GHANA NATIONAL ACTION PLAN ON ANTIMICROBIAL RESISTANCE

2017 - 2021

Ministry of Health
Ministry of Food and Agriculture
Ministry of Environment, Science, Technology and Innovation
Ministry of Fisheries and Aquaculture Development

Ghana
National Action Plan
for Antimicrobial Use and Resistance

Republic of Ghana

2017 - 2021

Ministry of Health
Ministry of Food and Agriculture
Ministry of Environment, Science, Technology and Innovation
Ministry of Fisheries and Aquaculture Development

1st Edition 2017

ISBN 978-9988-2-6655-4

For all enquiries write to:
The Office of the Director of Pharmaceutical Services,
(Block B Room 12)
Ministry of Health,
P. O. Box MB-44,
Accra, Ghana, West Africa
Tel/Fax +233 302 666366

Websites:
www.mohghana.gov.gh
www.ghndp.org

Contents

ACKNOWLEDGMENT

The development of the AMR National Action Plan has been made possible through the contributions and support from the Ministry of Health, Ministry of Food and Agriculture, Ministry of environment Science Technology and Innovation, Ministry of Fisheries and Aquaculture Development, Ministry of Education, Ministry of Trade and Industry, Ministry of Justice and Attorney General's Department, Ministry of Interior, Ministry of Water Works and Housing, Ministry of Defense, Ministry of Local Government and Rural Development, and their respective departments and agencies.

The World Health Organisation, Food and Agriculture Organisation, are acknowledged for their support.

The AMR platform in Ghana are also acknowledged for their technical inputs as well as all stakeholders from Academia, Civil Society, Donors/Development Partners and Private Sector.

List of Abbreviations

AMR	Antimicrobial resistance
APD	Animal Production Directorate
CDC	Centre for Disease Control and Prevention
CSO	Civil Society Organisations
FAO	Food and Agriculture Organisation
FDA	Food and Drugs Authority
GCNH	Ghana Coalition of NGOs in Health
GHS	Ghana Health Service
IHR	International Health Regulations
MDAs	Ministries Departments and Agencies
MDR-TB	Multidrug-resistant Tuberculosis
MOD	Ministry of Defence
MOE	Ministry of Education
MOESTI	Ministry of Environment Science Technology and Innovation
MOFA	Ministry of Food and Agriculture
MOH	Ministry of Health
MOI	Ministry of Interior
MOJAG	Ministry of Justice and Attorney General
MOLGRD	Ministry of Local Government and Rural Development
MOTI	Ministry of Trade and Industry
MOWWH	Ministry of Water, Works and Housing
MRSA	Methicillin-resistant *Staphylococcus aureus*
NAP	National Action Plan
NNRTI	Non-neucloside reverse transcriptase inhibitors
OIE	World Health Organisation for Animal Health
PMS	Post Market Surveillance
PPA	Public Procurement Authority
SDGs	Sustainable Development Goals
TOT	Trainer of Trainers
TWG	Technical Working Group
VSD	Veterinary Services Department
WHO	World Health Organisation
XDR-TB	Extensively drug–resistant Tuberculosis

FOREWORD

The Antimicrobial Resistance (AMR) National Action Plan (NAP) represents in clear terms a synthesis of the steps which would help Ghana realise her aspirations at combating the AMR phenomenon in the country.

The Action Plan has been informed by the need to contain antimicrobial resistance, a phenomenon affecting human health, animal health, plants and the environment. It is guided by the need to provide universal health coverage for human health, preserve animal health, as well as the entire ecosystem. It is also guided by the World Health Organization's (WHO) global action plan on AMR, the Sustainable Development Goals (SDGs), the Office International des Epizooties (OIE) i.e. the World Health Organisation for Animal Health Strategy for AMR, the Health Sector Medium-Term Strategy as well as WHO's guidelines for developing NAPs.

It seeks to give interpretation to the policy directives recommended in the first edition of the National Policy on Antimicrobial Use and Resistance developed from 2013 to 2016 and published in 2017. The NAP is to ensure a convergence of efforts and investments in the fight against AMR. Thus, all actions in the relevant sectors would align with this action plan to maximize our efforts in preserving this important group of medicines.

The various components of the NAP, in line with global objectives, include steps to: improve awareness and understanding of AMR, strengthen knowledge and evidence base for AMR policy and related actions, reduce the incidence of infection, optimize the use of antimicrobials as well as develop the economic case for sustainable investments in antimicrobials. In recommending these steps, attention has been given to the best available local evidence, stakeholders' concerns and inputs, the life-saving value of antimicrobial medicines in disease management, global action on AMR, the socio-economic and socio-cultural context of Ghana, as well as the specific components of the Ghana health system.

This Action Plan would be implemented through existing systems with support from all partners. It defines the role of all implementing stakeholders and shall be the focus for investments into AMR containment efforts in Ghana.

We wish to express our sincere appreciation to all stakeholders, the Technical Working Group of Experts, the Food and Agriculture Organisation (FAO), the World Health Organization (WHO) and all whose immense contribution and support has made the development of this Action Plan a success.

Kwaku Agyeman-Manu
Hon. Minister
Ministry of Health

Dr. Owusu Afriyie Akoto
Hon. Minister
Ministry of Food and Agriculture

Prof. Kwabena Frimpong Boateng
Hon. Minister
Ministry of Environment, Science, Technology and Innovation

Elizabeth Afoley Quaye
Hon. Minister
Ministry of Fisheries and Aquaculture Development

EXECUTIVE SUMMARY

Antimicrobial Resistance (AMR) is the ability of a microorganism such as bacteria, viruses, fungi and some parasites, to survive the lethal effects of an antimicrobial, resulting in a situation where standard treatments become ineffective and infections persist which may spread to others. The implication of the above phenomenon on global health has led to several efforts to combat and contain AMR both at the global, regional and national levels. The "One Health" concept was introduced to communicate the idea that human health and animal health are interdependent and bound to the health of the ecosystems in which they exist. Multifaceted, comprehensive and integrated strategies, as advocated by the WHO Global Action Plan and the Food and Agriculture Organisation (FAO) Action Plan in line with the One Health approach, are urgently required. WHO advises that countries follow WHO, OIE, and FAO recommendations to implement national action plans encompassing the human, food, animal, and environmental sectors.

The National Action Plan (NAP) has been developed based on the model recommended in the global Action Plan. Local data on on-going interventions were collected from technical informants in the various areas of work. These were analysed using the policy framework provided by the AMR policy document. Interventions were developed to address gaps in all five objectives of the global Action Plan. Further consultations were done to ensure that the recommended interventions were feasible, valid and relevant within the systemic contexts pertaining to the various affected sectors.

The resulting NAP reflects stakeholder consensus on evidence-based, context-specific recommendations on multifaceted actions in Ghana including: improving awareness and knowledge of AMR; providing evidence-based knowledge to reduce the burden of AMR; reducing the occurrence of infections in establishments; optimizing the use of antimicrobials in animal and human health; creating an enabling environment for sustainable investment in AMR reduction. The NAP is to be implemented over a five-year period with regular assessments on the progress of implementation, within a multi-stakeholder platform with mutual accountability. An inter-ministerial governing body with the respective Ministers, Chief Directors, Heads of agencies and departments would provide overarching political oversight, whilst an AMR stakeholder/technical platform provides technical direction.

It is hoped that the needed resources and governance regimes would enable the full implementation of the NAP, in such a manner as to ensure that the health system is protected from the AMR threat.

Preamble

Problems revealed in Ghana from situational analysis reports on AMR, indicated that Ghana is burdened with AMR and associated socio-economic challenges. The gaps identified in the situational analysis informed the AMR policy. The NAP was developed to give implementable interpretation to the AMR policy. The NAP has a strategy as well as an in-built operational plan. The plan details key agencies responsible for specific activities and their collaborators. This has been done with cognisance to statutory mandate within the country's governance systems. The plan has been costed and provides options for resource mobilization. An M & E framework, detailing process, output and outcome indicators is also provided.

How to use this document

This document is organised based on 5 strategic areas from the global Action Plan. There is a strategic plan, an operational plan with a budget, matrix of process indicators and time benchmarks. There is also a monitoring and evaluation framework provided as appendix 1.

All activities have been given a code which is a unique ID for the activity. This code is intended to serve as a guide in tracing an activity in the strategic plan, operational plan, budget etc.

Through the activity ID, the budget provides linkages to the respective activities and associated budgets, and covers the cost of implementation of the activities listed in the plan within the scope of the intent that has informed the recommended activities. A budget narrative has been provided to describe the nature of the expenditure indicated as well as potential sources of funding.

BACKGROUND

Introduction

Antimicrobial Resistance (AMR) is a phenomenon in which a microorganism such as bacteria, viruses, fungi and some parasites, survive the lethal effects of an antimicrobial agent, resulting in a situation where standard treatments become ineffective; infections persist and may spread to others. (1) The AMR phenomenon could have far-reaching social, health and economic consequences on several sectors including human health, agriculture, aquaculture, apiculture, as well as the environment.

The implication of the above phenomenon on global health has led to several efforts to combat and contain AMR both at global, regional and national levels. Thus, AMR gained attention at the 67th and 68th World Health Assemblies. (2) (3) There have also been efforts at developing National Action Plans for AMR in several countries in Europe, Asia, the Americas, as well as in Africa. Global technical consultative meetings have been held on the development of a Global Action Plan for AMR including a meeting in Oslo in 2014. (4) The World Organisation for Animal Health strategy for combating AMR was released in May 2016. (5)

The "One Health" concept was introduced to communicate the idea that human health and animal health are interconnected and bound to the health of the ecosystems in which they exist (6). It seeks to reiterate an existing concept that animals also share similar susceptibility to some diseases and environmental hazards with humans. This is evident due to the presence and spread of zoonotic diseases including Rabies, Salmonella infection, West Nile virus fever, Q Fever (*Coxiella burnetti*) and many more. (7)

This concept should guide a collaborative approach to appreciate the risks of AMR for human health, animal health and the ecosystem from a global perspective. The one health concept is founded on an awareness of the major opportunities that exist to protect public health through policies aimed at preventing and controlling pathogens within animal populations. All these synergies between animal health, public health and environmental specialists, applied at local, national and global levels will undoubtedly contribute to the constant and simultaneous improvement of public health and animal health worldwide. (8)

Founou et al., in their review of antibiotic resistance in the Food Chain from a developing country perspective, concluded that AMR is a global public health challenge with severe health and socio-economics repercussions, and that is significantly influenced by antibiotic use in food animals. Combating AMR effectively at a global scale means addressing it equally in the developed and developing world. Multifaceted, comprehensive and integrated strategies, as advocated by the WHO Global Action Plan and Food and Agriculture Organisation (FAO) Action Plan in line with the One Health approach, are urgently required. (9)

The goal of "One Health" is to encourage the collaborative efforts of multiple disciplines – working locally, nationally, and globally – to achieve the best health for people, animals, and our environment. The "One Health" approach is important because, 6 out of every 10 infectious diseases in humans are spread from animals. (7)

Indeed, the OIE Resolution 36 states amongst others that the OIE Strategy on antimicrobials be implemented through a stepwise approach, in close cooperation with WHO and FAO through a One Health approach, as well as with other relevant partners and stakeholders, and that the OIE further promotes inter-sectorial cooperation, coordination and interaction at regional and national levels. It also recommends that the OIE seeks support to enable Member Countries implement the OIE Strategy and their national action plans. (5) Furthermore, it has been recommended that countries follow the WHO, OIE, and FAO recommendations to implement national action plans encompassing human, food, animal, and environmental sectors to improve policies, interventions and activities that

address the prevention and containment of AMR from farm-to-fork. (9)

This national action plan builds on the global agenda and seeks to develop interventions that are evidence-based as well as consensus-driven within the country context in order to maximize the investments in AMR.

Situational analysis and assessment

WHO reports that, about 440 000 new cases of multidrug-resistant tuberculosis emerge annually, leading to at least 150 000 deaths. Extensively drug-resistant tuberculosis has been reported in 64 countries. It is also reported that, a high percentage of hospital-acquired infections are caused by highly resistant bacteria such as methicillin-resistant Staphylococcus aureus (MRSA). AMR has become a serious problem for the treatment of gonorrhoea (caused by *Neisseria gonorrhoeae)*, involving even "last- line" oral cephalosporins. (10) This phenomenon is increasingly prevalent worldwide. Untreatable gonococcal infections would result in increased rates of illness and death, thus reversing the gains made in the control of this sexually transmitted infection. The inappropriate and irrational use of antimicrobial medicines provides favourable conditions for resistant microorganisms to emerge, spread and persist.

Resistance is also an emerging concern for treatment of HIV infection, after the rapid expansion in access to antiretroviral drugs in recent years. National surveys are underway to detect and monitor resistance. At the end of 2011, more than 8 million people were receiving antiretroviral therapy in low- and middle-income countries to manage HIV. Although it can be minimized through good programme practices, some amount of resistance to the medications used to manage HIV is expected to emerge. An analysis of data from WHO surveys that target people who have been recently infected with HIV indicates increasing levels of resistance to the Non-Nucleoside Reverse Transcriptase (NNRTI) class of anti-retrovirals. This increase is particularly noticeable in Africa, where the prevalence of resistance to NNRTI reached 3.4% (95% CI, 1.8-5.2%) in 2009. (10)

Over the past 10 years, antiviral drugs have become important tools for treating epidemic and pandemic influenza. It was estimated that, by 2012, virtually all influenza A viruses circulating in humans would be resistant to drugs frequently used for the prevention of influenza (Amantadine and Rimantadine). Antiviral susceptibility is constantly monitored through the WHO Global Surveillance and Response System.

In Africa, antibiotics are among the commonest prescribed medicines. A survey on predictors of antibiotic use in five countries in Africa showed that 90% of individuals with acute illness sought care outside the home with 95% receiving medicines and 36% received antibiotics. Cotrimoxazole, Amoxicillin and Metronidazole represented 75% of the antibiotics received. Over 30% of individuals accessed antibiotics without prescription and one in four individuals obtained antibiotics from an informal dispenser. This survey also reported various levels of resistance to antibiotics in the sampled countries. (11) (10)

Many African countries reported the presence of resistant strains of bacteria. For instance, in Nigeria, there is high resistance to Vancomycin, Gentamycin, Chloramphenicol and Cloxacillin. (12)

Various studies carried out proved the existence of antibiotic resistance in Ghana. A study in 2 teaching, 7 regional and 2 district hospitals in Ghana revealed that very common microbes such as streptococci, salmonella, and *E. coli* showed very high levels of multiple drug resistance, some as high as 78.7%. In the various hospitals sampled, the prevalence of resistance to common and affordable antimicrobials like Tetracycline, Co-trimoxazole, Ampicillin and Nalidixic acid are significantly high (largely above 70%). (11) (13)

In another 2007 study carried out in some key health facilities among in-patients and out-patients, specimens taken from various sources including wounds, urine, sputum and blood, showed a high prevalence of MRSA. (11)

Furthermore, other evidence in Ghana suggests that, many infectious pathogens are failing to

respond to common, potent and easily accessible antibiotics in the health system and thus resulting in increased morbidity and mortality from infections. (13) Several reports suggest that antimicrobial resistance is an increasingly global problem; but like with most pandemics, the greatest toll is in the less developed countries. The dismally low rate of discovery of antimicrobials compared to the rate of development of antimicrobial resistance places humanity on the edge of a very dangerous precipice. Since antimicrobial resistance is part of an organism's natural survival instinct, total eradication might be unachievable; however, it can be reduced to a level that it no longer poses a threat to humanity. While inappropriate antimicrobial consumption contributes to the development of antimicrobial resistance, other complex political, social, economic and biomedical factors are equally important. Tackling the menace therefore should go beyond the conventional sensitization of members of the public and occasional press releases to include a multi-sectoral intervention involving the formation of various alliances and partnerships. Involving civil society organisations like the media could greatly enhance the success of the interventions.

The mechanism for the surveillance of antimicrobial use and resistance is nascent. Meanwhile, surveillance data of antimicrobial resistance is required to track changes in microbial populations, detect early resistant strains and support the prompt notification and investigation of outbreaks, guide clinical therapy decisions and policy recommendations as well as assess the impact of resistance containment interventions. However, national surveillance systems exist for special public health programmes, e.g. TB and HIV. The TB surveillance system is paper-based (an electronic recording and reporting case-based surveillance system is not yet in place) and aligns with the WHO-recommended structure of quarterly reporting of aggregated data. The system covers health facilities in 170 districts in 10 regions. The 2013 assessment also reveals that there is ongoing deployment of software for transition to such an electronic system. Some data quality elements include: standardization and consistency of the electronic system with international standard (i.e. WHO), scheduled and adequate periodic data submissions (reporting) received and processed at national level, data accuracy, completeness, and internal and external data consistency. (14)

The absence of national antimicrobial use policy that guides the use and control of antimicrobials has also contributed immensely to the upsurge in abuse of antimicrobials at community and institutional levels across the country.

The use of antibiotics for disease prevention and growth promotion in animal husbandry, and the existence of antibiotic residues in the food chain are also likely to compound the problem of antibiotic resistance. (15) (16)

Antibiotics are used in livestock for treatment and prophylaxis against infections, among other purposes. It is also used in sub-therapeutic doses in livestock feeds to enhance growth and improve feed efficiency in intensive livestock farming. The non-therapeutic use of antimicrobials in livestock production has increased tremendously. The Union of Concerned Scientists report that about 90% of antimicrobials used in the USA were for non-therapeutic purposes. (17) (18) The types of antibiotics used by 110 pig farms in the Ashanti region and the handling practices of the farmers during disease management have been assessed. This study revealed that injectable Tetracycline, Sulphadimidine, Benzylpenicillin, and Dihydrostreptomycin containing antibiotics were overly used by the farmers especially in the management of diarrhea, rashes, and coughs. The study also revealed unsafe storage and disposal practices for these medicines among the farms in Ghana. (19) Misdiagnosis and inadequate protection during antibiotic handling in the farms increased the risk of antibiotic resistance development and spread. The factors affecting antibiotic resistance development and spread are rife in pig farms in the Ashanti region and appropriate education and veterinary interventions are needed to prevent resistant bacteria from becoming endemic in pork and pig farm communities. This is in line with other studies which confirm the use of Tetracycline, Penicillin and Erythromycin in animals for non-therapeutic purposes. (20) The above discovery compounds the risk of AMR development especially for such antibiotics, which are also used in humans.

An assessment of the extent of antibiotic use as well as knowledge, perceptions and practice of

drug withdrawal period in 483 commercial poultry farms in the Greater Accra, Ashanti and Central regions of Ghana revealed significant gap allowances for the withdrawal period in the production of eggs and meat, as well as gaps in drug management practices. The sources of knowledge on medicines for poultry farmers were: personal experience, 33.3 percent (n=481); veterinarians, 21.4 percent; veterinary technicians, 20.6 percent; drug sellers or shops, 18.7 percent; and other farmers, 6.0 percent. The medicines used (excluding vitamins and mineral supplements) were antibacterials (52.0%, n=1,559), coccidiostats or coccidicidals (33.7%), and dewormers (14.3%). For the antibiotic category, tetracyclines formed the largest class (35.7%, n=831), followed by nitrofurans (23.1%), penicillin-streptomycin combinations (18%), and sulphonamides and sulphonamide combinations (8.3%). For the coccidiostats, the largest group comprised drugs with sulphonamides or their combination (58.4%, n=539), followed by those with amprolium and amprolium combinations (39.1%). The dewormers were mainly of two classes: those containing piperazine (50.7%, n=229) and those with levamisole (49.3%). When asked what they did with eggs when layers were under drug treatment, a significant proportion of respondents (91.1%, n=426) said they sold them. When asked whether they had heard the term "withdrawal period", 47.4 percent (n=479) of the respondents replied in the affirmative. The mean (± SE) days given by respondents (who had heard the term) as the minimum length of the withdrawal period (WP) were 8±0.4 days (n=166) for broilers (range 0-28 days with median of 7 days) and 7±0.4 days (n=171) for eggs (range 0-26 days with median of 5 days). The reasons given for the withdrawal period being unnecessary or impracticable in Ghana, were mainly economic or ignorance and lack of knowledge. (20)

The Veterinary Public Health and Food Safety Unit is presently the main unit responsible for monitoring the use of antibiotics and surveillance of resistance in animals. The overall goal of the Veterinary Public Health and Food Safety Unit is to prevent zoonotic diseases in humans and ensure food safety. There are also plans to carry out antibiotic residue testing and Antibiotic resistance testing in the veterinary public health laboratory. Meanwhile the veterinary services are poorly resourced with outlets poorly distributed in the country. Public knowledge on veterinary services is also minimal. Collaboration is mainly in the area of zoonotic diseases and not on antimicrobial resistance. (21)

The FDA is responsible for the registration, post market surveillance and quality assurance of all medicines including those used in veterinary services. The FDA also regulates imports of antibiotics for veterinary use (22). Meanwhile, antibiotic resistance has not been a priority for veterinary services in Ghana. There are no acceptable national standards regarding antibiotic residue in veterinary and aquaculture produce, the minimum allowable weaning period before slaughter and processing, and no testing for antibiotic residue is done.

A case study from Ghana on the presence of beta Lactamase producing *Escherichia coli* and *klebsiella pneumoniae* isolates as well as tetracycline residues in chicken meat established the occurrence of drug resistance among *E.coli* and *K. pneumoniae* strains isolated from chicken meats bought in Ghana. In addition, high incidence of tetracycline residues was found in chicken meat samples. (23)

Another study on the presence of antimicrobials and resistance in healthy subjects from Greater Accra concluded that 74.2% of studied subjects showed the presence of at least one antibiotic residue in their urine, although all (100%) of the study participants had not knowingly consumed antibiotics during the study period. This calls for further investigation as it possible that, people are consuming antibiotics from alternate sources such as food and water. (24)

There is anecdotal information on the use of antibiotics in aquaculture especially in fish farming. There is no department/unit responsible for antibiotic use and surveillance in aquaculture as well as the monitoring of residual antibiotics in fish. Some antibiotics used locally in both humans and animals include: tetracyclines, chloramphenicol, streptomycin and penicillin.

It is imperative that the country response to AMR be interpreted in a manner that addresses all forms of gaps and fundamental challenges at the point of practice. This would ensure that the aspirations of national medicines policy are realised. The national action plan on antimicrobial use and resistance therefore seeks to give such interpretation to the new AMR policy for Ghana.

