator or more have been identified for each strategic pillar. These M&E indicators have been divided into their input, process, output or outcome/impact indicators:

- Input indicators affect the context in which AMR program is delivered. This includes the structures, labs, equipment, and human resources, as well as organizational characteristics such as staff training.
- Process indicators measure the implementation of standards of care and AMR guidelines either such that the pillar implementation interventions are achieved
- Output indicators measure how the activities have changed the resistance patterns of AMR organisms and also influenced the consumption of antimicrobials;
- Impact indicators attempt to determine whether the program has had any impact on the well being and health of patients and animals in relation to infectious diseases.

The following are the indicators determined for the NAAP on AMR:

6.1 Prevention

Pillar	Input	Process	Output/ Outcome	Impact
Prevention	Malaria incidence			Malaria mortality rate (per 100 000 population)
	HIV incidence	Proportion of ART patients who completed a standard course of TB preventive therapy within the reporting period		
			Percentage of population with access to safe drinking water	Diarrhea case fatality rate among children < 5 years
			Percentage of population with access to functional sanitation system	
	Percentage of hospitals with a qualified IPC practitioners as per WHO recommendations.	Completeness of reporting on notifiable diseases		Surgical Site Infections (SSI) Indicator
		Timeliness of weekly submission of reports for notifiable diseases		
	Percentage of healthcare facilities with access to a Functional Incinerator			

	Percentage of entry points with quarantine facilities	Early detection of outbreaks	Percentage compliance on farm biosecurity guidelines	
			Percentage compliance to veterinary import requirements	
		Full immunization coverage among one-year olds (%)		
		Percentage of vaccination coverage in animal health		
Prevention – animals			# of outbreaks of NMC	% unsatisfactory tests taken for food safety

6.2 Rational Use

Pillar	Input	Process	Output/ Outcome	Impact
Rational Use human health	% availability of key items in the pharmacy		% of out patient prescriptions with an antibiotic	Antimicrobial use in DDD's for the high use antimicrobial classes
	% Days/quarter that each ARV medicine was out stock			
Rational Use-animal health				Antimicrobial use in kg's for sale by suppliers by ATC Class (J01)
				Farm level data on antimicrobial use – future indicator once system to establish volumes are determined
				% Residues in samples taken for export (future include local)

6.3 Surveillance

Pillar	Input	Process	Output/ Outcome	Impact
Surveillance		Surveilllance system established for AMR in humans	Key organisms resistance profiles for humans against ESKCAPE organisms (NIP)	Reduction in resistance for specific targeted organisms
		Surveilllance system established for AMR in animals	Key organisms resistance profiles for animals for organisms of importance to humans (CVL)	Reduction in resistance for specific targeted organisms
		Surveilllance system established for antimicrobial use in both animal and human health		Antimicrobial use in DDD's for the high use antimicrobial classes Antimicrobial use in kg's for sale by suppliers by ATC Class (J01)
Food safety			# of clinical cases seen for non NMC i.e tickborne, mastitits etc (Epi)	% condemned carcasses/ total animals slaughtered in abattoirs
			Biosecurity - % illegal movements/ total movements	% condemnation certificates issued/ total inspections of retailers
			% compliance of export abattoirs on food safety/licensing inspections by type	% unsatisfactory inspections to general regulations – retailers
			Average compliance level of farms inspected on BS measures and other aspects related to antimicrobial use and recording.	

6.4 Education and training

Pillar	Input	Process	Output/ Outcome	Impact
Education	CPD conducted		Number of professionals who participated in CPD activities	Neonatal mortality rate
			Proportion of professionals who successfully completed a CPD activity	Infant mortality rate
			Percentage of appropriate use of antimicrobials	Under five mortality rate
				Maternal mortality ratio
				Reduction in patient morbidity
	IPC training conducted		Number of IPC practitioners trained	Reduction in hospital acquired infections
			Percentage of IPC practitioners who successfully completed the training	Reduction in mortality rate related to infections by resistant organisms
			Number of facilities with IPC practitioners implementing IPC procedures	
	Antimicrobial use training conducted		Number of farmers and retailer trained	
			Percentage of appropriate use of antimicrobials	
	Meeting with HP councils conducted		Percentage of health related courses in high institutions of learning with AMR incorporated in curricula	
	Meeting with institutions of higher learning			

7. REFERENCES

WHO Global Action Plan on Antimicrobial Resistance, 2015. Available at: www.wpro.who.int/entity/drug_resistance/.../global_action_plan_eng.pdf

The FAO Action Plan on Antimicrobial Resistance 2016-2020. available at:

www.fao.org/3/a-i5996e.pdf

The OIE Strategy on Antimicrobial Resistance and the Prudent Use of Antimicrobials http://www.oie.int/fileadmin/Home/eng/Media_Center/docs/pdf/PortailAMR/EN_OIE-AMRstrategy.pdf

WHO global strategy for containment of antimicrobial resistance, 2001 www.who.int/drugresistance/WHO_Global_Strategy_English.pdf

UNGA Political declaration of the high-level meeting of the General Assembly on antimicrobial resistance 2016. Available at:

http://www.un.org/pga/71/wp-content/uploads/sites/40/2016/09/DGACM_GAEAD_ESCAB-AMR-Draft-Political-Declaration-1616108E.pdf

O'Neil (2015). AMR Review UK Report. Available at : https://amr-review.org/

UNAS (2015). Antibiotic Resistance in Uganda: Situational Analysis and Recommendations. Prepared by Mpairwe Yusuf, Wamala Samuel and GARP-Uganda Working Group.