Country response

The AMR policy has been developed to improve awareness and understanding of AMR through effective communication, education and training. It seeks to strengthen knowledge and evidence base through national surveillance and research and improvement of laboratory services for culture and sensitivity. It also seeks to reduce the incidence of infections through effective sanitation, hygiene and infection prevention measures.

It is expected that the use of antimicrobial agents in humans and animal health would be optimized in the 'One Health' approach through specific interventions in the Responsible Use of Antimicrobials in humans, veterinary and aquaculture as well as in the environment and industry.

The policy also recommends specific interventions in regulations and enforcement, manufacturing and supply chain, borrowing from existing synergies within the health sector for sustainable investment that considers the needs of all sectors, and increases investment in new medicines, diagnostic tools, vaccines and other interventions.

It is emphasized that a strong multi-stakeholder collaboration, which has made the development of this policy a success, would also strengthen the implementation of this policy under existing governance structures.

In summary, a systemic balance between access and excess is sought through optimal implementation of the AMR policy to preserve antimicrobials for current and future generations.

Governance

The structures for the implementation of AMR activities are as follows:

- The AMR inter-ministerial committee made up of the Ministers of the affected Ministries to help drive the AMR agenda at the highest level of governance
- The AMR Platform including stakeholders from all affected sectors i.e. human, animal (livestock, fish, poultry, bees etc.), plant and the environment. This body was created by the Minister of Health to develop the AMR policy for Ghana addressing all AMR-related issues from a "One Health" approach
- The AMR technical working groups constituted as necessary to address specific tasks e.g. the TWG on policy was instrumental in drafting the AMR policy
- The AMR advocacy working groups constituted as necessary to address specific advocacy tasks
- This structure should be strengthened through the identification of a secretariat and a coordinator who reports to the chair of the AMR platform. It is recommended that such a secretariat be located within existing agencies to benefit from existing management regimes and structures
- The inter-ministerial committee shall be supported by the respective chief directors and heads of agencies to support the implementation

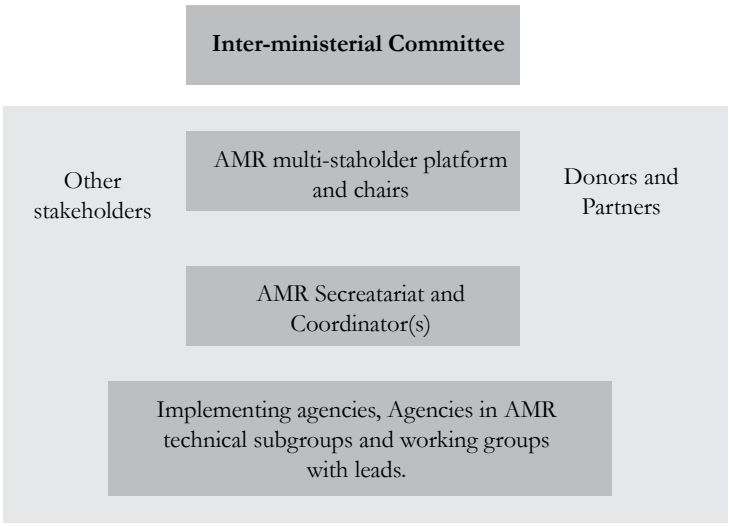


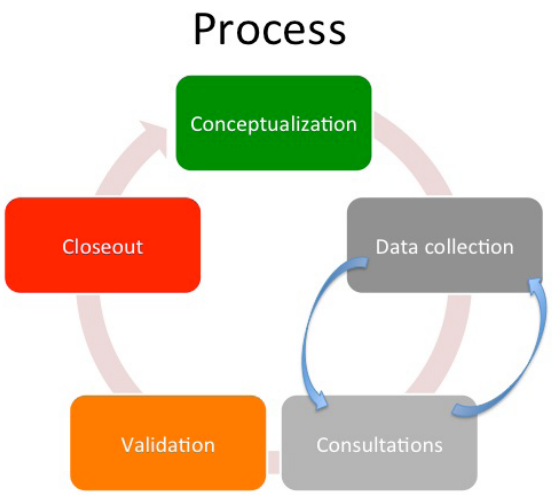
Fig 1. AMR Country level governance framework for Ghana

Resource mobilisation

There is a need for an efficient resource mobilisation strategy to support the implementation of this plan. It is recommended that country level commitment to this plan be demonstrated through budgetary allocation and donor support for the interventions recommended. This national action plan recommends potential sources of funding as part of the operational plan. All stakeholders are urged to support the implementation to ensure that the aspirations of the AMR policy are realized.

Process of developing the National Action Plan

The National Action Plan (NAP) has been developed based on the model recommended in the global Action Plan. The elements of the NAP were adapted from the global plan and presented to a group of purposefully selected technical officials within the various sectors of implementation. Local data on ongoing interventions were collected from technical informants in the various areas of work. These were analysed using the policy framework provided by the AMR policy document. Thus interventions were developed to address gaps in all 5 objectives of the global action plan. Further consultations were conducted to ensure that the recommended interventions were feasible and relevant within the systemic contexts pertaining to the various affected sectors. Recommendations were aligned and addressed for validation at broad stakeholder meetings to arrive at a widely accepted plan with stakeholder buy-in and ownership.



STRATEGIC PLAN

		Timelines				
		Year 1, Q4 2017-2018	Year 2, 2018	Year 3, 2019	Year 4, 2020	Year 5, 2021
		J F M A M J J A S O N D	J F M A M J J A S O N D	J F M A M J J A S O N D	J F M A M J J A S O N D	J F M A M J J A S O N D
Strategic objective 1: Improve awareness and understanding of antimicrobial resistance through effective communication, education and training.						
Awareness-raising and risk communication						
Sub-objective 1 - Increase national awareness of AMR						
Strategic interventions	Activities					
5.1.1.1 There shall be collaboration with all stakeholders (including Civil Society Organizations-CSOs and Media) for continuous education to promote the responsible use of antimicrobials amongst general public in the spirit of the 'one-health' approach	5.1.1.1.1. Engage CSOs and the media (as AMR media partners) to educate the public on responsible use of antimicrobials in the spirit of 'One health'					
	5.1.1.1.2. Develop Information, Education and Communication (IE & C) materials for targeted groups in a stratified public education campaign					
	5.1.1.1.3. Educate the public in order to promote the responsible use of antimicrobials among the general population					
	5.1.1.1.4. Review the public education campaign for optimized impact					
5.1.1.2 There shall be continuous education to promote the responsible use of antimicrobials in animal husbandry, aquaculture and crop production with emphasis on the dangers of antimicrobial misuse	5.1.1.2.1. Engage professional associations to educate professionals to promote the responsible use of antimicrobials at all levels of practice in all affected sectors (human, animal, plant, environment, etc.)					
5.1.1.3 The Ministry of Health (MOH) and its agencies, in collaboration with the educational institutions shall incorporate information on antimicrobials into their curricula	5.1.1.3.1. Develop the content framework on responsible use of antimicrobials for consideration into the curriculum of training institutions. (This is to serve as the basis for the content of syllabus)					
5.1.1.4 The Ministries of Food and Agriculture, Fisheries and Aquaculture Development shall collaborate with the relevant educational institutions to develop and include in their curricula the concept of AMU and AMR	5.1.1.4.1.(a) Develop the content framework on responsible use of antimicrobials in non-human settings, for consideration into the curriculum of training institutions. (This is to serve as the basis for the content of syllabus) [See activity 5.1.1.4.1.(a) below]					

		Timelines
		Year 1, Q4 2017-2018	Year 2, 2018	Year 3, 2019	Year 4, 2020	Year 5, 2021
		J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
	5.1.1.4.1.(b) Incorporate content on responsible use of antimicrobials into the curriculum of training institutions for professionals in all affected sectors (human, animal, plant, environment etc.) [This is linked with Activity 7.1.1.1.3.] Also [See activity 5.1.1.4.1 above]	

Strategic objective 2: Strengthen knowledge and evidence base through surveillance and research

National surveillance on antimicrobial resistance

Sub-objective 1 - To establish a surveillance system for antimicrobial resistance

Strategic interventions	Activities
6.1.1.1 There shall be established national monitoring systems for antimicrobial use and surveillance of antimicrobial resistance to inform policy	6.1.1.1.1.(a) Establish a structure for the national surveillance system for human health – which includes the national reference laboratory (would also cover Healthcare Associated Infection [HCAI])
	6.1.1.1.2.(a) Establish a structure for the national surveillance systems for non-human health which includes animal, plant and environment (would also cover a national reference laboratory)
	6.1.1.1.3. Develop national guidelines for the surveillance systems – including guidelines for passive and active surveillance.
	6.1.1.1.4. Develop unified protocols and SOPs including standardized diagnostics and methodology for sensitivity testing.
	6.1.1.1.5 Train sentinel sites on the use of guidelines, protocols and SOPs
	6.1.1.1.6. Rollout implementation: starting with laboratories that would meet requirements in human and animal sectors
6.1.1.2 Laboratories for animal, fish, plant and human shall be strengthened to monitor resistance to antimicrobials.	6.1.1.2.1. Assess current capacity of laboratories for conducting culture and sensitivity testing
	6.1.1.2.2. Develop unified protocols and SOPs (See activity 6.1.1.1.4. above)
	6.1.1.2.3. Train core clinical care and laboratory staff on standardized protocols, SOPS, systems etc.

		Timelines
		Year 1, Q4 2017-2018 / Year 2, 2018 / Year 3, 2019 / Year 4, 2020 / Year 5, 2021 (J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D)
6.1.1.3 There shall be a data management system to yield quality surveillance data that can be shared regionally and globally to drive future actions in managing AMR.	6.1.1.3.1.(a) Undertake wide stakeholder consultation on end-user needs, requirements, feasibilities, constraints, SOPs, use or adapt international available data management systems, etc. [Activity 6.1.1.3.3 follows in logic]	
	6.1.1.3.2.(a) Define system specification, scope and feature-set and definition of future development and management.	
	6.1.1.3.3.(a) Develop a national surveillance database, management tools, analytical tools, applications/software. (This would cover communication and reporting modules, access and security modules, etc.)	
Sub-objective 2 - To establish a surveillance system for antimicrobial consumption		
Strategic interventions	Activities	
6.1.1.1 There shall be established national monitoring systems for antimicrobial use and surveillance of antimicrobial resistance to inform policy.	6.1.1.1.1.(b) Establish a system for the national surveillance of antimicrobial use in human health	
	6.1.1.1.2.(b) Establish a system for the national surveillance of antimicrobial use in non-human health	
	6.1.1.1.7. Establish and resource a desk at the Ministry of Health for collation of antimicrobial resistance and consumption data. (Continues from Activity 6.1.1.1.6 under Objective 1 above)	
6.1.1.3 There shall be a data management system to yield quality surveillance data that can be shared regionally and globally to drive future actions in managing AMR.	6.1.1.3.1.(b) Undertake wide stakeholder consultation on end-user needs requirements, feasibilities, constrains etc. for the development of a data management system for antimicrobial consumption in human and animal health	
	6.1.1.3.2.(b) Define system specification, scope and feature-set and definition of future development and management.	
	6.1.1.3.3.(b) Develop a national surveillance database, management tools, analytical tools, applications/software for antimicrobial consumption in humans and animal health. Deliverables would include communication and reporting modules, access and security modules, etc.	
Laboratory services		
Sub-objective 3 - Strengthen laboratory services to provide the needed clinical decision support service		

		Timelines
		Year 1, Q4 2017-2018 | Year 2, 2018 | Year 3, 2019 | Year 4, 2020 | Year 5, 2021
		J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
Strategic interventions	Activities	
6.2.1.1 Government and other stakeholders shall provide resources to improve on the quality of laboratory diagnostic services to inform the selection and prescribing of antimicrobials	6.2.1.1.1. Establish a structure for the national surveillance system for human health – including a national reference laboratory (this would also cover health care associated infection [HCAI] and of the organisms that cause HCAIs) (Refer to activity 6.1.1.1.1)	
	6.2.1.1.2. Establish a structure for the national surveillance systems for non-human health – including a national reference laboratory (Refer to activity 6.1.1.1.1)	
	6.2.1.1.3. Quantification and costing of laboratory commodities and tests	
	6.2.1.1.4. Encourage local production of antimicrobial susceptibility testing disk. (Develop a sustainable business case for the local production of susceptibility disks, engage the business community, engage MOTI for incentives and enabling environment)	
6.2.1.2 The National laboratory policy shall be implemented in all healthcare facilities. District hospital laboratories shall be strengthened to provide culture and sensitivity testing services.	6.2.1.2.1. Implement the national laboratory policy implementation plans for human health	
	6.2.1.2.2. Upgrade district laboratories with capacity to perform culture and sensitivity testing based on comprehensive needs assessment	
	6.2.1.2.3. Train laboratory personnel as part of the laboratory upgrade programme	
6.2.1.3 Government through the Ministries of Food and Agriculture and Fisheries and Aquaculture Development shall develop National laboratory policies for the food, agriculture, fisheries and environment sectors. All the laboratories in these sectors shall be strengthened to enable them work on AMU and AMR	6.2.1.3.1. Develop national laboratory policy and implementation plans for the food, agriculture, fisheries and environment sectors	
	6.2.1.3.2. Engage relevant stakeholders towards the development of national laboratory policies for these sectors	
	6.2.1.3.3. Implement national laboratory policy for the food, agriculture, fisheries and environment sectors	
Sub-objective 4 - To disseminate data on antimicrobial surveillance and consumption in all sectors regularly		

Timelines: Year 1, Q4 2017-2018 | Year 2, 2018 | Year 3, 2019 | Year 4, 2020 | Year 5, 2021 (months J F M A M J J A S O N D for each year)

Strategic interventions	Activities
6.1.1 There shall be established national monitoring systems for antimicrobial use and surveillance of antimicrobial resistance to inform policy.	6.1.1.7. Organise annual dissemination workshops for data on AMR surveillance and consumption
	6.1.1.8. Follow through evidence-based advocacy activities
	6.1.1.9. Organise forum on evidence-based policy implementation based on data on the AMR surveillance and its implications for the AMR policy implementation process

Sub-objective 5 - Surveillance data to inform the selection and prescribing of antimicrobials in country

Strategic interventions	Activities
6.2.1.1 Government and other stakeholders shall provide resources to improve on the quality of laboratory diagnostic services to inform the selection and prescribing of antimicrobials	6.2.1.1.1. Collate incidence data on infectious diseases of common occurrence in Ghana to inform review of clinical guidelines
	6.2.1.1.2. Update Standard Treatment Guidelines and Essential Medicines List based on emergent surveillance data on AMR and AMC, generated from Ghana in the light of the best evidence and the rigour of the national medicines selection process
	6.2.1.1.3. Develop and launch diagnostic, prescribing, and treatment aids based on the national medicines selection process, STGs and evidence from surveillance
	6.2.1.1.4. Train on the use of updated Standard Treatment Guidelines with a focus on infectious disease management, based on surveillance data and monitor for adherence

Strategic objective 3: Reduce the incidence of infection through effective sanitation, hygiene and infection prevention measures and good agricultural and biosecurity practices.

Infection prevention and control

Sub-objective 1 - To develop and implement infection prevention and control policies and interventions in all relevant sectors nationwide

Strategic interventions	Activities

		Timelines																																																										
		Year 1, Q4 2017-2018												Year 2, 2018												Year 3, 2019												Year 4, 2020												Year 5, 2021											
		J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
7.1.1 The Ministry of Health Infection prevention and control policies and guidelines shall be implemented in all health facilities.	7.1.1.1. Implement MOH IPC policies in all health facilities																			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒
	7.1.1.1.1.1 Conduct a baseline study on Healthcare Associated Infections																				■	■	■	■																																							
	7.1.1.1.1.2 Advocate and create awareness on Healthcare Associated Infections [to be added training activities of human and animal health professionals] Refer to Activity 8.1.1.1.1.																																																												
	7.1.1.1.2. Assessment of implementation of the IPC policy (including development of assessment tools)																																															■	■	■												
	7.1.1.1.3.(a) Advocate for and facilitate the provision of potable water in 50% of health facilities.																						■	■	■	■	■	■	■	■	■	■	■	■	■																											
	7.1.1.1.3.(b) Advocate for inclusion of infection prevention and control practices into curriculum of health training institutions [This is linked with Activity 5.1.1.4.1.; 7.1.1.1.3.(a) and 7.1.1.1.5]																■	■	■																																										
	7.1.1.1.4 Provide adequate toilet and hand washing facilities in hospitals and communities. [This activity is linked with 5.1.1.4.1; 7.1.1.1.3.(a) and 7.1.1.1.5]																						■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■														
	7.1.1.1.5 Provide PPEs in health facilities [This activity is linked with 5.1.1.4.1; 7.1.1.1.3.(a) and 7.1.1.1.5]																						■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■														
	7.1.1.1.6 Conduct supportive supervision for IPC [This activity is linked with Activity 7.1.1.1.7]																							■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■																	
	7.1.1.1.7 Enforce the use of items for IPC– coloured bin liners, sharp boxes, disposable paper napkins [This activity is linked with Activity 7.1.1.1.6]																								■	■	■	■	■	■	■	■	■	■	■	■	■																										
	7.1.1.1.8 Develop guidelines for management of referred patients with infectious conditions from one point to the other [surveillance should be part of management]																										■	■	■	■																															
	7.1.1.1.9 Implement IHR guidelines for containment of outbreaks of bacterial infection of public health interest in health facilities [This is linked with Activity 7.1.1.1.10]																		|■|■|■|																																								
	7.1.1.1.10. Train and sensitise health workers and the general public on the containment of outbreaks. [This is linked with Activity 7.1.1.1.9]																			■	■	■	■																																						

		Timelines
		Year 1, Q4 2017-2018 / Year 2, 2018 / Year 3, 2019 / Year 4, 2020 / Year 5, 2021 (J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D)
7.1.1.2 The Ministries of Food and Agriculture, Fisheries and Aquaculture Development shall develop for agencies in these sectors guidelines and SOPs on Infection Prevention and Control, and ensure their implementation at all levels.	7.1.1.2.1 Develop IPC policies for non-human sectors	
	7.1.1.2.2 Implement IPC policies in non-human sectors	
	7.1.1.2.3 Assess implementation of the IPC policy (non-human sectors)	
	7.1.1.2.4 Develop SOPs for ensuring proper infection prevention and control on farms etc. [This is linked to Activity 7.1.1.2.5]	
	7.1.1.2.5 Develop and train farmers on guidelines for containment of outbreaks of infections on farms etc. [This is linked to Activity 7.1.1.2.4.]	
7.1.1.3 The Waste management policy of the Ministry of Health shall be implemented in all health care settings	7.1.1.3.1 Phase, prioritise, cost and implement the waste management policy in health facilities	
	7.1.1.3.2 Assess implementation of the waste management policy	
	7.1.1.3.3 Educate the public on hand hygiene, environmental cleanliness and waste management	
7.1.1.4 Guidelines and SOPs on Waste management shall be developed for each of the agencies of the food, agriculture and fisheries sectors; the necessary measures shall be put in place for their implementation.	7.1.1.4.1 Develop guidelines and SOPs on waste management in other sectors	
	7.1.1.4.2 Train affected implementing entities on new guidelines on waste management	
	7.1.1.4.3. Provide resources for implementation of SOPs and guidelines	
7.1.1.5 Vaccination in animal husbandry and aquaculture shall be promoted as an approach to reducing infections in food animals.	7.1.1.5.1 Conduct regular sensitisation campaign on vaccination of animals	
7.1.1.6 Promotion of resilience of plant through soil fertility management shall be emphasized	7.1.1.6.1 Train farmers on soil fertility management and other measures to promote the resilience of plants [This activity is linked to Activity 7.1.1.7.1]	
7.1.1.7 Promotion of vector control in all sectors shall be emphasized	7.1.1.7.1 Train farmers on vector control on farms etc. [This activity can be linked with Activity 7.1.1.6.1]	

		Timelines				
		Year 1, Q4 2017-2018	Year 2, 2018	Year 3, 2019	Year 4, 2020	Year 5, 2021
		J F M A M J J A S O N D	J F M A M J J A S O N D	J F M A M J J A S O N D	J F M A M J J A S O N D	J F M A M J J A S O N D
Strategic objective 4: Optimize the use of antimicrobial agents in humans, aquaculture, plant production and in animal health in the 'one health' approach						
Responsible Use of Antimicrobials in humans						
Sub-objective 1 - To improve the responsible use of antimicrobials in humans						
Strategic interventions	Activities					
8.1.1.1 The Ministries, Departments and Agencies involved in antimicrobial resistance shall promote stewardship of all antimicrobial agents.	8.1.1.1.1. Train and re-train core clinical care providers on responsible use of antimicrobials in all sectors					
	8.1.1.1.2. Develop indicators for monitoring antimicrobial use and resistance across all affected sectors					
	8.1.1.1.3. Monitor antimicrobial use in all health facilities for human health [Activity 8.2.1.2.2 covers monitoring in animal health]					
	8.1.1.1.4. Advocate for regular post market surveillance of antimicrobials in circulation. [This activity is linked with activity 9.3.1.2.2]					
	8.1.1.1.5. Enforce the use of the Dangerous drug book/appropriate software and record keeping at both wholesale and retail outlets of antibiotics					
	8.1.1.1.6. Advocate for and support periodic testing of herbal preparations with the claim of anti-infective properties for the presence of orthodox antibiotic substances. Use such data to engage producers of herbal preparations. (This activity is in sync with 9.3.1.2.1 for potential synergy to minimise cost)					
	8.1.1.1.7. Disseminate standards and practice guidelines for pharmaceutical care for human health					
	8.1.1.1.8. Train of core clinical care providers on the SPGPC					
	8.1.1.1.9. Educate herbal practitioners on responsible use of medicines including antimicrobials					
	8.1.1.1.10. Promote responsible use of herbal products with antimicrobial properties					
	8.1.1.1.11. Advocate for increased coverage of national health insurance in line with WHO reserved watch list					

		Timelines
		Year 1, Q4 2017-2018 / Year 2, 2018 / Year 3, 2019 / Year 4, 2020 / Year 5, 2021 (J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D)
	8.1.1.1.12. Develop and disseminate standards for care for veterinary practice	
8.1.1.2 The criteria for the selection of antimicrobials at the national level shall include surveillance data on antimicrobial resistance.	8.1.1.2.1 Develop criteria and guidelines for the use of national surveillance data for selection of antimicrobials	
	8.1.1.2.2 Update the national medicines selection process to include data from national surveillance of antimicrobial use and resistance. Utilize antimicrobial consumption and resistance data for selection at the national level	
8.1.1.3 The MOH, VSD, FC (in collaboration with EPA, PPRSD), shall ensure that the prescribing and dispensing of antimicrobials are informed by laboratory results.	8.1.1.3.1 Adapt the WHO classification list of Antimicrobials for Ghana and ensure optimised prescribing and dispensing based on Laboratory results	
	8.1.1.3.2 Develop institutional formulary list for prescribing and dispensing of antimicrobials in health facilities	
	8.1.1.3.3 Procure and supply relevant 'rapid' diagnostic kits to aid diagnosis at lower levels under a 2-year pilot management framework, and review for health system integration after 2 years	
8.1.1.4 Promotion and advertisement of antimicrobials shall be restricted to animal, human and plant health professionals and scientific publications only.	8.1.1.4.1 Advocate for enforcement of the law on advertisement of restricted drugs	
	8.1.1.4.2 Collaborate with law enforcement agencies and lorry station owners, drivers unions, chiefs, market queens to enforce the ban on sale of drugs at unauthorized places	
8.1.1.5 Sale and promotion of antimicrobials shall be in accordance with the Public Health Act 2012 (Act 851)	8.1.1.5.1 Public education and sensitisation on the dangers of sourcing antimicrobials from unauthorised sources	
8.1.1.6 There shall be functional Drugs and Therapeutic Committees to institute antimicrobial stewardship programmes in health facilities.	8.1.1.6.1 Develop antimicrobial stewardship training manual for health facilities	
	8.1.1.6.2 Train DTC members on antimicrobial stewardship concept	
	8.1.1.6.3 Monitor/provide supportive visits to the DTCs in the facilities on antimicrobial stewardship	

		Timelines				
		Year 1, Q4 2017-2018	Year 2, 2018	Year 3, 2019	Year 4, 2020	Year 5, 2021
		J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D				
	8.1.1.6.4 Conduct annual DTC peer review on antimicrobial stewardships					
Responsible Use of Antimicrobials in Veterinary, Aquaculture, Apiculture and Plant Health						
Sub-objective 2 - To improve the responsible use of antimicrobials in non-human sectors						
Strategic interventions	Activities					
8.2.1.1 The Ministries of Food and Agriculture, Fisheries and Aquaculture Development, and related agencies shall promote responsible use of antimicrobials at all veterinary fisheries and agricultural practice settings.	8.2.1.1.1 Hold inter-sectoral meetings on responsible antibiotics use in non-health settings					
	8.2.1.1.2 Develop training scheme and train veterinary personnel on responsible use of antibiotics in veterinary and aquaculture [This is linked with activity 8.1.1.1.1]					
8.2.1.2 There shall be instituted, monitoring mechanisms for the use of antimicrobials in veterinary, fisheries and agricultural practice settings.	8.2.1.2.1 Develop monitoring tools for antibiotic use in veterinary and aquaculture [This is linked with activity 8.1.1.1.2]					
	8.2.1.2.2 Monitor the use of antibiotics in veterinary and aquaculture. Quarterly monitoring reports to be shared with appropriate offices and with the AMR stakeholder platform					
8.2.1.3 The roles of veterinary services and PPRSD in animal and plant health respectively, and in antimicrobial use shall be promoted to assure public safety.	8.2.1.3.1 Develop communication kit and educate public on the existence and role of the veterinary services via campaigns on radio, TV, print media, web and social media					
8.2.1.4 The standard treatment guidelines and SOPs for animal and plant health shall be developed, disseminated and implemented.	8.2.1.4.1 Implement and monitor adherence to standards, treatment guidelines, benchmarks, SOPs, protocols, lists of medicines etc. for antimicrobial use in veterinary and aquaculture					
8.2.1.5 There shall be standards set for antimicrobial residue in veterinary, plant production and aquaculture.	8.2.1.5.1 Set-up technical working group to define standards, treatment guidelines, benchmarks, SOPs, protocols, lists of medicines etc. for antimicrobial use in veterinary and aquaculture. [include FDA and GSA, EPA]					
8.2.1.6 The quality of veterinary and plant pathology laboratory services shall be strengthened to inform selection and prescribing of antimicrobials.	8.2.1.6.1 Upgrade veterinary laboratories with capacity to perform culture and sensitivity testing based on comprehensive needs assessment					

		Timelines				
		Year 1, Q4 2017-2018	Year 2, 2018	Year 3, 2019	Year 4, 2020	Year 5, 2021
		J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D				
Antimicrobials, the environment and industry						
Sub-objective 3 - To promote safe disposal of microbiologically sensitive matter and waste						
Strategic interventions	Activities					
8.3.1.1 Guidelines and standards for biomedical wastes and effluents from health facilities, animal production and aquaculture units will be developed and enforced.	8.3.1.1.1 Setup a technical committee with clear TORs to develop guidelines for biomedical waste and effluents for all sectors					
8.3.1.2 EPA and FDA shall establish mechanisms for retrieval and disposal of unwholesome and unused antimicrobials from the general public and institutions	8.3.1.2.1 Explore and institute possibilities of incentives to encourage the return of unused and unwholesome antimicrobial agents					
	8.3.1.2.2 Educate public on the need to return unused and unwholesome antimicrobial agents					
	8.3.1.2.3 Identify and setup collection points for receiving unused and unwholesome antimicrobial agents					
Strategic objective 5: Develop the economic case and create an enabling environment for sustainable investment that takes account of the needs of Ghana, and increase investment in new medicines, diagnostic tools, vaccines and other interventions.						
Research and development						
Sub-objective 1 - To set research agenda into AMR in affected sectors						
Strategic interventions	Activities					
9.1.1.1 The Ministries of Health, Food and Agriculture, Fisheries and Aquaculture Development shall collaborate with other agencies and institutions to conduct research into various aspects of Antimicrobial use and resistance in humans, animals and plants.	9.1.1.1.1 Develop research agenda for AMR and incorporate into research agenda of MDAs in affected sectors (humans, animals, plants)					
	9.1.1.1.2 Research into costs of hospital acquired infections.					
	9.1.1.1.3 Research to identify antimicrobial resistance in specific zoonotic diseases					
	9.1.1.1.4 Research in new point-of-care diagnostic tools and methods					
	9.1.1.1.5 Conduct AMR prevalence studies					

		Timelines
		Year 1, Q4 2017-2018 / Year 2, 2018 / Year 3, 2019 / Year 4, 2020 / Year 5, 2021 J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
	9.1.1.1.6 Research into economic costs and implications of AMR in agriculture, aquaculture etc. and it's relatedness to human health	
9.1.1.2 Basic and operational research in antimicrobial use and resistance and development of new antimicrobial agents, vaccines and diagnostics shall be encouraged	9.1.1.2.1 Train and equip various practitioners on basic operational research that can yield useful data to refine operations as well as data of national interest.	
	9.1.1.2.2 Develop tools and methodologies to aid operational research in all affected sectors	
	For activities towards the development of new antimicrobial agents, See section under intervention 9.2.1.7	
9.1.1.3 A platform for academia, industry and policy shall be created to share information on research that can inform policy and industry.	9.1.1.3.1 (a) Set up a web-based repository for research on antimicrobial use and resistance for reports and published papers from all sectors (human, animal, plant and the environment)	
	9.1.1.3.1(b) Organise national and international scientific fora for research into potential antimicrobial agents, antimicrobial use and resistance in Ghana (with a secondary objective of seeding interest for investments into the development of antimicrobial agents)	
Manufacturing, Supply, distribution, Supply		
Sub-objective 2 - To improve the manufacturing, supply, distribution of antimicrobial agents including research and development		
Strategic interventions	Activities	
9.2.1.1 Sourcing, distribution and supply of antimicrobials shall strictly be in accordance with available regulatory instruments in the country.	9.2.1.1.1. Advocate for stringent enforcement of regulation on antimicrobials. [This activity is linked with activity 9.3.1.1.1]	
9.2.1.2 All local manufacturing companies shall have the technical requirements as determined by the FDA and EPA for the manufacture of antimicrobial agents.	9.2.1.2.1. Enforce minimum standards for manufacture of antimicrobial agents of acceptable quality amongst local manufacturers in Ghana, based on current international standards and GMP	
	9.2.1.2.2. Implement GMP roadmap for local manufacture of antimicrobials in country	
9.2.1.3 The Ministry of Health shall facilitate the establishment of a national bioequivalence Centre to support the manufacture of quality generic antimicrobials	9.2.1.3.1 Advocate and implement a national bioequivalence centre strategy in a PPP mode	

		Timelines
		Year 1, Q4 2017-2018 | Year 2, 2018 | Year 3, 2019 | Year 4, 2020 | Year 5, 2021 J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
9.2.1.4 The FDA shall support local industries manufacturing antimicrobials to meet quality specifications in accordance with Public Health Act 2012 (Act 851, 2012).	9.2.1.4.1 Advocate for the active implementation of the FDA roadmap for local manufacturers in support of the local manufacture of antimicrobials of acceptable quality [This activity is lined with 9.2.1.2.1, 9.2.1.2.2]	
9.2.1.5 The government through the Ministry of Health, Food and Agriculture, Ministry of Environment Science and Technology shall strengthen collaboration between academia and industry for the development of new antimicrobial agents.	9.2.1.5.1 Develop policy framework governing the research between stakeholders including academia and industry. [This intervention is linked with activities under intervention 9.2.1.7]	
9.2.1.6 The government shall provide incentives and financial support for local industries to produce affordable but quality antimicrobials including industries with the capacity to develop APIs for the pharmaceutical sector	9.2.1.6.1 Create an incentive package to encourage the local manufacture of antimicrobials of acceptable quality	
	9.2.1.6.2 Set-up a fund to support local manufacture of antimicrobials (based on transparent criteria informed by a demonstrable commitment to quality)	
9.2.1.7 Innovation for new antimicrobial agents shall be encouraged including those from herbal sources	9.2.1.7.1 Scan the research repositories of existing research institutions for existing research on medicinal agents of potential antimicrobial value.	
	9.2.1.7.2 Assess the economic viability of investment into such medicinal agents	
	9.2.1.7.3 Develop a clear action plan and investment model for long term drug development of potential agents	
	9.2.1.7.4 Explore the development of potential antimicrobial medicinal agents in-country (in collaboration with academia, research institutions and centres)	
	9.2.1.7.5 Support specific research into local medicinal plants with antimicrobial activity as well as the development of such agents	
Regulation and enforcement		
Sub-objective 3 - To strengthen the regulatory and enforcement regime for antimicrobials		
Strategic interventions	Activities	

		Timelines
		Year 1, Q4 2017-2018 / Year 2, 2018 / Year 3, 2019 / Year 4, 2020 / Year 5, 2021
		J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
9.3.1.1 Supply of antimicrobial agents shall be strictly according to laid down regulations (Public Health Act, Health Professions Regulatory Bodies Act, HeFRA) etc.	9.3.1.1.1 Collaborate with implementers of key Acts of government to regulate the supply, storage and distribution of antimicrobials in formal and informal markets [This activity is linked with activity 9.2.1.1.1]	
9.3.1.2 The FDA, EPA and other relevant institutions shall enhance post market surveillance and pharmacovigilance on antimicrobial agents	9.3.1.2.1 Conduct post market surveillance (PMS) of antimicrobial agents. [This activity is linked with activity 8.1.1.1.4]	
	9.3.1.2.2 Engage the private, public and mission sectors on stricter management model for the results of post market surveillance	
	9.3.1.2.3 Collaborate with FDA to collate pharmacovigilance data on antimicrobial treatments	
	9.3.1.2.4. Institute special courts for regulatory offences	
Stakeholder collaboration and governance of antimicrobial resistance		
Sub-objective 4 - To strengthen governance and stakeholder collaboration for implementation of AMR interventions in Ghana		
Strategic interventions	Activities	
9.4.1.1 There shall be established a Ministerial Commission comprising the Ministries of Health, Food and Agriculture, Fisheries and Aquaculture Development, Interior, Defense, Local Government and Rural Development, Environment, Science, Technology and Innovation and others to lead efforts to contain the AMR threat.	9.4.1.1.1 Set-up of an inter-ministerial commission on AMR from relevant ministries.	
	9.4.1.1.2 Convene meetings of the inter-ministerial commission bi-annually	
9.4.1.2 The Ministerial Commission will be advised on technical issues by a team of experts drawn from relevant fields of expertise.	9.4.1.2.1 Develop policy briefs and technical briefs for the ministerial commission on key AMR issues as needed.[On 9.4.1.2.1 Note: AMR technical team would provide such advise. The team could co-opt technical expertise as needed to strengthen its advisory functions.]	
9.4.1.3 Implementation of the Policy will take place at the District level by District Committees on AMR. The District AMR Committees shall be supervised by Regional Committees on AMR.	9.4.1.3.1 Engage district and regional structures on the implementation of AMR policy covering: intent, roles and responsibilities, interactions, etc.	
9.4.1.4 The Ministry of Health shall coordinate a functional multi-stakeholder platform to drive antimicrobial resistance issues in the country	9.4.1.4.1 Setup/identify and strengthen a secretariat within the ministry of Health to coordinate AMR issues in country	

		Timelines
		Year 1, Q4 2017-2018 / Year 2, 2018 / Year 3, 2019 / Year 4, 2020 / Year 5, 2021
	9.4.1.4.2 Engage national coordinators with clear TORs for the implementation of the NAP on AMR for the various sectors in Ghana	
9.4.1.5 The Ministry of Health shall promote collaboration; provide leadership and stewardship, amongst stakeholders, at international and national levels, as well as other sectors on antimicrobial use and resistance.	9.4.1.5.1 Convene quarterly AMR platform meetings	
9.4.1.6 There shall be a monitoring and evaluation framework for all aspects of this antimicrobial policy.	9.4.1.6.1 Develop a monitoring and evaluation framework as part of the NAP development process	
	9.4.1.6.2 Conduct a data mapping exercise to support the monitoring and evaluation framework and identify cost-effective (efficient) means to monitor and evaluate implementation of the NAP	
	9.4.1.6.3 Monitor implementation of the AMR NAP in Ghana half-yearly	
	9.4.1.6.4 Conduct annual multi-stakeholder project implementation review meetings for the AMR policy and NAP	

OPERATIONAL PLAN

The AMR National Action Plan details an operational plan which describes activities to be implemented /actions to be taken in line with the broad strategic objectives recommended. Lead implementers have been identified as well as relevant collaborators. The list of collaborators could be expanded during implementation.

Activities	Description of Activity	Time of implementation	Frequency (within 5 years)	Lead implementer/ Responsibility	Collaborators
Strategic objective 1: Improve awareness and understanding of antimicrobial resistance through effective communication, education and training.					
Sub-objective 1					
5.1.1.1.1. Engage CSOs and the media (as AMR media partners) to educate the public on responsible use of antimicrobials in the spirit of 'One health'	[CSO and media training workshop on AMR]	July, November 2018	1	GCNH, VSD, GHS	GJA, DPs, Media, MMDAs, MOFA(APD,PPRSD), Fisheries Commission, MOH (HPU), PSGH, GRNA, GRMA, OTCMSA, GMA, GVMA, Farmer Based Organisations
5.1.1.1.2. Develop Information, Education and Communication (IE & C) materials for targeted groups in a stratified public education campaign	[Technical Working Group activity with clear TORs, includes illustration, design and printing]	June-July 2018	1	GHS (Health Promotion Unit), MOFA (ISD), VSD, APD	GCNH, DPs, Media, MMDAs, Office of the Director of Pharmaceutical Services-MOH, MOFA (APD,PPRSD), Fisheries Commission, MOH, PSGH, GRNA, GRMA, OTCMSA, GMA, GVMA
5.1.1.1.3. Educate the public in order to promote the responsible use of antimicrobials among the general population	[AMR public education campaign-through radio, TV, print media, social media, schools, communities, churches etc.]	August-September 2018, November 2018-May 2019	5	VSD, GHS, GNDP	GCNH, DPs, Media, MMDAs, GES, MOFA (APD,PPRSD), Fisheries Commission, MOH (HPU), PSGH, GRNA, GRMA, OTCMSA, GMA, GVMA
5.1.1.1.4. Review the public education campaign for optimized impact	[Technical assistance: Review of public education campaign]	January 2019	1	VSD, GHS	All relevant stakeholders
5.1.1.2.1. Engage professional associations to educate professionals to promote the responsible use of antimicrobials at all levels of practice in all affected sectors (human, animal, plant, environment, etc.)	[Technical Workshop with relevant professional bodies and AMR Advocacy team, Annual General meetings/Continuous professional education platforms]	May 2018, December 2018	1	Professional associations (GMA, GRNA, PSGh, GRMA, VEMTAG, GVMA)	Professional associations, VEMTAG, All relevant stakeholders
5.1.1.3.1. Develop the content framework on responsible use of antimicrobials for consideration into the curriculum of training institutions. (This is to serve as the basis for the content on syllabus)	[Technical Working Group activity with clear TORs]	June 2018	1	AMR Platform Technical Working Group	Academia, MOH, MOFA MOE, GHS, Relevant professional regulatory bodies, all relevant stakeholders
5.1.1.4.1.(a) Develop the content framework on responsible use of antimicrobials in non-human settings, for consideration into the curriculum of training institutions. (This is to serve as the basis for the content on syllabus)	[Refer to activity 5.1.1.3.1]	[Refer to activity 5.1.1.3.1]	[Refer to activity 5.1.1.3.1]	[Refer to activity 5.1.1.3.1]	[Refer to activity 5.1.1.3.1]
5.1.1.4.1.(b) Incorporate content on responsible use of antimicrobials into the curriculum of training institutions for professionals in all affected sectors (human, animal, plant, environment etc.) [This is linked with Activity 7.1.1.1.3.]	[Technical workshop with relevant training institutions and AMR Advocacy team]	July-August 2018	1	AMR Platform Technical Working Group	Academia, VSD, FAO,MESTI, all relevant stakeholders
Strategic objective 2: Strengthen knowledge and evidence base through surveillance and research					
Activities - Sub-objective 1					
Activities					

Activities	Description of Activity	Time of implementation	Frequency (within 5 years)	Lead implementer/ Responsibility	Collaborators
6.1.1.1.1.(a) Establish a structure for the national surveillance system for human health – which includes the national reference laboratory (would also cover Healthcare Associated Infection [HCAI]	Laboratory-based Surveillance team	August 2018-July 2019	10	MOH, GHS, Academia	GHS, Academia,professional associations, all stakeholders
6.1.1.1.2.(a) Establish a structure for the national surveillance systems for non-human health which includes animal, plant and environment (would also cover a national reference laboratory)	Laboratory-based Surveillance team	August 2018-December 2019	10	MOFA, MOFAD, MESTI, VSD, Academia	VSD, FAO, MESTI, Academia, Professional associations, all stakeholders
6.1.1.1.3. Develop national guidelines for the surveillance systems – including guidelines for passive and active surveillance.	[Technical Working Group activity with clear TORs, Stakeholder workshop, design and printing]	May-November 2018	7	GHS	Academia, Professional associations, all stakeholders
6.1.1.1.4. Develop unified protocols and SOPs including standardized diagnostics and methodology for sensitivity testing.	[Technical Working Group activity with clear TORs, Stakeholder workshop, Design and Printing]	June-July 2018	5	GHS	Academia, Professional associations, all stakeholders
6.1.1.1.5. Train sentinel sites on the use of guidelines, protocols and SOPs	[Regional training workshops]	July-December 2018	3	MOH, MOFA, MESTI, MOFAD	Academia, Professional associations, all stakeholders
6.1.1.1.6. Rollout implementation: starting with laboratories that would meet requirements in human and animal sectors	[Technical outreach: Site supervision and Supportive supervision visits]	January-December 2019	1	GHS, VSD, Academia	all stakeholders, AMR platform
6.1.1.2.1. Assess current capacity of laboratories for conducting culture and sensitivity testing	[Consultancy: Local technical assistance]	June-July 2018	1	VSD, GHS	all stakeholders, AMR platform
6.1.1.2.2. Develop unified protocols and SOPs (See activity 6.1.1.1.4. above)	(See activity 6.1.1.1.4. above)	April-May 2018 (See activity 6.1.1.1.4. above)	-	(See activity 6.1.1.1.4. above)	(See activity 6.1.1.1.4. above)
6.1.1.2.3. Train core clinical care and laboratory staff on standardized protocols, SOPS, systems etc.	[Training Workshop targeted at Operational staff]	June-December 2018	1	GHS, VSD	Academia, all stakeholders, AMR platform
6.1.1.3.1.(a) Undertake wide stakeholder consultation on end-user needs, requirements, feasibilities, constraints, SOPs, use or adapt international available data management systems, etc. [Activity 6.1.1.3.3 follows in logic]	[Consultancy: Local technical assistance, Stakeholder workshop]	April 2018	2	Consultant	NITA, Academia, AMR platform, VSD, GHS, FDA
6.1.1.3.2.(a) Define system specification, scope and feature-set and definition of future development and management.	[Consultancy: Local technical assistance, Technical Working Group]	April-May 2018	5	Consultant	NITA, Academia, AMR platform, VSD, GHS, FDA
6.1.1.3.3.(a) Develop a national surveillance database, management tools, analytical tools, applications/software. (This would cover communication and reporting modules, access and security modules, etc.)	[Consultancy: Local technical assistance]	May-July 2018	1	Consultant	NITA, Academia, AMR platform, VSD, GHS, FDA

Activities - Sub-objective 2					
Activities					
6.1.1.1.1.(b) Establish a system for the national surveillance of antimicrobial use in human health	Consumption-based surveillance team	June 2018	1	MOH	GHS, GHAQI, CHAG, SPMDP, PMAG, Chamber of Pharmacy, CPPA, Pharmaceutical Wholesalers Association, Academia, GRA, professional associations, all stakeholders
6.1.1.1.2.(b) Establish a system for the national surveillance of antimicrobial use in non-human health	Consumption-based surveillance team	June 2018	1	MOFA, MOFAD, MESTI	VSD, Importers and Wholesalers Academia, GRA, Professional associations, all stakeholders
6.1.1.1.7. Establish and resource a desk at the Ministry of Health for collation of antimicrobial resistance and consumption data. (Continues from Activity 6.1.1.1.6 under Objective 1 above)	AMR platform administrative activity in Ministry of Health	June-July 2018	1	MOH	AMR platform, All stakeholders

Activities	Description of Activity	Time of implementation	Frequency (within 5 years)	Lead implementer/ Responsibility	Collaborators
6.1.1.3.1.(b) Undertake wide stakeholder consultation on end-user needs requirements, feasibilities, constrains etc. for the development of a data management system for antimicrobial consumption in human and animal health	[Consultancy: Local technical assistance, Stakeholder workshop]	June 2018	2	Consultant	Academia, AMR platform, VSD, GHS, FDA
6.1.1.3.2.(b) Define system specification, scope and feature-set and definition of future development and management.	[Consultancy: Local technical assistance, Technical Working Group]	April-May 2018	5	Consultant	Academia, AMR platform, VSD, GHS, FDA
6.1.1.3.3.(b) Develop a national surveillance database, management tools, analytical tools, applications/software for antimicrobial consumption in humans and animal health. Deliverables would include communication and reporting modules, access and security modules, etc.	[Consultancy: Local technical assistance]	May-August 2018	1	Consultant	Academia, AMR platform, VSD, GHS, FDA

Activities - Sub-objective 3					
Activities					
6.2.1.1.1. Establish a structure for the national surveillance system for human health – including a national reference laboratory (this would also cover health care associated infection [HCAI] and of the organisms that cause HCAIs)	As above	[Refer to activity 6.1.1.1.1.(a)]	0	[Refer to activity 6.1.1.1.1.(a)]	[Refer to activity 6.1.1.1.1.(a)]
6.2.1.1.2. Establish a structure for the national surveillance systems for non-human health – including a national reference laboratory	As above	[Refer to activity 6.1.1.1.2.(a)]	0	[Refer to activity 6.1.1.1.2.(a)]	[Refer to activity 6.1.1.1.2.(a)]
6.2.1.1.3. Quantification and costing of laboratory commodities and tests	[Technical Workshop]	May-June 2018	3	GHS, VSD	GHAQI, SPMDP, Laboratory professional associations
6.2.1.1.4. Encourage local production of antimicrobial susceptibility testing disk. (Develop a sustainable business case for the local production of susceptibility disks, engage the business community, engage MOTI for incentives and enabling environment)	[External Technical Assistance, Technical Working Group]	July-September 2018	1	MOTI, MOH	Academia, Private sector, FDA, GSA, NMIMR
6.2.1.2.1. Implement the national laboratory policy implementation plans for human health	[Consultancy: Local technical assistance] [Stakeholder implementation activities]	October 2018-2021	5	GHS, CHAG, SPMDP, GHAQI, MOI, MOD, Teaching Hospitals, VSD	All implementing stakeholders
6.2.1.2.2. Upgrade district laboratories with capacity to perform culture and sensitivity testing based on comprehensive needs assessment	[20 month Laboratory upgrade programme]	October 2018-May 2020	-	GHS/VSD	Academia and Research Institutions, GHAQI, CHAG, SPMDP, CDC, All stakeholders
6.2.1.2.3. Train laboratory personnel as part of the laboratory upgrade programme	[Training Workshops]	November 2018-March 2020	3	GHS, CHAG, SPMDP, GHAQI, MOI, MOD, Teaching Hospitals, VSD	Academia, GHAQI, SPMDP, Private Laboratories, All stakeholders
6.2.1.3.1. Develop national laboratory policy and implementation plans for the food, agriculture, fisheries and environment sectors	[Consultancy: Technical assistance, Stakeholder workshop]	April 2018-June 2019	8	MOFA, MESTI, MOFAD	Academia,professional associations, all stakeholders
6.2.1.3.2. Engage relevant stakeholders towards the development of national laboratory policies for these sectors	[Stakeholder workshop]	June 2018-April 2019	2	MOFA, MESTI, MOFAD	Academia,professional associations, all stakeholders
6.2.1.3.3. Implement national laboratory policy for the food, agriculture, fisheries and environment sectors	[Policy implementation activities]	October 2019-December 2021	4	MOFA, MESTI, MOFAD	Academia,professional associations, all stakeholders

Activities - Sub-objective 4					
Activities					
6.1.1.1.7. Organise annual dissemination workshops for data on AMR surveillance and consumption	[Dissemination workshops]	December 2018, 2019, 2020, 2021	4	MOH, MOFA	Academia,professional associations, CSOs, Media, all stakeholders

Activities	Description of Activity	Time of implementation	Frequency (within 5 years)	Lead implementer/ Responsibility	Collaborators
6.1.1.1.8. Follow through evidence-based advocacy activities	[AMR platform advocacy working group-policy dialogue, sessions with the parliamentary select committee on health, inter-ministerial AMR committee]	January-February 2019, January-February 2020, January-February 2021	4	MOH, MOFA, MESTI	Academia,professional associations, CSOs, Media, all stakeholders
6.1.1.1.9. Organise forum on evidence-based policy implementation based on data on the AMR surveillance and its implications for the AMR policy implementation process	[Stakeholder Forum]	October 2019, 2020, 2021	1	MOH, MOFA, MESTI	Academia,professional associations, CSOs, Media, all stakeholders
Activities - Sub-objective 5					
Activities					
6.2.1.1.1. Collate incidence data on infectious diseases of common occurrence in Ghana to inform review of clinical guidelines	[Technical Working Group/ National Medicines Selection Committee]	April 2018, 2020	7	GNDP	GHS, VSD, Academia, all relevant stakeholders
6.2.1.1.2. Update Standard Treatment Guidelines and Essential Medicines List based on emergent surveillance data on AMR and AMC, generated from Ghana in the light of the best evidence and the rigour of the national medicines selection process.	[Technical Working Group/ National Medicines Selection Committee]	April 2019-December 2020	7	GNDP	GHS,NHIA, GHAQI, SPMDP, VSD, Academia, all relevant stakeholders
6.2.1.1.3. Develop and launch diagnostic, prescribing, and treatment aids based on the national medicines selection process, STGs and evidence from surveillance	[Technical Working Group]	May-June 2018, October-December 2019	3	GNDP	GHS,NHIA, GHAQI, SPMDP, VSD, Academia, all relevant stakeholders
6.2.1.1.4. Train on the use of updated Standard Treatment Guidelines with a focus on infectious disease management, based on surveillance data and monitor for adherence	[Technical Working Group/ National Medicines Selection Committee]	August-October 2018, 2020	5	GNDP	GHS,NHIA, GHAQI, SPMDP, VSD, Academia, all relevant stakeholders
Strategic objective 3: Reduce the incidence of infection through effective sanitation, hygiene and infection prevention measures and good agricultural and biosecurity practices.					
Activities - Sub-objective 1					
Activities					
7.1.1.1.1. Implement MOH IPC policies in all health facilities	[phased and prioritised implementation of the infection prevention and control policy]	July 2018, September 2020	5	GHS, MOI, MOD, GHAQI, SPMDP, CHAG	VSD, All implementing stakeholders
7.1.1.1.1.1. Conduct a baseline study on Healthcare Associated Infections	[Commissioned Study]	August-November 2018		GHS, VSD, MOI, MOD, GHAQI, SPMDP, CHAG	All implementing stakeholders
7.1.1.1.1.2. Advocate and create awareness on Healthcare Associated Infections [to be added training activities of human and animal health professionals] Activity 8.1.1.1.1. refers.	[Refer to activity 8.1.1.1.1]	[Refer to activity 8.1.1.1.1]	[Refer to activity 8.1.1.1.1]	[Refer to activity 8.1.1.1.1]	[Refer to activity 8.1.1.1.1]
7.1.1.1.2. Assessment of implementation of the IPC policy (including development of tools for assessment)	[local technical assistance]	October-December 2020	1	GHS-ICD, CHAG, GHAQI, SPMDP, MOI, MOD	All implementers of IPC policy, All stakeoholders
7.1.1.1.3.(a) Advocate for and facilitate the provision of potable water in 50% of health facilities.	[Commissioned implementation team via GHS, SPMDP, CHAG]	October 2018-October 2019	5	GHS, CHAG, GHAQI, SPMDP, MOWS	GHS, CHAQ, GHAQI, SPMDP, All implementers of IPC policy, All stakeoholders
7.1.1.1.3.(b) Advocate for inclusion of infection prevention and control practices into curriculum of health training institutions [This is linked with Activity 5.1.1.4.1.; 7.1.1.1.3.(a) and 7.1.1.1.5.]	[Technical workshop with relevant training institutions and AMR Advocacy team]	April-June 2018	3	MOE, MOH, MOFA	Academia, Professional Associations, All stakeholders
7.1.1.1.4. Provide adequate toilet and hand washing facilities in hospitals and communities. [This activity is linked with 5.1.1.4.1.; 7.1.1.1.3.(a) and 7.1.1.1.5.]	[Commissioned implementation team via GHS, SPMDP, CHAG]	November 2018-October 2020	5	MOH-GHS, CHAG, GHAQI, SPMDP	Local Government, All stakeholders
7.1.1.1.5. Provide PPEs in health facilities [This activity is linked with 5.1.1.4.1.; 7.1.1.1.3.(a) and 7.1.1.1.5.]	[Commissioned implementation team via GHS, SPMDP, CHAG]	November 2018-October 2020	5	MOH, QHAQI, CHAG, SPMDP	PPA, GSA, FDA, Professional Associations

Activities	Description of Activity	Time of implementation	Frequency (within 5 years)	Lead implementer/ Responsibility	Collaborators
7.1.1.1.6. Conduct supportive supervision for IPC [This activity is linked with Activity 7.1.1.1.7.]	[Commissioned implementation team via GHS, SPMDP, CHAG]	October 2018-August 2020	3	GHS, QHAQI, CHAG, SPMDP	Relevant stakeholders
7.1.1.1.7. Enforce the use of items for IPC– coloured bin liners, sharp boxes, disposable paper napkins [This activity is linked with Activity 7.1.1.1.6]	[Commissioned implementation team via GHS, SPMDP, CHAG]	December 2018-December 2019	5	GHS, QHAQI, CHAG, SPMDP	Relevant stakeholders
7.1.1.1.8 Develop guidelines for management of referred patients with infectious conditions from one point to the other [surveillance should be part of management]	[Technical Working Group]	February-May 2019	5	MOH, AMR TWG platform	GHS, GHAQI, SPMDP, CHAG
7.1.1.1.9 Implement IHR guidelines for containment of outbreaks of bacterial infection of public health interest in health facilities [This is linked with Activity 7.1.1.1.10]	[Commissioned and phased implementation]	July-September 2018	5	GHS, QHAQI, CHAG, SPMDP	Relevant stakeholders
7.1.1.1.10. Train and sensitise health workers and the general public on the containment of outbreaks. [This is linked with Activity 7.1.1.1.9]	[Zoned TOT workshops]	July-October 2018	3	GHS, QHAQI, CHAG, SPMDP	Academia, AMR Platform TWG
7.1.1.2.1 Develop IPC policies for non-human sectors	[Phased and prioritised implementation of the infection prevention and control policy]	June-November 2018	10	AMR Platform, AMR Policy TWG	Academia, VSD, FAO, all relevant stakeholders
7.1.1.2.2 Implement IPC policies in non-human sectors	[Phased and prioritised implementation of the infection prevention and control policy]	December 2018, January 2021	5	VSD, MOFA, MESTI	FAO, Fisheries, All implementing stakeholders
7.1.1.2.3 Assess implementation of the IPC policy (non-human sectors)	[Local technical assistance]	February-April 2021	1	VSD, MOFA, MESTI	FAO, Fisheries, All implementing stakeholders
7.1.1.2.4 Develop SOPs for ensuring proper infection prevention and control on farms etc. [This is linked to Activity 7.1.1.2.5]	[Technical Working Group]	November-December 2018	6	VSD, MOFA	FAO, Fisheries, All implementing stakeholders
7.1.1.2.5 Develop and train farmers on guidelines for containment of outbreaks of infections on farms etc. [This is linked to Activity 7.1.1.2.4]	[Technical Working Group]	January-February 2019	6	VSD, MOFA	FAO, Fisheries, All implementing stakeholders
7.1.1.3.1 Phase, prioritise, cost and implement the waste management policy in health facilities	[Phased and prioritised implementation of the waste management policy]	April 2018-September 2020	2	MOH, MESTI	GHS, CHAG, GHAQI, SPMDP, All implementing stakeholders
7.1.1.3.2 Assess implementation of the waste management policy	[Technical Working Group/ technical assistance]	October-December 2020	2	AMR TWG, MOH, MESTI	GHS, CHAG, GHAQI, SPMDP, All implementing stakeholders
7.1.1.3.3 Educate the public on hand hygiene, environmental cleaning and waste management	[Public education campaign]	December 2018-December 2020	2	AMR TWG	WASH project, CWSA
7.1.1.4.1 Develop guidelines and SOPs on waste management in other sectors	[Technical Working Group/ technical assistance]	December 2018-April 2019	8	AMR Platform, AMR Policy TWG	Academia, VSD, FAO, all relevant stakeholders
7.1.1.4.2 Train affected implementing entities on new guidelines on waste management	[Training workshop]	December 2018-December 2020	3	VSD, MOFA, MESTI, Fisheries and Aquaculture	Academia, VSD, FAO, all relevant stakeholders
7.1.1.4.3. Provide resources for implementation of SOPs and guidelines	[Procurement activity]	December 2018-December 2020	1	VSD, MOFA, MESTI, Fisheries and Aquaculture	PPA, VSD, FAO, AMR platform
7.1.1.5.1 Conduct regular sensitisation campaign on vaccination of animals	[Public education campaign]	May-October 2018, May 2019, May-October 2020	2	AMR TWG, VSD, MOFA	Academia, VSD, FAO, all relevant stakeholders
7.1.1.6.1 Train farmers on soil fertility management and other measures to promote the resilience of plants [This activity is linked to Activity 7.1.1.7.1]	[Targeted education campaign and Technical workshops]	November 2018-February 2019	3	MOFA	Academia, FAO, all relevant stakeholders
7.1.1.7.1 Train farmers on vector control on farms etc. [This activity can be linked with Activity 7.1.1.6.1]	[Targeted education campaign and Technical workshops]	November 2018-February 2019	3	MOFA	Academia, FAO, all relevant stakeholders
Strategic objective 4: Optimize the use of antimicrobial agents in humans, aquaculture, plant production and in animal health in the 'one health' approach					
Activities - Sub-objective 1					

Activities	Description of Activity	Time of implementation	Frequency (within 5 years)	Lead implementer/ Responsibility	Collaborators
Activities					
8.1.1.1.1. Train and re-train core clinical care providers on responsible use of antimicrobials in all sectors	[Regional Training Workshops in all 10 regions]	July-December 2018, July-November 2019	20	MOH, MOFA, MESTI, MOFAD	Academia, AMR platform technical working group, all relevant stakeholders
8.1.1.1.2. Develop indicators for monitoring antimicrobial use and resistance across all affected sectors	[Technical assitance + Technical Working Group]	June, 2018	1	AMR platform technical working group	OCP, WHO, FAO, VSD, GNDP, Academia, AMR platform technical working group, all relevant stakeholders
8.1.1.1.3. Monitor antimicrobial use in all health facilities for human health [Activity 8.2.1.2.2 covers monitoring in animal health]	[Technical Working Group]	June, December 2018, 2019, 2020 and June 2021	10	GHS	OCP, WHO, GNDP, Academia, AMR platform technical working group, all relevant stakeholders
8.1.1.1.4. Advocate for regular post market surveillance of antimicrobials in circulation. [This activity is linked with activity 9.3.1.2.2]	[Advocacy team + FDA commissioned PMS study]	July-September 2018	1	FDA, AMR Platform advocacy group	FDA, All relevant stakeholders
8.1.1.1.5. Enforce the use of the Dangerous drug book/appropriate software and record keeping at both wholesale and retail outlets of antibiotics	[Use of existing PSGh platforms for pharmaceutical wholesalers and retails e.g. annual meetings, PC site monitoring]	July-October 2018	1	Pharmacy Council	PSGh, CPPA, Chamber of Pharmacy, GHS-ICD, SPMDPA, GHAQI, CHAG, FDA, All relevant stakeholders
8.1.1.1.6. Advocate for and support periodic testing of herbal preparations with the claim of anti-infective properties for the presence of orthodox antibiotic substances. Use of such data to engage producers of herbal preparations. This activity is in sync with 9.3.1.2.1 for potential synergy to minimise cost	[Collaboration with FDA + commissioned study on the traces of orthodox antimicrobials in herbal preparations]	November-December 2018, April-June 2019, 2020, 2021	4	FDA, TAMC, AMR Platform advocacy group	FDA, All relevant stakeholders
8.1.1.1.7. Disseminate standards and practice guidelines for pharmaceutical care for human health	[Dissemination workshops + Development of SPGPC in various formats]	March 2018	1	Pharmacy Council	GNDP, MOH, GHS regional health directorates, PSGh, CPPA, NHIA, WHO, all relevant stakeholders
8.1.1.1.8. Train of core clinical care providers on the SPGPC	[Regional Training Workshops in all 10 regions]	March-July 2018	1	MOH	Academia, AMR platform technical working group, all relevant stakeholders
8.1.1.1.9. Educate herbal practitioners on responsible use of medicines including antimicrobials	[Regional Training Workshops in all 10 regions]	January-April 2019	1	TAMD	Academia, AMR platform technical working group, MOH, OCP, GNDP, FDA, NHIA, all relevant stakeholders
8.1.1.1.10. Promote responsible use of herbal products with antimicrobial properties	[Development of evidence based use guides, Sensitization workshops]	January-April 2019	1	TAMD	Academia, GNDP, OCP, AMR platform technical working group, MOH, FDA, NHIA, Media, CSO, all relevant stakeholders
8.1.1.1.11. Advocate for increased coverage of national health insurance in line with WHO reserved watch list	[Advocacy meetings]	March-June 2018, 2019	1	NHIA, GNDP	AMR platform technical working group, OCP, MOH, NHIA, CSO, NMSC, all relevant stakeholders
8.1.1.1.12. Develop and disseminate standards for care for veterinary practice	[Dissemination workshops + Development of SPCs and SOPs in various formats]	September-December 2018	1	MOFA VSD	MOFA VSD, FAO, regional offices, Academia, all relevant stakeholders
8.1.1.2.1 Develop criteria and guidelines for the use of national surveillance data for selection of antimicrobials	[Technical Working Group/ National Medicines Selection Committee]	September-October 2018	1	GNDP	OCP, NHIA, WHO, FDA, Academia, GHS, GHAQI, CHAG, SPMDP, AREPI, PSGh, CPPA, AMR platform technical subgroup, all relevant stakeholders
8.1.1.2.2 Update the national medicines selection process to include data from national surveillance of antimicrobial use and resistance. Utilize antimicrobial consumption and resistance data for selection at the national level	[Technical Working Group/ National Medicines Selection Committee]	November-December 2018	1	GNDP, NMSC	OCP, NHIA, WHO, FDA, Academia, GHS, GHAQI, CHAG, SPMDP, AREPI, PSGh, CPPA, AMR platform technical subgroup, all relevant stakeholders
8.1.1.3.1 Adapt the WHO classification list of Antimicrobials for Ghana and ensure optimised prescribing and dispensing based on Laboratory results	[Technical Working Group/ National Medicines Selection Committee]	January-February 2019	1	GNDP, NMSC	OCP, NHIA, WHO, FDA, Academia, GHS, GHAQI, CHAG, SPMDPA, AREPI, PSGh, CPPA, AMR platform technical subgroup, all relevant stakeholders
8.1.1.3.2 Develop institutional formulary list for prescribing and dispensing of antimicrobials in health facilities	[Institutional DTC activity]	March-April 2019	1	GHS, GHAQI, Teaching Hospitals, SPMDP, CHAG	GHS regional health directorates, GNDP, NDIRC

Activities	Description of Activity	Time of implementation	Frequency (within 5 years)	Lead implementer/ Responsibility	Collaborators
8.1.1.3.3 Procure and supply relevant 'rapid' diagnostic kits to aid diagnosis at lower levels under a 2-year pilot management framework, and review for health system integration after 2 years	[Procurement activity]	November 2018-2020	3	MOH-P&S, MOFA, MESTI	GHS, VSD, CHAG, GHAQI, SPMDP, PSGh, Private Practitioners in Veterinary Private, EPA, FDA, GSA, GNDP, NHIA, Office of the Director Pharmaceutical Services
8.1.1.4.1 Advocate for enforcement of the law on advertisement of restricted drugs	[Advocacy Working Group]	June-December 2018	1	FDA, AMR platform	Ghana Police, CPPA, Media-TV, Radio, Print, CSOs, all relevant stakeholders
8.1.1.4.2 Collaborate with law enforcement agencies and lorry station owners, drivers unions, chiefs, market queens to enforce the ban on sale of drugs at unauthorized places	[Dialogue, Actionable Plans, Task Force Action]	June-December 2018	1	FDA	Ghana Police, CPPA, Media-TV, Radio, Print, CSOs, GPRTU, Market Associations, Traditional leaders, all relevant stakeholders
8.1.1.5.1 Public education and sensitisation on the dangers of sourcing antimicrobials from unauthorised sources	[Public sensitisation campaigns]	June-December 2018	1	VSD, GHS	GCNH, DPs, Media, MMDAs, GES, MOFA(APD,PPRSD), Fisheries Commission, MOH (HPU), PSGH, GRNA, GRMA, OTCMSA, GMA, GVMA
8.1.1.6.1 Develop antimicrobial stewardship training manual for health facilities	[Technical Working Group/ National Medicines Selection Committee]	November 2018-January 2019	1	GHS-OCP/ICD, CHAG, GHAQI, SPMDP, MOI, MOD, Teaching Hospitals	GNDP, MOH, GHS regional health directorates, PSGh, CPPA, Pharmacy Council, NHIA, WHO, all relevant stakeholders
8.1.1.6.2 Train DTC members on antimicrobial stewardship concept	[Training Workshops]	April-August 2019	1	GHS-OCP/ICD, CHAG, GHAQI, SPMDP, MOI, MOD, Teaching Hospitals	Academia, AMR platform technical working group, all relevant stakeholders
8.1.1.6.3 Monitor/provide supportive visits to the DTCs in the facilities on antimicrobial stewardship	[Field visits and supportive supervision]	September-December 2019	1	GHS-OCP/ICD, CHAG, GHAQI, SPMDP, MOI, MOD, Teaching Hospitals	Academia, AMR platform technical working group, all relevant stakeholders
8.1.1.6.4 Conduct annual DTC peer review on antimicrobial stewardships	[Peer review workshops]	November 2019, May, Novemvember 2020, May, Novemvember 2021	5	MOH	GNDP, Academia, AMR platform technical working group, all relevant stakeholders

Activities - Sub-objective 2					
Activities					
8.2.1.1.1 Hold inter-sectoral meetings on responsible antibiotics use in non-health settings	[Sensitisation/Evidence dissemination workshop]	May, 2018, 2019, 2020, 2021	4	MOFA	MOH, MESTI, All relevant stakeholders
8.2.1.1.2 Develop training scheme and train veterinary personnel on responsible use of antibiotics in veterinary and aquaculture [This is linked with activity 8.1.1.1.1]	[Technical Working Group, Training Workshops]	July-October 2018	3	VSD, GHS	Academia, AMR platform technical working group, all relevant stakeholders
8.2.1.2.1 Develop monitoring tools for antibiotic use in veterinary and aquaculture [This is linked with activity 8.1.1.1.2]	[Technical assistance]	November-December 2018	1	AMR platform technical working group	FAO, VSD, GNDP, Academia, AMR platform technical working group, all relevant stakeholders
8.2.1.2.2 Monitor the use of antibiotics in veterinary and aquaculture. Quarterly monitoring reports to be shared with appropriate offices and with the AMR stakeholder platform	[Quarterly Monitoring activities]	January-March 2019, June, September, December 2019, March, June, September, December 2020, March, June, September, 2021	4	GHS, VSD	OCP, WHO, FAO, VSD, GNDP, Academia, AMR platform technical working group, all relevant stakeholders
8.2.1.3.1 Develop communication kit and educate public on the existence and role of the veterinary services via campaigns on radio, TV, print media, web and social media	[Local technical assistance + Technical Working Group + public education campaign]	January-March 2019	1	VSD	Media, GCNH, DPs, MMDAs, GES, MOFA(APD,PPRSD), Fisheries Commission, MOH (HPU), PSGH, GRNA, GRMA, OTCMSA, GMA, GVMA

Activities	Description of Activity	Time of implementation	Frequency (within 5 years)	Lead implementer/ Responsibility	Collaborators
8.2.1.4.1 Implement and monitor adherence to standards, treatment guidelines, benchmarks, SOPs, protocols, lists of medicines etc. for antimicrobial use in veterinary and aquaculture	[Implementation and Quaterly Monitoring Activities]	March, June, September, December 2019, March, June, September, 2021	4	VSD	Academia, AMR platform technical working group, all relevant stakeholders
8.2.1.5.1 Set-up technical working group to define standards, treatment guidelines, benchmarks, SOPs, protocols, lists of medicines etc. for antimicrobial use in veterinary and aquaculture. [include FDA and GSA, EPA]	[Technical Working Group+ Technical assistance]	September 2018	8	MOFA, VSD, GSA	FDA, GSA, EPA, Academia, AMR platform technical working group, all relevant stakeholders
8.2.1.6.1 Upgrade veterinary laboratories with capacity to perform culture and sensitivity testing based on comprehensive needs assessment	[Laboratory upgrade programme]	June-December 2019	3	MOFA	Academia, AMR platform technical working group, all relevant stakeholders
Activities - Sub-objective 3					
Activities					
8.3.1.1.1 Setup a technical committee with clear TORs to develop guidelines for biomedical waste and effluents for all sectors	[Technical Working Group]	June 2019	8	AMR platform technical subgroup	AMR platform
8.3.1.2.1 Explore and institute possibilities of incentives to encourage the return of unused and unwholesome antimicrobial agents	[Technical Working Group]	August-September 2019	3	EPA, CSIR, AMR platform technical subgroup	Pharmacy Council, CPPA, MOH, MOFA, MESTI, all relevant stakeholders
8.3.1.2.2 Educate public on the need to return unused and unwholesome antimicrobial agents	[Technical Working Group]	October 2019-April 2020	2	EPA, CSIR	Pharmacy Council, CPPA, MOH, MOFA, MESTI, all relevant stakeholders
8.3.1.2.3 Identify and setup collection points for receiving unused and unwholesome antimicrobial agents	[Technical Working Group]	August-September 2019	2	AMR platform technical subgroup, CPPA, EPA, CSIR	Pharmacy Council, CPPA, MOH, GHS, GHAQI, CHAG, SPMDP, MOFA, MESTI, all relevant stakeholders
Strategic objective 5: Develop the economic case and create an enabling environment for sustainable investment that takes account of the needs of Ghana, and increase investment in new medicines, diagnostic tools, vaccines and other interventions.					
Activities - Sub-objective 1					
Activities					
9.1.1.1.1 Develop research agenda for AMR and incorporate into research agenda of MDAs in affected sectors (humans, animals, plants)	[Technical Dialogue Series]	August-September 2018	3	Academia	AMR platform, all relevant stakeholders
9.1.1.1.2 Research into costs of hospital acquired infections.	[Collaboration between AMR platform and Academia]	June-December 2018	1	Academia	GHS-OCP/ICD, CHAG, GHAQI, SPMDP, MOI, MOD, Teaching Hospitals, Academia, AMR platform, all relevant stakeholders
9.1.1.1.3 Research to identify antimicrobial resistance in specific zoonotic diseases	[Collaboration between AMR platform and Academia]	June-December 2018	1	Academia, Research Institutions	MOH, MOFA, MESTI, AMR platform, all relevant stakeholders
9.1.1.1.4 Research in new point-of-care diagnostic tools and methods	[Collaboration between AMR platform and Academia]	June-December 2018	1	Academia, Research Institutions	MOH, MOFA, MESTI, AMR platform, all relevant stakeholders
9.1.1.1.5 Conduct AMR prevalence studies	[Collaboration between AMR platform and Academia]	October-December 2018	1	Academia, Research Institutions	AMR platform, all relevant stakeholders
9.1.1.1.6 Research into economic costs and implications of AMR in agriculture, aquaculture etc. and it's relatedness to human health	[Collaboration between AMR platform and Academia]	June-December 2018	1	Academia	AMR platform, all relevant stakeholders
9.1.1.2.1 Train and equip various practitioners on basic operational research that can yield useful data to refine operations as well as data of national interest.	[Training workshops - AMR technical task team for operational research]	March-July 2019	3	GHS, VSD, Academia	AMR platform, PPRSD (MOFA), FDA, EPA, all relevant stakeholders
9.1.1.2.2 Develop tools and methodologies to aid operational research in all affected sectors	[Technical Working Group/ technical assistance]	January-February 2019	5	GHS, VSD, Academia	

Activities	Description of Activity	Time of implementation	Frequency (within 5 years)	Lead implementer/ Responsibility	Collaborators
For activities towards the development of new antimicrobial agents, See section under intervention 9.2.1.7					
9.1.1.3.1(a) Set up a web-based repository for research on antimicrobial use and resistance for reports and published papers from all sectors (human, animal, plant and the environment)	[Technical Working Group + Local technical assistance]	Novermber 2018-January 2019	2	GNDP, Academia	MESTI, MOFA, AMR platform, Research Institutions, All relevant stakeholders
9.1.1.3.1(b) Organise national and international scientific fora for research into potential antimicrobial agents, antimicrobial use and resistance in Ghana (with a secondary objective of seeding interest for investments into the development of antimicrobial agents)	[National Conference, International Conference]	September 2019-National Conference, July 2021-International Conference	2	MOH, MOFA, MESTI	WHO, FAO, All stakeholders, International partners, Donors etc.

Activities - Sub-objective 2					
Activities					
9.2.1.1.1 Advocate for stringent enforcement of regulation on antimicrobials. [This activity is linked with activity 9.3.1.1.1]	[AMR Advocacy team/advocacy meetings/public empowerment on appropriate sourcing of antimicrobials]	May-July 2018	3	FDA	PMAG, PSGh, WHO, MOI, Ghana Police, All relevant stakeholders
9.2.1.2.1 Enforce minimum standards for manufacture of antimicrobial agents of acceptable quality amongst local manufacturers in Ghana, based on current international standards and GMP	[Regulatory activity]	August-September 2018	1	FDA	PMAG, PSGh, WHO, All relevant stakeholders
9.2.1.2.2. Implement GMP roadmap for local manufacture of antimicrobials in country	[Technical Working Group + Stakeholder Engagement]	October-November 2018, January-December 2019, 2020	3	MOH, FDA	PMAG, PSGh, WHO, All relevant stakeholders
9.2.1.3.1 Advocate and implement a national bioequivalence centre strategy in a PPP mode	[AMR Advocacy team/advocacy meetings]	August-December 2018, January-December 2019, 2020	2	MOH, MOF, MOTI, Ministry for Business Development	FDA, WHO, PMAG, NMIMR, Academia, PSGh, all relevant stakeholders
9.2.1.4.1 Advocate for the active implementation of the FDA roadmap for local manufacturers in support of the local manufacture of antimicrobials of acceptable quality [This activity is lined with 9.2.1.2.1, 9.2.1.2.2]	[AMR Advocacy team/advocacy meetings]	April-July 2018	2	FDA, AMR Platform Adocacy Team	PMAG, AMR platform, FDA, MOH, MOTI, MOFA
9.2.1.5.1 Develop policy framework governing the research between stakeholders including academia and industry. [This intervention is linked with activities under intervention 9.2.1.7]	[Technical Working Group + Stakeholder Engagement]	January-March 2019	10	MOH, MOFA	Academia, Research Institutions
9.2.1.6.1 Create an incentive package to encourage the local manufacture of antimicrobials of acceptable quality	[Technical and Advocacy Group + Stakeholder Engagement + Political/policy dialogue]	Novermber 2018-February 2019	3	MOH, FDA	PMAG, MOTI, MOFA, MESTI
9.2.1.6.2 Set-up a fund to support local manufacture of antimicrobials (based on transparent criteria informed by a demonstrable commitment to quality)	[Technical and Advocacy Group + Stakeholder Engagement + Political/policy dialogue]	December 2018-March 2019	3	MOH, MOTI	PMAG, FDA, DPs, WHO, MOFA, MESTI, PSGh
9.2.1.7.1 Scan the research repositories of existing research institutions for existing research on medicinal agents of potential antimicrobial value.	[Local technical assistance]	February-March 2018	5	Academia, research instituions	AMR platform, MoH, PMAG, FDA
9.2.1.7.2 Assess the economic viability of investment into such medicinal agents	[Local technical assistance]	April-May 2018	1	Academia, researh institutions	AMR platform, MoH, PMAG, FDA
9.2.1.7.3 Develop a clear action plan and investment model for long term drug development of potential agents	[International techncial assistance]	June-July 2018	1	Consultant	AMR platform, MOH, MOTI, MOFA, MESTI, PMAG, FDA
9.2.1.7.4 Explore the development of potential antimicrobial medicinal agents in-country (in collaboration with academia, research institutions and centres)	[Advocacy for the thesis of interested students to focus on AMR]	July-October 2018	2	Academia, research instituions	Academia, research instituions, MoH, PMAG, FDA

Activities	Description of Activity	Time of implementation	Frequency (within 5 years)	Lead implementer/ Responsibility	Collaborators
9.2.1.7.5 Support specific research into local medicinal plants with antimicrobial activity as well as the development of such agents	[Allocation of research grant and merit criteria, fund management protocols]	May-June 2018	1	CSRIPM, Academia	Academia, Research institutions, PMAG
Activities - Sub-objective 3					
Activities					
9.3.1.1.1 Collaborate with implementers of key Acts of government to regulate the supply, storage and distribution of antimicrobials in formal and informal markets [This activity is linked with activity 9.2.1.1.1]	[Policy dialogue with HeFRA, Pharmacy Council, Ghana medical and Dental Council, Nursing and Midwifery Council etc.]	July-September 2019	2	MOH, FDA	GHS, MOFA, MESTI, AMR platform, EPA, VSD, CHAG, GHAQI, SPMDP, Wholesalers, PMAG, CPPA, HeFRA, Pharmacy Council
9.3.1.2.1 Conduct post market surveillance (PMS) of antimicrobial agents. [This activity is linked with activity 8.1.1.1.4]	[Collaboration with FDA for PMS studies]	April-June 2018, 2019, 2020, 2021	4	FDA	AMR platform, GHS, VSD, EPA, CHAG, GHAQI, SPMDP, MOH, Wholesalers, PMAG, CPPA
9.3.1.2.2 Engage the private, public and mission sectors on stricter management model for the results of post market surveillance	[Stakeholder workshop inlcuding private sector engagements]	March 2019, July-August 2019	2	MOH, FDA	PMAG, CPPA, Pharmaceutical Wholesalers,Retailers, LCS, PSGh, Champer of Pharmacy, Media
9.3.1.2.3 Collaborate with FDA to collate pharmacovigilance data on antimicrobial treatments	[Pharmacovigilance study]	July-August 2019	1	FDA	GHS, GHAQI, CHAG, SPMDP, PMAG, CPPA ,Retailers, LCS, Media
9.3.1.2.4. Institute special courts for regulatory offences	[Advocacy and High level policy dialogue]	March 2019, July-August 2019	2	MOH, MOJAG, FDA	PMAG, CPPA, Pharmaceutical Wholesalers,Retailers, LCS, PSGh, Champer of Pharmacy, Media, Relevant Parliamentary Select Committees
Activities - Sub-objective 4					
Activities					
9.4.1.1.1 Set-up of an inter-ministerial commission on AMR from relevant ministries.	[AMR platform advocacy team, WHO, FAO]	January-March 2018	2	MOH	MOH, MESTI, MOFA, MOTI, MOE, MOJAG, MOD, MOI, MOLGRD, MOFAD, MOWS, MOBD, MOF, MOME
9.4.1.1.2 Convene meetings of the inter-ministerial commission bi-annually	[AMR coordination, Interministerial commission meeting]	June and December of every year; ... 2018, 2019, 2020, 2021	10	MOH	MOH, MESTI, MOFA, MOTI, MOE, MOJAG, MOD, MOI, MOLGRD, MOFAD, MOWS, MOBD, MOF, MOME
9.4.1.2.1 Develop policy briefs and technical briefs for the ministerial commission on key AMR issues as needed.[On 9.4.1.2.1 Note: AMR technical team would provide such advise. The team could co-opt technical expertise as needed to strengthen its advisory functions.]	[Technical meetings + Technical assistance as needed]	June and December of every year; ... 2018, 2019, 2020, 2021	10	AMR TWG	AMR TWG
9.4.1.3.1 Engage district and regional structures on the implementation of AMR policy covering: intent, roles and responsibilities, interactions, etc.	[Regional policy implementation workshops on the new AMR policy and NAP in all affected sectors]	August-September 2018	10	MOH	GHS-regional health directorates, GHAQI, CHAG, SPMDP, all implementing stakeholders
9.4.1.4.1 Setup/identify and strengthen a secretariat within the ministry of Health to coordinate AMR issues in country	[Develop terms of reference (TORs), mode of operations, reporting lines, define relationships with donors, AMR platform, etc.]	January-March 2018, April-December 2018, January-December 2019, 2020, 2021	53	MOH	AMR platform, MOFA, EPA, FAO, WHO
9.4.1.4.2 Engage national coordinators with clear TORs for the implementation of the NAP on AMR for the various sectors in Ghana	[Develop terms of reference (TORs), mode of operations, reporting lines, define relationships with donors, AMR platform, etc.]	January-March 2018, April-December 2018, January-December 2019, 2020, 2021	53	MOH	AMR platform, MOFA, EPA, FAO, WHO
9.4.1.5.1 Convene quarterly AMR platform meetings	[Stakeholder meetings]	March, June, September, December 2018, 2019, 2020, 2021	19	AMR platform chair and secretariat	AMR Platform
9.4.1.6.1 Develop a monitoring and evaluation framework as part of the NAP development process	[Local technical assistance]	April-June 2018	1	AMR platform	AMR policy implementing stakeholders

Activities	Description of Activity	Time of implementation	Frequency (within 5 years)	Lead implementer/ Responsibility	Collaborators
9.4.1.6.2 Conduct a data mapping exercise to support the monitoring and evaluation framework and identify cost-effective (efficient) means to monitor and evaluate implementation of the NAP	[Technical working group with Lead consultant]	June-July 2018	1	AMR platform	AMR policy implementing stakeholders
9.4.1.6.3 Monitor implementation of the AMR NAP in Ghana half-yearly	[Monitoring and evaluation activities/field visits/ computation of indicators]	June-July, November-December 2018, 2019, 2020, 2021	8	AMR platform	AMR policy implementing stakeholders
9.4.1.6.4 Conduct annual multi-stakeholder project implementation review meetings for the AMR policy and NAP	[Multi-stakeholder workshop with updates from implementing partners]	July 2018, 2019, 2020, 2021	4	AMR platform	AMR policy implementing stakeholders

PROCESS INDICATOR MATRIX

The Ghana AMR National Action Plan provides an M and E framework as detailed below to enhance project implementation. Indicators a provided under each strategic objective and sub-objective including the data sources that inform the indicator or where the indicator could be obtained and targets for the stated indicator.

Activities	Implementation time	Process Indicator/ Deliverables	Data source	Targets
Indicators-Strategic Objective 1				
Sub-objective 1				
5.1.1.1.1. Engage CSOs and the media (as AMR media partners) to educate the public on responsible use of antimicrobials in the spirit of 'One health'	July, November 2018	[1] Number of CSOs and media engaged [2] Number of CSO and Media engagement workshops held	MOFA, MOH, MESTI	[1] Participation from 10 radio stations and 5 TV stations with national coverage [2] Participantion from CSO from all 10 regions
5.1.1.1.2. Develop Information, Education and Communication (IE & C) materials for targeted groups in a stratified public education campaign	June-July 2018	Simple and concise IE&C materials produced and available in several formats for various media channels	GHS (Health Promotion Unit), MOFA(ISD), Office of the Director of Pharmaceutical Services-MOH, VSD, APD	[1] 250,000 fliers, stickers and fact sheets [2] 100,000 posters
5.1.1.1.3. Educate the public in order to promote the responsible use of antimicrobials among the general population	August-September 2018, November 2018-May 2019	[1] Number of awareness creation activities undertaken [2]Number of people sensitized [3] Number of people trained	ISD, MESTI, MOH, MOFA, VSD, GHS,MOFAD, GES	[1] 10 awareness creation activities per year [2] 10 regions sensitized [3] 50 ToT conducted twice for the period
5.1.1.1.4. Review the public education campaign for optimized impact	January 2019	[1] Public education campaign review report available	VSD, GHS	[1] Changes in public awareness on AMR demonstrated
5.1.1.2.1. Engage professional associations to educate professionals to promote the responsible use of antimicrobials at all levels of practice in all affected sectors (human, animal, plant, environment, etc.)	May 2018, December 2018	[1] Number of professional associations engaged	Professional associations	[1] Professional associations in all sectors engaged [2] Number of AGMs/CPDs etc. held on AMR
5.1.1.3.1. Develop the content framework on responsible use of antimicrobials for consideration into the curriculum of training institutions. (This is to serve as the basis for the content on syllabus)	June 2018	[1] Content framework for update of syllabus developed	MOH, MOFA, AMR Platform, Academia, GHS	[1] Content framework for update of syllabus developed submitted to all tertiary institutions training professionals in **human and animal** health
5.1.1.4.1.(a) Develop the content framework on responsible use of antimicrobials in non-human settings, for consideration into the curriculum of training institutions. (This is to serve as the basis for the content on syllabus)	[Refer to activity 5.1.1.3.1]	[Refer to activity 5.1.1.3.1]	[Refer to activity 5.1.1.3.1]	[Refer to activity 5.1.1.3.1]
5.1.1.4.1.(b) Incorporate content on responsible use of antimicrobials into the curriculum of training institutions for professionals in all affected sectors (human, animal, plant, environment etc.) [This is linked with Activity 7.1.1.1.3.]	July-August 2018	[1] Content framework for update of syllabus developed	AMR Platform, Academia, GHS, VSD	[1] Updated curriculum of training institutions containing modules on AMR [2] Short auxiliary courses/lectures on AMR in training institutions
Indicators-Strategic Objective 2				
Sub-objective 1				
Activities				
6.1.1.1.1.(a) Establish a structure for the national surveillance system for human health – which includes the national reference laboratory (would also cover Healthcare Associated Infection [HCAI]	August 2018-July 2019	[1] Functional national surveillance/ reference laboratory infrastructure for human health	MOH	[1] National Surveillance/ Reference Laboratory infrastructure for human health built and equipped
6.1.1.1.2.(a) Establish a structure for the national surveillance systems for non-human health which includes animal, plant and environment (would also cover a national reference laboratory)	August 2018-December 2019	[1] Functional national surveillance/ reference laboratory infrastructure for animal health	MOFA, MESTI, MOFAD	[1] National Surveillance/ Reference Laboratory infrastructure for animal health built and equipped
6.1.1.1.3. Develop national guidelines for the surveillance systems – including guidelines for passive and active surveillance.	May-November 2018	National surveillance guidelines developed	GHS	National surveillance guidelines developed

Activities	Implementation time	Process Indicator/ Deliverables	Data source	Targets
6.1.1.1.4. Develop unified protocols and SOPs including standardized diagnostics and methodology for sensitivity testing.	June-July 2018	Protocols and SOPs developed	GHS	Protocols and SOPs developed
6.1.1.1.5. Train sentinel sites on the use of guidelines, protocols and SOPs	July-December 2018	[1] Number of training workshops [2] Number of persons trained	MOH, MOFA, MESTI, MOFAD	[1] Laboratory staff from all sentinel sites trained
6.1.1.1.6. Rollout implementation: starting with laboratories that would meet requirements in human and animal sectors	January-December 2019	[1]Number of laboratories on surveillance system [2] Percent reporting of surveillance data	GHS, VSD	100% reporting from facilities (based on systematic increase in reporting)
6.1.1.2.1. Assess current capacity of laboratories for conducting culture and sensitivity testing	June-July 2018	Laboratory assessment report available	GHS, VSD	Laboratory assessment report available and disseminated
6.1.1.2.2. Develop unified protocols and SOPs (See activity 6.1.1.1.4. above)	April-May 2018 (See activity 6.1.1.1.4. above)	(See activity 6.1.1.1.4. above)	(See activity 6.1.1.1.4. above)	(See activity 6.1.1.1.4. above)
6.1.1.2.3. Train core clinical care and laboratory staff on standardized protocols, SOPS, systems etc.	June-December 2018	Number/percentage of personel trained in SOPs and protocols	GHS, VSD	100% personel trained
6.1.1.3.1.(a) Undertake wide stakeholder consultation on end-user needs, requirements, feasibilities, constraints, SOPs, use or adapt international available data management systems, etc. [Activity 6.1.1.3.3 follows in logic]	April 2018	Specification for data management system developed	MOH, MOFA, MOFAD, MESTI	Consensus on system specification, that meets end user requirements
6.1.1.3.2.(a) Define system specification, scope and feature-set and definition of future development and management.	April-May 2018	Specification for data management system developed	MOH, MOFA, MOFAD, MESTI	System specification developed
6.1.1.3.3.(a) Develop a national surveillance database, management tools, analytical tools, applications/software. (This would cover communication and reporting modules, access and security modules, etc.)	May-July 2018	National surveillance system available	MOH, MOFA, MOFAD, MESTI	National surveillance system available and functional with global alignment
Sub-objective 2				
Activities				
6.1.1.1.1.(b) Establish a system for the national surveillance of antimicrobial use in human health	June 2018	[1] National Surveillance System for AMC developed	MOH	[1] National Surveillance System for AMC in humans developed and functional with data intergrity
6.1.1.1.2.(b) Establish a system for the national surveillance of antimicrobial use in non-human health	June 2018	[1] National Surveillance System for AMC developed	MOFA, MOFAD, MESTI	[1] National Surveillance System for AMC in non-humans sector developed and functional with data intergrity
6.1.1.1.7. Establish and resource a desk at the Ministry of Health for collation of antimicrobial resistance and consumption data. (Continues from Activity 6.1.1.1.6 under Objective 1 above)	June-July 2018	[1] Functional information desk on AMC data	MOH	[1] AMC data for Ghana readily available
6.1.1.3.1.(b) Undertake wide stakeholder consultation on end-user needs requirements, feasibilities, constrains etc. for the development of a data management system for antimicrobial consumption in human and animal health	June 2018	Specification for data management system developed	MOH, MOFA, MOFAD, MESTI	Consensus on system specification, that meets end user requirements
6.1.1.3.2.(b) Define system specification, scope and feature-set and definition of future development and management.	April-May 2018	Specification for data management system developed	MOH, MOFA, MOFAD, MESTI	System specification developed
6.1.1.3.3.(b) Develop a national surveillance database, management tools, analytical tools, applications/software for antimicrobial consumption in humans and animal health. Deliverables would include communication and reporting modules, access and security modules, etc.	May-August 2018	National surveillance system available	MOH, MOFA, MOFAD, MESTI	National surveillance system available and functional with global alignment
Sub-objective 3				
Activities				
6.2.1.1.1. Establish a structure for the national surveillance system for human health – including a national reference laboratory (this would also cover health care associated infection [HCAI] and of the organisms that cause HCAIs)	[Refer to activity 6.1.1.1.1.(a)]	[Refer to activity 6.1.1.1.1.(a)]	[Refer to activity 6.1.1.1.1.(a)]	[Refer to activity 6.1.1.1.1.(a)]

Activities	Implementation time	Process Indicator/ Deliverables	Data source	Targets
6.2.1.1.2. Establish a structure for the national surveillance systems for non-human health – including a national reference laboratory	[Refer to activity 6.1.1.1.2.(a)]	[Refer to activity 6.1.1.1.2.(a)]	[Refer to activity 6.1.1.1.2.(a)]	[Refer to activity 6.1.1.1.2.(a)]
6.2.1.1.3. Quantification and costing of laboratory commodities and tests	May-June 2018	Laboratory comodities and tests quntified and costed	GHS, VSD	Laboratory comodities and tests quntified and costed
6.2.1.1.4. Encourage local production of antimicrobial susceptibility testing disk. (Develop a sustainable business case for the local production of susceptibility disks, engage the business community, engage MOTI for incentives and enabling environment)	July-September 2018	Susceptibility testing disc locally produced	MOTI, MOH	Susceptibility testing disc locally produced
6.2.1.2.1. Implement the national laboratory policy implementation plans for human health	October 2018-2021	National laboratory plan for human health accepted and implemented. (Refer to Lab.. policy implementation plan)	GHS, CHAG, SPMDP, GHAQI, MOI, MOD, Teaching Hospitals, VSD	20% incremental implementation over the project time frame
6.2.1.2.2. Upgrade district laboratories with capacity to perform culture and sensitivity testing based on comprehensive needs assessment	October 2018-May 2020	Percentage enrollment on District Laboratory Upgrade programme	GHS/VSD	25% Labs upgraded over a 5 month period as a rolling target
6.2.1.2.3. Train laboratory personnel as part of the laboratory upgrade programme	November 2018-March 2020	Number/percentage of laboratory staff strained	GHS, CHAG, SPMDP, GHAQI, MOI, MOD, Teaching Hospitals, VSD	25% Lab staff trained over a 5 month period as a rolling target
6.2.1.3.1. Develop national laboratory policy and implementation plans for the food, agriculture, fisheries and environment sectors	April 2018-June 2019	National laboratory policy for non-human sector developed	MOFA, MESTI, MOFAD	National laboratory policy for non-human sector developed
6.2.1.3.2. Engage relevant stakeholders towards the development of national laboratory policies for these sectors	June 2018-April 2019	Stakeholders engaged	MOFA, MESTI, MOFAD	Consensus and stakeholder buy-in on National Laboratory Policy
6.2.1.3.3. Implement national laboratory policy for the food, agriculture, fisheries and environment sectors	October 2019-December 2021	National Laboratory Policy for non-human sector accepted and Implemented. (Refer to M & E framework on Lab. Policy implementation plan)	MOFA, MESTI, MOFAD	20% incremental implementation over the project time frame

Sub-objective 4				
Activities				
6.1.1.1.7. Organise annual dissemination workshops for data on AMR surveillance and consumption	December 2018, 2019, 2020, 2021	AMR and AMC disseminaiton report	MOH, MOFA	Data visibility on AMR and AMC
6.1.1.1.8. Follow through evidence-based advocacy activities	January-February 2019, January-February 2020, January-February 2021	Reports from dialogue with parliamentary select group	MOH, MOFA, MESTI	Political buy-in on AMR initiatives in Ghana
6.1.1.1.9. Organise forum on evidence-based policy implementation based on data on the AMR surveillance and its implications for the AMR policy implementation process	October 2019, 2020, 2021	AMR stakeholder fora held	MOH, MOFA, MESTI	AMR stakeholder fora held

Sub-objective 5				
Activities				
6.2.1.1.1. Collate incidence data on infectious diseases of common occurrence in Ghana to inform review of clinical guidelines	April 2018, 2020	Incidence data on infectious diseases collated	GNDP	Incidence data on infectious diseases collated
6.2.1.1.2. Update Standard Treatment Guidelines and Essential Medicines List based on emergent surveillance data on AMR and AMC, generated from Ghana in the light of the best evidence and the rigour of the national medicines selection process.	April 2019-December 2020	STG and EML updated	GNDP	STG and EML informed by AMR surveillance data
6.2.1.1.3. Develop and launch diagnostic, prescribing, and treatment aids based on the national medicines selection process, STGs and evidence from surveillance	May-June 2018, October-December 2019	Diagnostic, prescribing and treatment aids developed	GNDP	Diagnostic, prescibing and treatment aids developed
6.2.1.1.4. Train on the use of updated Standard Treatment Guidelines with a focus on infectious disease management, based on surveillance data and monitor for adherence	August-October 2018, 2020	Percentage of faciliities or regions trained on updated guidelines	GNDP	STG training workshops in held in all 10 regions

Activities	Implementation time	Process Indicator/ Deliverables	Data source	Targets
Indicators-Strategic Objective 3				
Sub-objective 1				
Activities				
7.1.1.1.1. Implement MOH IPC policies in all health facilities	July 2018, September 2020	National laboratory plan for human health accepted and implemented. (Refer to Lab. policy implementation plan)	GHS, MOI, MOD, GHAQI, SPMDP, CHAG	20% incremental implementation over the project time frame
7.1.1.1.1.1 Conduct a baseline study on Healthcare Associated Infections	August-November 2018	Report of Baseline Assessment of Healthcare Associated Infections available	GHS, VSD, MOI, MOD, GHAQI, SPMDP, CHAG	Report of Baseline Assessment of Healthcare Associated Infections Disseminated
7.1.1.1.1.2 Advocate and create awareness on Healthcare Associated Infections [to be added training activities of human and animal health professionals] Activity 8.1.1.1.1 refers.	[Refer to activity 8.1.1.1.1]	[Refer to activity 8.1.1.1.1]	[Refer to activity 8.1.1.1.1]	[Refer to activity 8.1.1.1.1]
7.1.1.1.2. Assessment of implementation of the IPC policy (including development of tools for assessment)	October-December 2020	[1] IPC policy assessment report disseminated	GHS-ICD, CHAG, GHAQI, SPMDP, MOI, MOD	[1] Healthcare associated Infections reduced/controlled
7.1.1.1.3.(a) Advocate for and facilitate the provision of potable water in 50% of health facilities.	October 2018-October 2019	[1] Number of health facilities provided with potable water supply	MOWS, GHS-ICD, CHAQ, CHAQI, SPMDP	[1] 50% of Health facilities with potable water
7.1.1.1.3.(b) Advocate for inclusion of infection prevention and control practices into curriculum of health training institutions [This is linked with Activity 5.1.1.4.1.; 7.1.1.1.3.(a) and 7.1.1.1.5.]	April-June 2018	Number of Training Institutions with IPC incoorporated into curriculum	MOE, MOH, MOFA	Increase in number of training institutions with IPC incoorporated into curriculum
7.1.1.1.4. Provide adequate toilet and hand washing facilities in hospitals and communities. [This activity is linked with 5.1.1.4.1.; 7.1.1.1.3.(a) and 7.1.1.1.5.]	November 2018-October 2020	Number of Health Faciliities with Adequate Toilet and Handwashing Facilities	MOH, MOLGRD	50% of Health Facilities with
7.1.1.1.5. Provide PPEs in health facilities [This activity is linked with 5.1.1.4.1; 7.1.1.1.3.(a) and 7.1.1.1.5.]	November 2018-October 2020	Availability and use of PPEs	MOH, QHAQI, CHAG, SPMDP	PPEs available and used at points of service delivery
7.1.1.1.6 Conduct supportive supervision for IPC [This activity is linked with Activity 7.1.1.1.7]	October 2018-August 2020	Number of supportive supervision visits conducted	GHS, QHAQI, CHAG, SPMDP	Supportive supervision helps to enforce good IPC practices
7.1.1.1.7 Enforce the use of items for IPC– coloured bin liners, sharp boxes, disposable paper napkins [This activity is linked with Activity 7.1.1.1.6]	December 2018-December 2019	Number of supportive supervision visits conducted	GHS, QHAQI, CHAG, SPMDP	Supportive supervision helps to enforce good IPC practices
7.1.1.1.8 Develop guidelines for management of referred patients with infectious conditions from one point to the other [surveillance should be part of management]	February-May 2019	Availability of guidelines for referral of patients with infectious diseases	MOH, AMR TWG platform	Guideline disseminated
7.1.1.1.9 Implement IHR guidelines for containment of outbreaks of bacterial infection of public health interest in health facilities [This is linked with Activity 7.1.1.1.10]	July-September 2018	Percentage of outbreaks contained	GHS, QHAQI, CHAG, SPMDP	All outbreaks contained
7.1.1.1.10. Train and sensitise health workers and the general public on the containment of outbreaks. [This is linked with Activity 7.1.1.1.9]	July-October 2018	Training workshop reports	GHS, QHAQI, CHAG, SPMDP	3 zonal TOT workshops held
7.1.1.2.1 Develop IPC policies for non-human sectors	June-November 2018	IPC policy document for non-human sector accepted, approved, launched and disseminated	VSD, MOFA, MESTI	IPC policy document for non-human sector accepted, approved, launched and disseminated
7.1.1.2.2 Implement IPC policies in non-human sectors	December 2018, January 2021	IPC policy document for non-human sector accepted and in implementation	VSD, MOFA, MESTI	20% incremental implementation over the project time frame
7.1.1.2.3 Assess implementation of the IPC policy (non-human sectors)	February-April 2021	IPC policy assessment report available	VSD, MOFA, MESTI	IPC policy Assessment report available
7.1.1.2.4 Develop SOPs for ensuring proper infection prevention and control on farms etc. [This is linked to Activity 7.1.1.2.5]	November-December 2018	SOPs for IPC on farms developed	VSD, MOFA	SOPs for IPC on farms developed
7.1.1.2.5 Develop and train farmers on guidelines for containment of outbreaks of infections on farms etc. [This is linked to Activity 7.1.1.2.4]	January-February 2019	Number of training workshop for farmers	VSD, MOFA	SOPs for IPC on farms developed
7.1.1.3.1 Phase, prioritise, cost and implement the waste management policy in health facilities	April 2018-September 2020	Waste management policy in implementation	MOH, MESTI	20% incremental implementation over the project time frame

Activities	Implementation time	Process Indicator/ Deliverables	Data source	Targets
7.1.1.3.2 Assess implementation of the waste management policy	October-December 2020	Assessment report	MOH, MESTI	Assessment report disseminated
7.1.1.3.3 Educate the public on hand hygiene, environmental cleaning and waste management	December 2018-December 2020	Public education campaign designed and executed	MOH, GHS	Public awareness created
7.1.1.4.1 Develop guidelines and SOPs on waste management in other sectors	December 2018-April 2019	Waste management guidelines and SOPs for non-human sector accepted, approved, launched and disseminated	VSD, MOFA, MESTI	Waste management guidelines and SOPs for non-human sector accepted, approved, launched and disseminated
7.1.1.4.2 Train affected implementing entities on new guidelines on waste management	December 2018-December 2020	Percentage of institutions or regions trained on new guidelines	VSD, MOFA, MESTI	Training workshops in held in all 10 regions
7.1.1.4.3. Provide resources for implementation of SOPs and guidelines	December 2018-December 2020	Inputs for policy implementation procured	VSD, MOFA, MESTI	Training workshops in held in all 10 regions
7.1.1.5.1 Conduct regular sensitisation campaign on vaccination of animals	May-October 2018, May 2019, May-October 2020	[1] Public education campaign designed and executed [2] Increased % of animals vaccinated	VSD, MOFA	Public awareness created
7.1.1.6.1 Train farmers on soil fertility management and other measures to promote the resilience of plants [This activity is linked to Activity 7.1.1.7.1]	November 2018-February 2019	Number of farmers trained	MOFA	-
7.1.1.7.1 Train farmers on vector control on farms etc. [This activity can be linked with Activity 7.1.1.6.1]	November 2018-February 2019	Number of farmers trained	MOFA	-

Indicators-Strategic Objective 4				
Sub-objective 1				
Activities				
8.1.1.1.1. Train and re-train core clinical care providers on responsible use of antimicrobials in all sectors	July-November 2017, July-November 2018	[1] Number of training workshops for practitioners [2] The range of practitioners trained in each sector [3] The number of practitioners trained	Regional offices GHS, Academia, AMR policy platform, MOH, MOFA, MESTI, MOFAD	[1] Minimum target of 1 training workshop in each region
8.1.1.1.2. Develop indicators for monitoring antimicrobial use and resistance across all affected sectors	June, 2017	[1] SMART monitoring indicators developed for each sector	MOH, MOFA, MESTI, MOFAD	[1] Minimum set of measurable and meaningful (SMART) indicators developed
8.1.1.1.3. Monitor antimicrobial use in all health facilities for human health [Activity 8.2.1.2.2 covers monitoring in animal health]	June 2017-December 2021	[1] Monitoring reports/data on antimicrobial use based on developed monitoring indicators	MOH	[1] Data on 70% of indicators populated every 6 months [2] Clear cost effective approach to collect data on special non-routine indicators
8.1.1.1.4. Advocate for regular post market surveillance of antimicrobials in circulation. [This activity is linked with activity 9.3.1.2.2]	July-September 2017	[1] Advocacy activity report (indicating consensus on postmarket surveillance with FDA)	FDA, AMR platform	[1] A clear concept note for 4 post market surveillance activities in 4 years
8.1.1.1.5. Enforce the use of the Dangerous drug book/appropriate software and record keeping at both wholesale and retail outlets of antibiotics	July-November 2017	[1] Availability of user-friendly tools and points of service delivery for improved record keeping [2] Use of above tools at points of service delivery	Pharmacy Council	[1] 20% improvement in record keeping at both wholesale and retail outlets
8.1.1.1.6. Advocate for and support periodic testing of herbal preparations with the claim of anti-infective properties for the presence of orthodox antibiotic substances. Use of such data to engage producers of herbal preparations. This activity is in sync with 9.3.1.2.1 for potential synergy to minimise cost	November-December 2017, April-June 2019, 2010,2021	Advocacy activity report (indicating consensus on periodic testing of herbal preparations with FDA)	FDA, AMR platform	A clear concept note for 4 assessments activities in 4 years [2] An indication of continous testing after 5 years
8.1.1.1.7. Disseminate standards and practice guidelines for pharmaceutical care for human health	November-December 2017	SPGPC for human health disseminated	Pharmacy Council	80% of Health professionals in human health aware of new SPGPC
8.1.1.1.8. Train of core clinical care providers on the SPGPC	March-July 2018	[1] Number of training workshops on SPGPC [2] The number of health care providers trained	MOH	[1] Minimum target of 1 training workshop in each region
8.1.1.1.9. Educate herbal practitioners on responsible use of medicines including antimicrobials	December 2017-March 2018	[1] Number of training workshops for herbal practitioners [2] The number of herbal practitioners trained	TAMD, Academia, AMR policy platform	[1] Minimum target of 1 training workshop in each region

Activities	Implementation time	Process Indicator/ Deliverables	Data source	Targets
8.1.1.1.10. Promote responsible use of herbal products with antimicrobial properties	December 2017-March 2018	[1] Evidence based guidelines for use of herbal products developed and implemented [2] % herbal practitioners sensitised on appropriate use of herbal products [3] Number of public sensitization programmes held	TAMD, Academia, AMR policy platform	[1] Evidence based guidelines on the use of herbal products availabe by February 27, 2018 [2] Herbal practitioners and the Public sensitised on appropriate use of herbal products
8.1.1.1.11. Advocate for increased coverage of national health insurance in line with WHO reserved watch list	March-May 2018, 2019	[1] Number of claims for antimicrobials on the WHO reserved list under NHIS	MOH, NHIA, GNDP	[1] Reduction in claims for antimicrobials on WHO reserved list
8.1.1.1.12. Develop and disseminate standards for care for veterinary practice	September-December 2017	[1] SPCs and SOPs for animal health developed [2] SPCs and SOPs for animal health dissminated	MOFA VSD	[1] 80% of practitioners in animal health aware of new SPCs and SOPs
8.1.1.2.1 Develop criteria and guidelines for the use of national surveillance data for selection of antimicrobials	September-October 2017	[1] Updated criteria for inclusions and exclusions to include specific requirements for antimicrobial agents	GNDP	[1] Data on surveillance as part of criteria for inclusion or exclusion
8.1.1.2.2 Update the national medicines selection process to include data from national surveillance of antimicrobial use and resistance. Utilize antimicrobial consumption and resistance data for selection at the national level	November-December 2017	[1] Standard Treatment Guidelines for Infectious diseases updated based on current evidence on surveillance	GNDP	[1] Specialised guidelines on infectious diseases launched
8.1.1.3.1 Adapt the WHO classification list of Antimicrobials for Ghana and ensure optimised prescribing and dispensing based on Laboratory results	January-February 2018	[1] Focus list developed (part of the above process in 8.1.1.2.2	GNDP	[1] Mapping of antimicrobials and antimicrobial scope launched as prescribing aid
8.1.1.3.2 Develop institutional formulary list for prescribing and dispensing of antimicrobials in health facilities	March-April 2018	[1] Institutional formulary list for prescribing and dispensing of antimicrobials available	GHS, GHAQI, Teaching Hospitals, SPMDP, CHAG	[1] Institutional formulary list for prescribing and dispensing of antimicrobials launched
8.1.1.3.3 Procure and supply relevant 'rapid' diagnostic kits to aid diagnosis at lower levels under a 2-year pilot management framework, and review for health system integration after 2 years	2017-2019	Rapid test kits available in all lower level facilities and private sector practice	MOH, MOFA, MESTI	80 % availability for Rapid test kits at lower levels
8.1.1.4.1 Advocate for enforcement of the law on advertisement of restricted drugs	June-December 2017	[1] Advocacy activity reports	AMR Platform	[1] Advocacy activity reports (indicating a clear roadmap for action)
8.1.1.4.2 Collaborate with law enforcement agencies and lorry station owners, drivers unions, chiefs, market queens to enforce the ban on sale of drugs at unauthorized places	June-December 2017	[1] Enforcement Campaign launched	FDA	[1] Advocacy activity reports (indicating a clear roadmap for action)
8.1.1.5.1 Public education and sensitisation on the dangers of sourcing antimicrobials from unauthorised sources	June-December 2017	[1] Number of sesitisation activities undertaken	VSD, GHS reports, GES	[1] General public aware of dangers in appropriate sourcing of antimicrobials [2] Reduced incentive for the activities of medicine vendors
8.1.1.6.1 Develop antimicrobial stewardship training manual for health facilities	January-March 2018	[1] Antimicrobial stewardship manual available	GHS-OCP/ICD, CHAG, GHAQI, SPMDP, MOI, MOD, Teaching Hospitals	[1] Antimicrobial stewardship manual developed and launched
8.1.1.6.2 Train DTC members on antimicrobial stewardship concept	April-August 2018	[1] Number of training workshops on antimicrobial stewardship [2] The number of DTCs trained	GHS-OCP/ICD, CHAG, GHAQI, SPMDP, MOI, MOD, Teaching Hospitals	[1] Minimum target of 1 training workshop for northern and southern sectors
8.1.1.6.3 Monitor/provide supportive visits to the DTCs in the facilities on antimicrobial stewardship	September-December 2018	[1] Number of health facility DTCs supported	GHS-OCP/ICD, CHAG, GHAQI, SPMDP, MOI, MOD, Teaching Hospitals	[1] Minimum target of 5 facilities per region supported
8.1.1.6.4 Conduct annual DTC peer review on antimicrobial stewardships	May, November 2019, 2020, 2021	[1] Number of DTC peer review workshops on antimicrobial stewardship [2] The number of DTCs in attendance [3] Innovations in operations based on antimicrobial stewardship concept	Regional Offices for GHS, Academia, AMR policy platform	[1] DTC engaged and demonstrating operational innovations based on implementation of antimicrobial stwardship manual
Sub-objective 2				
Activities				
8.2.1.1.1 Hold inter-sectoral meetings on responsible antibiotics use in non-health settings	May, 2017, 2018, 2019, 2020, 2021	[1] Inter-sectoral platform established and functional	MOFA, MOH, MESTI	[1] Intersectoral meetings held once annually

Activities	Implementation time	Process Indicator/ Deliverables	Data source	Targets
8.2.1.1.2 Develop training scheme and train veterinary personnel on responsible use of antibiotics in veterinary and aquaculture [This is linked with activity 8.1.1.1.1]	July-October 2017	[1] Number of training workshops for practitioners [2] The range of practitioners trained in each sector [3] The number of practitioners trained	Regional Offices for VSD, GHS, Academia, AMR policy platform	[1] Minimum target of 1 training workshop in each region
8.2.1.2.1 Develop monitoring tools for antibiotic use in veterinary and aquaculture [This is linked with activity 8.1.1.1.2]	November-December 2017	[1] SMART monitoring indicators developed for each sector	MOFA, MESTI	[1] Minimum set of measurable and meaningful (SMART) indicators developed
8.2.1.2.2 Monitor the use of antibiotics in veterinary and aquaculture. Quarterly monitoring reports to be shared with appropriate offices and with the AMR stakeholder platform	January 2018-December 2021	[1] Monitoring reports/data on antimicrobial use based on developed monitoring indicators	MOFA, MESTI	[1] Data on 70% of indicators populated every 6 months [2] Clear cost effective approach to collect data on special non-routine indicators
8.2.1.3.1 Develop communication kit and educate public on the existence and role of the veterinary services via campaigns on radio, TV, print media, web and social media	January-July 2018	[1] Communication kit on veterinary services developed [2] Public education campaign launched	VSD	[1] General public aware of the services of the veterinary services department [2] Increased patronage of veterinary services
8.2.1.4.1 Implement and monitor adherence to standards, treatment guidelines, benchmarks, SOPs, protocols, lists of medicines etc. for antimicrobial use in veterinary and aquaculture	January-December 2018, 2020	[1] % of health facilities supported	Regional Offices for GHS, Academia, AMR policy platform	[1] Minimum target of 5 facilities per region supported
8.2.1.5.1 Set-up technical working group to define standards, treatment guidelines, benchmarks, SOPs, protocols, lists of medicines etc. for antimicrobial use in veterinary and aquaculture. [include FDA and GSA, EPA]	September-December 2017	[1] Standards for veterinary practice determined	MOFA, VSD, GSA	[1] Standards for veterinary practice developed and laucnhed (including washout period etc.)
8.2.1.6.1 Upgrade veterinary laboratories with capacity to perform culture and sensitivity testing based on comprehensive needs assessment	June-December 2018	[1] Number of laboratories upgraded	MOFA	[1] Minimum of 1 laboratory upgraded per region

Sub-objective 3				
Activities				
8.3.1.1.1 Setup a technical committee with clear TORs to develop guidelines for biomedical waste and effluents for all sectors	June-September 2018	[1] Guidelines for biomedical waste available	MOFA, MOH, MESTI	[1] Evidence based consensus guidelines for biomedical waste launched
8.3.1.2.1 Explore and institute possibilities of incentives to encourage the return of unused and unwholesome antimicrobial agents	August-December 2018	[1] Technical committee report with recommendations	EPA, CSIR	[1] Implementable recommendations on potential mechanisms to encourga returns of unused and unwholesome medicines
8.3.1.2.2 Educate public on the need to return unused and unwholesome antimicrobial agents	October 2018-April 2019	[1] Number of public education activities on disposal of unused or unwholesome medicines	EPA, CSIR	[1] 10-20% quarterly increase in medication returns at collection points
8.3.1.2.3 Identify and setup collection points for receiving unused and unwholesome antimicrobial agents	August-September 2018	[1] Quarterly increase in unused and unwholesome medicines returns at collection points	EPA, CSIR	[1] 10-20% quarterly increase in medication returns at collection points

Indicators-Strategic Objective 5				
Sub-objective 1				
Activities				
9.1.1.1.1 Develop research agenda for AMR and incorporate into research agenda of MDAs in affected sectors (humans, animals, plants)	August - September 2017	[1] Research agenda developed [2] Agenda set for new product development e.g. antimicrobials, vaccines and diagnostics	MOH, MOFA, MESTI	[1] Research agenda developed
9.1.1.1.2 Research into costs of hospital acquired infections.	June 2017-December 2018	[1] Published research [2] Academic degree obtained in colloboration with local/foreign academic partners	GHS-OCP/ICD, CHAG, GHAQI, SPMDP, MOI, MOD, Teaching Hospitals, Academia	[1] Evidence from local research informing policy [2] Capacity building in country through Academic partnerships
9.1.1.1.3 Research to identify antimicrobial resistance in specific zoonotic diseases	June 2017-December 2018	[1] Published research [2] Academic degree obtained in colloboration with local/foreign academic partners	MOH, MoFA, Academia and Research Institutions	[1] Evidence from local research informing policy [2] Capacity building in country through Academic partnerships
9.1.1.1.4 Research in new point-of-care diagnostic tools and methods	June 2017-December 2018	[1] Published research [2] Academic degree obtained in colloboration with local/foreign academic partners	MOH, MoFA, Academia and Research Institutions	[1] Evidence from local research informing policy [2] Capacity building in country through Academic partnerships

Activities	Implementation time	Process Indicator/ Deliverables	Data source	Targets
9.1.1.1.5 Conduct AMR prevalence studies	October-December 2017	[1] Published research [2] Academic degree obtained in colloboration with local/foreign academic partners	MOH, Academia	[1] Evidence from local research informing policy [2] Capacity building in country through Academic partnerships
9.1.1.1.6 Research into economic costs and implications of AMR in agriculture, aquaculture etc. and it's relatedness to human health	June 2017-December 2018	[1] Published research [2] Academic degree obtained in colloboration with local/foreign academic partners	MoFA, Academia	[1] Evidence from local research informing policy [2] Capacity building in country through Academic partnerships
9.1.1.2.1 Train and equip various practitioners on basic operational research that can yield useful data to refine operations as well as data of national interest.	March-July 2018	[1] Number of practitioners trainined in oeprational research on AMR	GHS, VSD, Academia	[1] Increased publication of oprational research on AMR
9.1.1.2.2 Develop tools and methodologies to aid operational research in all affected sectors	January-February 2018	[1] Operational research kit for AMR developed	GHS, VSD, Academia	[1] Increased publication of oprational research on AMR
For activities towards the development of new antimicrobial agents, See section under intervention 9.2.1.7				
9.1.1.3.1(a) Set up a web-based repository for research on antimicrobial use and resistance for reports and published papers from all sectors (human, animal, plant and the environment)	Novermber 2017-January 2018	[1] Web based repository established and maintained	MOH, MOFA, MESTI	[1] Web based repository available and accessible [2] Target users aware of web based repository
9.1.1.3.1(b) Organise national and international scientific fora for research into potential antimicrobial agents, antimicrobial use and resistance in Ghana (with a secondary objective of seeding interest for investments into the development of antimicrobial agents)	September 2019-National Conference, June 2021-International Conference	[1] National AMR conference held [2] International AMR conference held in Ghana	MOH, MOFA, MESTI	[1] National and international exposure on AMR interventions and NAP implementation in Ghana [2] Promotion of knowledge sharing on AMR

Sub-objective 2				
Activities				
9.2.1.1.1 Advocate for stringent enforcement of regulation on antimicrobials. [This activity is linked with activity 9.3.1.1.1]	May-July 2018	[1] Advocacy activity reports	FDA	[1] Clear roadmap and commitment for enforcement of regulations
9.2.1.2.1 Enforce minimum standards for manufacture of antimicrobial agents of acceptable quality amongst local manufacturers in Ghana, based on current international standards and GMP	August-September 2018	[1] Minimum standards determined (Technical report)	FDA, PMAG	[1] Local manufacturers and regulator engaged on minimum standards for manufacture of antimicrobials
9.2.1.2.2. Implement GMP roadmap for local manufacture of antimicrobials in country	October 2017-December 2020	[1] Roadmap for local manufacturers on antimicrobial manufcture developed	MOH, FDA	[1] Local manufacturers and regulator engaged on minimum standards for manufacture of antimicrobials
9.2.1.3.1 Advocate and implement a national bioequivalence centre strategy in a PPP mode	August-October 2017, February December 2019	Advocacy activity reports	MOH, MOF, MOTI, Ministry for Business Development	National bioequivalence centre strategy implemented
9.2.1.4.1 Advocate for the active implementation of the FDA roadmap for local manufacturers in support of the local manufacture of antimicrobials of acceptable quality [This activity is lined with 9.2.1.2.1, 9.2.1.2.2]	April-July 2018	Advocacy activity reports	FDA, AMR Platform Adocacy Team	FDA roadmap for local manufacture in implementation
9.2.1.5.1 Develop policy framework governing the research between stakeholders including academia and industry. [This intervention is linked with activities under intervention 9.2.1.7]	October 2018-March 2019	Policy framework developed	MOH, MOFA	Policy framework developed
9.2.1.6.1 Create an incentive package to encourage the local manufacture of antimicrobials of acceptable quality	Novermber 2018-February 2019	Incentive package developed	MOH, FDA	Incentive package developed
9.2.1.6.2 Set-up a fund to support local manufacture of antimicrobials (based on transparent criteria informed by a demonstrable commitment to quality)	December 2018-September 2019	Fund established	MOH, MOTI	Fund established
9.2.1.7.1 Scan the research repositories of existing research institutions for existing research on medicinal agents of potential antimicrobial value.	February-March 2018	Activity report	Acadamia, Research institutions	Activity report shared with stakeholders
9.2.1.7.2 Assess the economic viability of investment into such medicinal agents	April-May 2018	Activity report	Academia, Researh institutions	Activity report shared with stakeholders

Activities	Implementation time	Process Indicator/ Deliverables	Data source	Targets
9.2.1.7.3 Develop a clear action plan and investment model for long term drug development of potential agents	June-July 2018	Model for long term drug development developed	MOH	Model for long term drug development developed
9.2.1.7.4 Explore the development of potential antimicrobial medicinal agents in-country (in collaboration with academia, research institutions and centres)	July 2018- December 2019	Activity report	Academia	Develop the local medicinal plants of antimicrobial value
9.2.1.7.5 Support specific research into local medicinal plants with antimicrobial activity as well as the development of such agents	May-June 2018	Report on specific local medicinal plants with antimicrobial activity	CSRIPM, Academia, MoH	Develop the local medicinal plants of antimicrobial value
Sub-objective 3				
Activities				
9.3.1.1.1 Collaborate with implementers of key Acts of government to regulate the supply, storage and distribution of antimicrobials in formal and informal markets [This activity is linked with activity 9.2.1.1.1]	March 2018, July 2019-December 2021	Reports of collaboration activity, Regulatory framework for antimicrobials along the supply chain	MOH, FDA	Reports of collaboration activity shared with stakeholders
9.3.1.2.1 Conduct post market surveillance (PMS) of antimicrobial agents. [This activity is linked with activity 8.1.1.1.4]	November-December 2017, April-June 2019, 2010,2021	Report on PMS activities	FDA	Report on PMS activities shared with stakeholders
9.3.1.2.2 Engage the private, public and mission sectors on stricter management model for the results of post market surveillance	March 2019, July-August 2019	Modalities for management of PMS data developed	MOH, FDA	Modalities for management of PMS data accepted and applied
9.3.1.2.3 Collaborate with FDA to collate pharmacovigilance data on antimicrobial treatments	July 2019-January 2020	Reports of collaboration activity	FDA	Reports of collaboration activity shared with stakeholders
9.3.1.2.4. Institute special courts for regulatory offences	January-December 2019	Special courts established	MOH, MOJAG, FDA	Special courts established and functional
Sub-objective 4				
Activities				
9.4.1.1.1 Set-up of an inter-ministerial commission on AMR from relevant ministries.	April-June 2017	Interministerial commission established (meeting reports available)	MOH	Interministerial commission functional
9.4.1.1.2 Convene meetings of the inter-ministerial commission bi-annually	June and December of every year; 2017, 2018, 2019, 2020, 2021	Interministerial commission established (meeting reports available)	MOH	Interministerial commission functional
9.4.1.2.1 Develop policy briefs and technical briefs for the ministerial commission on key AMR issues as needed.[On 9.4.1.2.1 Note: AMR technical team would provide such advise. The team could co-opt technical expertise as needed to strengthen its advisory functions.]	June and December of every year; 2017, 2018, 2019, 2020, 2021	AMR policy briefs developed	MOH	AMR policy briefs developed and shared
9.4.1.3.1 Engage district and regional structures on the implementation of AMR policy covering: intent, roles and responsibilities, interactions, etc.	August-September 2017	Northen and southern sector AMR policy implementation workshops held	MOH	Northen and southern sector AMR policy implementation workshops held
9.4.1.4.1 Setup/identify and strengthen a secretariat within the ministry of Health to coordinate AMR issues in country	May-July 2017	AMR secretariat established	MOH	AMR secretariat established
9.4.1.4.2 Engage national coordinators with clear TORs for the implementation of the NAP on AMR for the various sectors in Ghana	May-July 2017	AMR NAP Coordinators engaged	MOH	AMR NAP Coordinators engaged
9.4.1.5.1 Convene quarterly AMR platform meetings	June, September, December 2017, March, June, September, December 2018-2021	AMR platform meeting reports	AMR platform	AMR platform continually enagaged
9.4.1.6.1 Develop a monitoring and evaluation framework as part of the NAP development process	April-June 2017	NAP M&E framework developed	AMR platform	NAP M&E framework developed and validated
9.4.1.6.2 Conduct a data mapping exercise to support the monitoring and evaluation framework and identify cost-effective (efficient) means to monitor and evaluate implementation of the NAP	June-July 2017	Report from M&E data mapping exercise	AMR platform	NAP M&E framework developed and validated

Activities	Implementation time	Process Indicator/ Deliverables	Data source	Targets
9.4.1.6.3 Monitor implementation of the AMR NAP in Ghana half-yearly	Annually; June 2017, 2018, 2019, 2020, 2021	AMR NAP Monitoring report available	AMR platform	AMR NAP Monitoring report disseminated
9.4.1.6.4 Conduct annual multi-stakeholder project implementation review meetings for the AMR policy and NAP	Annually; July 2017, 2018, 2019, 2020, 2021	AMR project multi-stakeholder forum	AMR platform	AMR project multi-stakeholder forum

BUDGET

The budget below cover the cost of implementation of the listed activities in this plan within the scope of the intent that has informed that recommended activities. A budget narrative has been provided to describe the nature of the expenditure indicated.

Activities	Lead implementer/ Responsibility	Cost per Unit Activity (USD)	factor	freq.	Other Cost	Indicative Budget (USD)	Budget narrative	Source of Funding
Budget-Strategic Objective 1						684,576.04		
Budget: Sub-objective 1						684,576.04		
5.1.1.1.1. Engage CSOs and the media (as AMR media partners) to educate the public on responsible use of antimicrobials in the spirit of 'One health'	GCNH, VSD, GHS	17,500.00	1	2	0	35,000.00	Budget covers the cost of media training workshops	GOG, DPs, Corporate Institutions, NGOs
5.1.1.1.2. Develop Information, Education and Communication (IE & C) materials for targeted groups in a stratified public education campaign	GHS (Health Promotion Unit), MOFA (ISD), VSD, APD	15,000.00	1	1	40000	55,000.00	Budget covers development of education and communications kit for the public education campaign on antibiotics	GOG, DPs, Corporate Institutions, NGOs
5.1.1.1.3. Educate the public in order to promote the responsible use of antimicrobials among the general population	VSD, GHS, GNDP	70,000.00	1	5	60000	410,000.00	Budget covers media campaign TV programmes, Radio programmes, Social media campaign etc. as well as support for antimicrobial week in November	GOG, DPs, Corporate Institutions, NGOs
5.1.1.1.4. Review the public education campaign for optimized impact	VSD, GHS	7,000.00	1	1	0	7,000.00	Consultancy to review the success and challenges of the public education campaign and make recommendations	GOG, DPs, Corporate Institutions, NGOs
5.1.1.2.1. Engage professional associations to educate professionals to promote the responsible use of antimicrobials at all levels of practice in all affected sectors (human, animal, plant, environment, etc.)	Professional associations (GMA, GRNA, PSGh, GRMA, VEMTAG, GVMA)	21,394.01	4	1	0	85,576.04	Budget covers the cost of technical workshops with health professional bodies in various formats e.g. AGMs etc.	GOG, DPs, Corporate Institutions, NGOs
5.1.1.3.1. Develop the content framework on responsible use of antimicrobials for consideration into the curriculum of training institutions. (This is to serve as the basis for the content on syllabus)	AMR Platform Technical Working Group	50,000.00	1	1	0	50,000.00	Budget covers the development of materials for curricullum update for all tertiary training institutions for human and animal health.	GOG, DPs, Corporate Institutions, NGOs
5.1.1.4.1. Develop the content framework on responsible use of antimicrobials in non-human settings, for consideration into the curriculum of training institutions. (This is to serve as the basis for the content on syllabus)	[Refer to activity 5.1.1.3.1]	-	1	1	0	-	-	[Refer to activity 5.1.1.3.1]
5.1.1.4.1. Incorporate content on responsible use of antimicrobials into the curriculum of training institutions for professionals in all affected sectors (human, animal, plant, environment etc.) [This is linked with Activity 7.1.1.1.3.]	AMR Platform Technical Working Group	10,500.00	4	1	0	42,000.00	Budget covers the cost of High-level Advocacy engagements with academia	DPs, GoG, Corporate Institutions, NGOs
Budget-Strategic Objective 2						3,437,606.45		
Budget: Sub-objective 1						1,478,016.13		
Activities								
6.1.1.1.1.(a) Establish a structure for the national surveillance system for human health – which includes the national reference laboratory (would also cover Healthcare Associated Infection [HCAI]	MOH, GHS, Academia	2,845.62	1	10	400,000.00	428,456.22	Covers cost of technical consultation (TWG) and infrastructure costs	DPs, GoG, Corporate Institutions, NGOs

Activities	Lead implementer/ Responsibility	Cost per Unit Activity (USD)	factor	freq.	Other Cost	Indicative Budget (USD)	Budget narrative	Source of Funding
6.1.1.1.2.(a) Establish a structure for the national surveillance systems for non-human health which includes animal, plant and environment (would also cover a national reference laboratory)	MOFA, MOFAD, MESTI, VSD, Academia	2,845.62	1	10	760,000.00	788,456.22	Covers cost of technical consultation (TWG) and infrastructure costs	DPs, GoG, Corporate Institutions, NGOs
6.1.1.1.3. Develop national guidelines for the surveillance systems – including guidelines for passive and active surveillance.	GHS	2,845.62	1	7	19,410.14	39,329.49	Development cost plus cost of printing	GOG, DPs, Corporate Institutions, NGOs
6.1.1.1.4. Develop unified protocols and SOPs including standardized diagnostics and methodology for sensitivity testing.	GHS	2,845.62	1	5	19,410.14	33,638.25	Development cost plus cost of printing	GOG, DPs, Corporate Institutions, NGOs
6.1.1.1.5 Train sentinel sites on the use of guidelines, protocols and SOPs	MOH, MOFA, MESTI, MOFAD	13,410.14	1	3	0	40,230.41	Cost of training workshops including all training logistics	GOG, DPs, Corporate Institutions, NGOs
6.1.1.1.6. Rollout implementation: starting with laboratories that would meet requirements in human and animal sectors	GHS, VSD, Academia	22,741.94	1	1	0	22,741.94		GOG, DPs, Corporate Institutions, NGOs
6.1.1.2.1. Assess current capacity of laboratories for conducting culture and sensitivity testing	VSD, GHS	4,608.29	1	1	1500	6,108.29	Budget covers consultancy costs	GOG, DPs, Corporate Institutions, NGOs
6.1.1.2.2. Develop unified protocols and SOPs (See activity 6.1.1.1.4. above)	(See activity 6.1.1.1.4. above)	-	1	5	-	-	(See activity 6.1.1.1.4. above)	(See activity 6.1.1.1.4. above)
6.1.1.2.3. Train core clinical care and laboratory staff on standardized protocols, SOPS, systems etc.	GHS, VSD	21,394.01	3	1	0	64,182.03	Covers the cost of traning workshops in northern, middle and southern belts	GOG, DPs, Corporate Institutions, NGOs
6.1.1.3.1.(a) Undertake wide stakeholder consultation on end-user needs, requirements, feasibilities, constraints, SOPs, use or adapt international available data management systems, etc. [Activity 6.1.1.3.3 follows in logic]	Consultant	13,410.14	1	2	0	26,820.28	Covers the cost of stakeholder workshop before and after the system is developed. The consultant should facilitate the workshop.	GOG, DPs, Corporate Institutions, NGOs
6.1.1.3.2.(a) Define system specification, scope and feature-set and definition of future development and management.	Consultant	2,845.62	1	5	0	17,684.33	Budget covers 5 TWG meetings and meetings with consultant	GOG, DPs, Corporate Institutions, NGOs
6.1.1.3.3.(a) Develop a national surveillance database, management tools, analytical tools, applications/ software. (This would cover communication and reporting modules, access and security modules, etc.)	Consultant	6,912.44	1	1	0	10,368.66	Budget covers cost of consultancy for development of data management system.	GOG, DPs, Corporate Institutions, NGOs

3,437,606.45

Budget: Sub-objective 2						302,776.96		
Activities								
6.1.1.1.1.(b) Establish a system for the national surveillance of antimicrobial use in human health	MOH	16,255.76	10	1	3,456.22	166,013.82	Budget covers 1 TWG meeting and 1 stakeholder training workshop per region for 10 regions as well as the cost of technical assistance	GOG, DPs, Corporate Institutions, NGOs
6.1.1.1.2.(b) Establish a system for the national surveillance of antimicrobial use in non-human health	MOFA, MOFAD, MESTI	16,255.76	3	1	3,456.22	52,223.50	Budget covers 1 TWG meeting and 1 stakeholder training workshop per zone; northern, middle and southern belts	GOG, DPs, Corporate Institutions, NGOs
6.1.1.1.7. Establish and resource a desk at the Ministry of Health for collation of antimicrobial resistance and consumption data. (Continues from Activity 6.1.1.1.6 under Objective 1 above)	MOH	806.45	0.4	53	12,569.59	29,666.36	40% FTE for an existing staff of the health system to take on additional tasks. Budget also covers 5 year operational costs and logistics	GOG, DPs, Corporate Institutions, NGOs

Activities	Lead implementer/ Responsibility	Cost per Unit Activity (USD)	factor	freq.	Other Cost	Indicative Budget (USD)	Budget narrative	Source of Funding
6.1.1.3.1.(b) Undertake wide stakeholder consultation on end-user needs requirements, feasibilities, constrains etc. for the development of a data management system for antimicrobial consumption in human and animal health	Consultant	13,410.14	1	2	0	26,820.28	Covers the cost of stakeholder workshop before and after the system is developed. The consultant should facilitate the workshop.	GOG, DPs, Corporate Institutions, NGOs
6.1.1.3.2.(b) Define system specification, scope and feature-set and definition of future development and management.	Consultant	2,845.62	1	5	3,456.22	17,684.33	Budget covers 5 TWG meetings and meetings with consultant	GOG, DPs, Corporate Institutions, NGOs
6.1.1.3.3.(b) Develop a national surveillance database, management tools, analytical tools, applications/ software for antimicrobial consumption in humans and animal health. Deliverables would include communication and reporting modules, access and security modules, etc.	Consultant	6,912.44	1	1	3,456.22	10,368.66	Budget covers cost of consultancy for development of data management system.	GOG, DPs, Corporate Institutions, NGOs

Budget: Sub-objective 3						1,263,852.53		
Activities								
6.2.1.1.1. Establish a structure for the national surveillance system for human health – including a national reference laboratory (this would also cover health care associated infection [HCAI] and of the organisms that cause HCAIs)	[Refer to activity 6.1.1.1.1]	-	0	0	-	-		[Refer to activity 6.1.1.1.1]
6.2.1.1.2. Establish a structure for the national surveillance systems for non-human health – including a national reference laboratory	[Refer to activity 6.1.1.1.1]	-	0	0	-	-		[Refer to activity 6.1.1.1.1]
6.2.1.1.3. Quantification and costing of laboratory commodities and tests	GHS, VSD	2,845.62	1	3	3,456.22	11,993.09		GOG, DPs, Corporate Institutions, NGOs
6.2.1.1.4. Encourage local production of antimicrobial susceptibility testing disk. (Develop a sustainable business case for the local production of susceptibility disks, engage the business community, engage MOTI for incentives and enabling environment)	MOTI, MOH	6,912.44	1	1	8,536.87	15,449.31		GOG, DPs, Corporate Institutions, NGOs
6.2.1.2.1. Implement the national laboratory policy implementation plans for human health	GHS, CHAG, SPMDP, GHAQI, MOI, MOD, Teaching Hospitals, VSD	2,845.62	1	5	113,410.14	127,638.25		GOG, DPs, Corporate Institutions, NGOs
6.2.1.2.2. Upgrade district laboratories with capacity to perform culture and sensitivity testing based on comprehensive needs assessment	GHS/VSD	2,845.62	5	5	500,000.00	571,140.55	Includes budget for technical work and procurement of equipment for lap upgrade programme	GOG, DPs, Corporate Institutions, NGOs
6.2.1.2.3. Train laboratory personnel as part of the laboratory upgrade programme	GHS, CHAG, SPMDP, GHAQI, MOI, MOD, Teaching Hospitals, VSD	13,410.14	5	5	0	335,253.46		GOG, DPs, Corporate Institutions, NGOs
6.2.1.3.1. Develop national laboratory policy and implementation plans for the food, agriculture, fisheries and environment sectors	MOFA, MESTI, MOFAD	2,845.62	1	8	28,000.00	50,764.98		GOG, DPs, Corporate Institutions, NGOs
6.2.1.3.2. Engage relevant stakeholders towards the development of national laboratory policies for these sectors	MOFA, MESTI, MOFAD	13,410.14	1	2	0	26,820.28		GOG, DPs, Corporate Institutions, NGOs
6.2.1.3.3. Implement national laboratory policy for the food, agriculture, fisheries and environment sectors	MOFA, MESTI, MOFAD	2,845.62	1	4	113,410.14	124,792.63		GOG, DPs, Corporate Institutions, NGOs

Activities	Lead implementer/ Responsibility	Cost per Unit Activity (USD)	factor	freq.	Other Cost	Indicative Budget (USD)	Budget narrative	Source of Funding
Budget: Sub-objective 4						118,352.53		
Activities								
6.1.1.1.7. Organise annual dissemination workshops for data on AMR surveillance and consumption	MOH, MOFA	21,394.01	1	4	0	85,576.04		GOG, DPs, Corporate Institutions, NGOs
6.1.1.1.8. Follow through evidence-based advocacy activities	MOH, MOFA, MESTI	2,845.62	1	4	-	11,382.49		GOG, DPs, Corporate Institutions, NGOs
6.1.1.1.9. Organise forum on evidence-based policy implementation based on data on the AMR surveillance and its implications for the AMR policy implementation process	MOH, MOFA, MESTI	21,394.01	1	1	0	21,394.01		GOG, DPs, Corporate Institutions, NGOs
Budget: Sub-objective 5						274,608.29		
Activities								
6.2.1.1.1. Collate incidence data on infectious diseases of common occurrence in Ghana to inform review of clinical guidelines	GNDP	2,845.62	1	7	21,394.01	41,313.36		GOG, DPs, Corporate Institutions, NGOs
6.2.1.1.2. Update Standard Treatment Guidelines and Essential Medicines List based on emergent surveillance data on AMR and AMC, generated from Ghana in the light of the best evidence and the rigour of the national medicines selection process.	GNDP	2,845.62	1	7	112,788.02	132,707.37		GOG, DPs, Corporate Institutions, NGOs
6.2.1.1.3. Develop and launch diagnostic, prescribing, and treatment aids based on the national medicines selection process, STGs and evidence from surveillance	GNDP	2,845.62	1	3	25,000.00	33,536.87		GOG, DPs, Corporate Institutions, NGOs
6.2.1.1.4. Train on the use of updated Standard Treatment Guidelines with a focus on infectious disease management, based on surveillance data and monitor for adherence	GNDP	13,410.14	1	5	0	67,050.69		GOG, DPs, Corporate Institutions, NGOs
Budget-Strategic Objective 3						10,616,428.11		
Budget: Sub-objective 1						10,616,428.11		
Activities								
7.1.1.1.1. Implement MOH IPC policies in all health facilities	GHS, MOI, MOD, GHAQI, SPMDP, CHAG	2,845.62	1	5	113,410.14	127,638.25		GOG, DPs, Corporate Institutions, NGOs
7.1.1.1.1.1 Conduct a baseline study on Healthcare Associated Infections	GHS, VSD, MOI, MOD, GHAQI, SPMDP, CHAG	54,389.40	7	1	-	380,725.81	All sectors to conduct baseline study	GOG, DPs, Corporate Institutions, NGOs
7.1.1.1.1.2 Advocate and create awareness on Healthcare Associated Infections [to be added training activities of human and animal health professionals] Activity 8.1.1.1.1 refers.	[Refer to activity 8.1.1.1.1]						Budget to be pulled from Activity 8.1.1.1.1	[Refer to activity 8.1.1.1.1]
7.1.1.1.2. Assessment of implementation of the IPC policy (including development of tools for assessment)	GHS-ICD, CHAG, GHAQI, SPMDP, MOI, MOD	6,912.44	1	1	26,820.28	33,732.72	Budget covers the cost due to consultancy (for human health in public, private and faith-based sectors), and the additional operational cost of the assessment	GOG, DPs, Corporate Institutions, NGOs
7.1.1.1.3.(a) Advocate for and facilitate the provision of potable water in 50% of health facilities.	GHS, CHAG, GHAQI, SPMDP, MOWS	2,845.62	1	8	13,410.14	8,561,520.74	Budget for 8 TWG meetings plus procurement cost for 2000 mechanised bore holes for 2000 health facilities	GOG, DPs, Corporate Institutions, NGOs

Activities	Lead implementer/ Responsibility	Cost per Unit Activity (USD)	factor	freq.	Other Cost	Indicative Budget (USD)	Budget narrative	Source of Funding
7.1.1.1.3.(b) Advocate for inclusion of infection prevention and control practices into curriculum of health training institutions [This is linked with Activity 5.1.1.4.1.; 7.1.1.1.3.(a) and 7.1.1.1.5.]	MOE, MOH, MOFA	2,845.62	1	3	13,410.14	21,947.00		GOG, DPs, Corporate Institutions, NGOs
7.1.1.1.4. Provide adequate toilet and hand washing facilities in hospitals and communities. [This activity is linked with 5.1.1.4.1.; 7.1.1.1.3.(a) and 7.1.1.1.5.]	MOH-GHS, CHAG, GHAQI, SPMDP	2,845.62	1	5	93,410.14	107,638.25		GoG-District Assemplies, DPs, Health Facilities, Donors, Corporate Institutions, NGOs
7.1.1.1.5. Provide PPEs in health facilities [This activity is linked with 5.1.1.4.1.; 7.1.1.1.3.(a) and 7.1.1.1.5.]	MOH, QHAQI, CHAG, SPMDP	2,845.62	1	5	500,000.00	514,228.11	Budget pegged at 500,000.00 USD to procure PPEs and 5 meetings of experts to advice the process	GOG, DPs, Corporate Institutions, NGOs
7.1.1.1.6 Conduct supportive supervision for IPC [This activity is linked with Activity 7.1.1.1.7]	GHS, QHAQI, CHAG, SPMDP	22,741.94	1	3	0	68,225.81		GOG, DPs, Corporate Institutions, NGOs
7.1.1.1.7 Enforce the use of items for IPC– coloured bin liners, sharp boxes, disposable paper napkins [This activity is linked with Activity 7.1.1.1.6]	GHS, QHAQI, CHAG, SPMDP	2,845.62	1	5	8,000.00	22,228.11		GOG, DPs, Corporate Institutions, NGOs
7.1.1.1.8 Develop guidelines for management of referred patients with infectious conditions from one point to the other [surveillance should be part of management]	MOH, AMR TWG platform	2,845.62	1	5	17,410.14	31,638.25		GOG, DPs, Corporate Institutions, NGOs
7.1.1.1.9 Implement IHR guidelines for containment of outbreaks of bacterial infection of public health interest in health facilities [This is linked with Activity 7.1.1.1.10]	GHS, QHAQI, CHAG, SPMDP	2,845.62	1	5	17,410.14	31,638.25		GOG, DPs
7.1.1.1.10. Train and sensitise health workers and the general public on the containment of outbreaks. [This is linked with Activity 7.1.1.1.9]	GHS, QHAQI, CHAG, SPMDP	21,394.01	3	1	70,000.00	134,182.03	Budget covers cost of three TOT workshops in northern, middle and southern zones and 70,000 USD for public education on the subject	GOG, DPs, Corporate Institutions, NGOs
7.1.1.2.1 Develop IPC policies for non-human sectors	AMR Platform, AMR Policy TWG	2,845.62	1	10	53,214.29	81,670.51	Budget covers 10 TWG working meetings, and 2 stakeholder workshops, the policy launch event and USD 5000 for printing.	GOG, DPs, Corporate Institutions, NGOs
7.1.1.2.2 Implement IPC policies in non-human sectors	VSD, MOFA, MESTI	2,845.62	1	5	63,410.14	77,638.25		GOG, DPs, Corporate Institutions, NGOs
7.1.1.2.3 Assess implementation of the IPC policy (non-human sectors)	VSD, MOFA, MESTI	4,608.29	1	1	3200	7,808.29		GOG, DPs, Corporate Institutions, NGOs
7.1.1.2.4 Develop SOPs for ensuring proper infection prevention and control on farms etc. [This is linked to Activity 7.1.1.2.5]	VSD, MOFA	2,845.62	1	6	4,000.00	21,073.73		GOG, DPs, Corporate Institutions, NGOs
7.1.1.2.5 Develop and train farmers on guidelines for containment of outbreaks of infections on farms etc. [This is linked to Activity 7.1.1.2.4]	VSD, MOFA	2,845.62	1	6	3,000.00	20,073.73		GOG, DPs, Corporate Institutions, NGOs
7.1.1.3.1 Phase, prioritise, cost and implement the waste management policy in health facilities	MOH, MESTI	2,845.62	1	3	44,608.29	53,145.16		GOG, DPs, Corporate Institutions, NGOs
7.1.1.3.2 Assess implementation of the waste management policy	AMR TWG, MOH, MESTI	2,845.62	1	2	4,608.29	10,299.54		GOG, DPs, Corporate Institutions, NGOs
7.1.1.3.3 Educate the public on hand hygiene, environmental cleaning and waste management	AMR TWG	2,845.62	1	2	20,000.00	25,691.24		GOG, DPs, Corporate Institutions, NGOs

Activities	Lead implementer/ Responsibility	Cost per Unit Activity (USD)	factor	freq.	Other Cost	Indicative Budget (USD)	Budget narrative	Source of Funding
7.1.1.4.1 Develop guidelines and SOPs on waste management in other sectors	AMR Platform, AMR Policy TWG	2,845.62	1	8	6,000.00	28,764.98		GOG, DPs, Corporate Institutions, NGOs
7.1.1.4.2 Train affected implementing entities on new guidelines on waste management	VSD, MOFA, MESTI, Fisheries and Aquaculture	13,410.14	1	3	0	40,230.41	Budget covers 3 training workshops in the northern, middle and southern zones respectively	GOG, DPs, Corporate Institutions, NGOs
7.1.1.4.3. Provide resources for implementation of SOPs and guidelines	VSD, MOFA, MESTI, Fisheries and Aquaculture	2,845.62	1	3	100,000.00	108,536.87	Budget covers 3 meeting for quantification, and the procurement process, with procurement pegged as USD 100,000.00	GOG, DPs, Corporate Institutions, NGOs
7.1.1.5.1 Conduct regular sensitisation campaign on vaccination of animals	AMR TWG, VSD, MOFA	2,845.62	1	2	20,000.00	25,691.24		GOG, DPs, Corporate Institutions, NGOs
7.1.1.6.1 Train farmers on soil fertility management and other measures to promote the resilience of plants [This activity is linked to Activity 7.1.1.7.1]	MOFA	13,410.14	1	3	0	40,230.41	Budget covers the cost of 3 training workshops in the northern, middle and southern zones respectively	GOG, DPs, Corporate Institutions, NGOs
7.1.1.7.1 Train farmers on vector control on farms etc. [This activity can be linked with Activity 7.1.1.6.1]	MOFA	13,410.14	1	3	0	40,230.41	Budget covers the cost of 3 training workshops in the northern, middle and southern zones respectively	GOG, DPs, Corporate Institutions, NGOs
Budget-Strategic Objective 4						**3,424,081.11**		
Budget: Sub-objective 1						**2,933,977.42**		
Activities								
8.1.1.1.1. Train and re-train core clinical care providers on responsible use of antimicrobials in all sectors	MOH, MOFA, MESTI, MOFAD	13,410.14	1	20	0	268,202.76	Budget covers the cost of training workshops in all 10 regions at 7000 USD per region, with a re-training in year 3	GOG, DPs, Corporate Institutions, NGOs
8.1.1.1.2. Develop indicators for monitoring antimicrobial use and resistance across all affected sectors	AMR platform technical working group	2,845.62	2	5	0	28,456.22	Cost for Technical work per sector (ie human and non-human)	GOG, DPs, Corporate Institutions, NGOs
8.1.1.1.3. Monitor antimicrobial use in all health facilities for human health [Activity 8.2.1.2.2 covers monitoring in animal health]	GHS	3,500.00	2	10	0	70,000.00	3500 USD per bi-annual field monitoring	GOG, DPs, Corporate Institutions, NGOs
8.1.1.1.4. Advocate for regular post market surveillance of antimicrobials in circulation. [This activity is linked with activity 9.3.1.2.2]	FDA, AMR Platform advocacy group	3,500.00	1	1	0	3,500.00	3500 USD for advocacy work with for regular PMS	GOG, DPs, Corporate Institutions, NGOs
8.1.1.1.5. Enforce the use of the Dangerous drug book/appropriate software and record keeping at both wholesale and retail outlets of antibiotics	Pharmacy Council	7,000.00	10	1	11900	81,900.00	Budget to cover software development costs, testing and training, including other enforcement activities at annual general meetings etc.	GOG, DPs, Corporate Institutions, NGOs
8.1.1.1.6. Advocate for and support periodic testing of herbal preparations with the claim of anti-infective properties for the presence of orthodox antibiotic substances. Use of such data to engage producers of herbal preparations. This activity is in sync with 9.3.1.2.1 for potential synergy to minimise cost	FDA, TAMC, AMR Platform advocacy group	7,700.00	1	4	0	30,800.00		GOG, DPs, Corporate Institutions, NGOs
8.1.1.1.7. Disseminate standards and practice guidelines for pharmaceutical care for human health	Pharmacy Council	35,000.00	1	1	0	35,000.00	Budget covers the cost of dissemination workshop, printing, SOPs and Initial copies of selected job aids, as well as dissemination on web and portable devices	GOG, DPs, Corporate Institutions, NGOs

Activities	Lead implementer/ Responsibility	Cost per Unit Activity (USD)	factor	freq.	Other Cost	Indicative Budget (USD)	Budget narrative	Source of Funding
8.1.1.1.8. Train of core clinical care providers on the SPGPC	MOH	13,410.14	15	1	0	201,152.07	Budget covers the cost of training workshops in all 10 regions and 5 tertiary facilities	GOG, DPs, Corporate Institutions, NGOs
8.1.1.1.9. Educate herbal practitioners on responsible use of medicines including antimicrobials	TAMD	13,410.14	10	1	0	134,101.38	Budget covers training costs for 10 regions	GOG, DPs, Corporate Institutions, NGOs
8.1.1.1.10. Promote responsible use of herbal products with antimicrobial properties	TAMD	35,000.00	1	1	0	35,000.00	Budget covers the cost of lab based assessments, guidelines and sensitisation workshop	GOG, DPs, Corporate Institutions, NGOs
8.1.1.1.11. Advocate for increased coverage of national health insurance in line with WHO reserved watch list	NHIA, GNDP	17,500.00	1	2	0	35,000.00		GOG, DPs, Corporate Institutions, NGOs
8.1.1.1.12. Develop and disseminate standards for care for veterinary practice	MOFA VSD	35,000.00	1	1	0	35,000.00	Budget covers the cost of technical workshops, dissemination workshop, printing, SOPs and Initial copies of Selected Job Aids, as well as dissemination on web and portable devises	GOG, DPs, Corporate Institutions, NGOs
8.1.1.2.1 Develop criteria and guidelines for the use of national surveillance data for selection of antimicrobials	GNDP	11,900.00	1	1	0	11,900.00	Budget covers 2 meetings of the national medicines selection committee and a technical workshop to do the analysis	GOG, DPs, Corporate Institutions, NGOs
8.1.1.2.2 Update the national medicines selection process to include data from national surveillance of antimicrobial use and resistance. Utilize antimicrobial consumption and resistance data for selection at the national level	GNDP, NMSC	40,000.00	1	1	0	40,000.00		GOG, DPs, Corporate Institutions, NGOs
8.1.1.3.1 Adapt the WHO classification list of Antimicrobials for Ghana and ensure optimised prescribing and dispensing based on Laboratory results	GNDP, NMSC	2,845.62	1	8	0	22,764.98		GOG, DPs, Corporate Institutions, NGOs
8.1.1.3.2 Develop institutional formulary list for prescribing and dispensing of antimicrobials in health facilities	GHS, GHAQI, Teaching Hospitals, SPMDP, CHAG	77,000.00	1	1	0	77,000.00		GOG, DPs, Corporate Institutions, NGOs
8.1.1.3.3 Procure and supply relevant 'rapid' diagnostic kits to aid diagnosis at lower levels under a 2-year pilot management framework, and review for health system integration after 2 years	MOH-P&S, MOFA, MESTI	500,000.00	1	3	0	1,500,000.00	This covers the procurement of rapid test kits to improve antimicrobial prescribing especially at lower levels of care.	GOG, DPs, Corporate Institutions, NGOs
8.1.1.4.1 Advocate for enforcement of the law on advertisement of restricted drugs	FDA, AMR platform	4,500.00	1	1	0	4,500.00		GOG, DPs, Corporate Institutions, NGOs
8.1.1.4.2 Collaborate with law enforcement agencies and lorry station owners, drivers unions, chiefs, market queens to enforce the ban on sale of drugs at unauthorized places	FDA	35,000.00	1	1	0	35,000.00		GOG, DPs, Corporate Institutions, NGOs
8.1.1.5.1 Public education and sensitisation on the dangers of sourcing antimicrobials from unauthorised sources	VSD, GHS	25,000.00	1	1	0	25,000.00		GOG, DPs, Corporate Institutions, NGOs
8.1.1.6.1 Develop antimicrobial stewardship training manual for health facilities	GHS-OCP/ICD, CHAG, GHAQI, SPMDP, MOI, MOD, Teaching Hospitals	49,000.00	1	1	0	49,000.00		GOG, DPs, Corporate Institutions, NGOs
8.1.1.6.2 Train DTC members on antimicrobial stewardship concept	GHS-OCP/ICD, CHAG, GHAQI, SPMDP, MOI, MOD, Teaching Hospitals	70,700.00	1	1	0	70,700.00		GOG, DPs, Corporate Institutions, NGOs

Activities	Lead implementer/ Responsibility	Cost per Unit Activity (USD)	factor	freq.	Other Cost	Indicative Budget (USD)	Budget narrative	Source of Funding
8.1.1.6.3 Monitor/provide supportive visits to the DTCs in the facilities on antimicrobial stewardship	GHS-OCP/ICD, CHAG, GHAQI, SPMDP, MOI, MOD, Teaching Hospitals	35,000.00	1	1	0	35,000.00		GOG, DPs, Corporate Institutions, NGOs
8.1.1.6.4 Conduct annual DTC peer review on antimicrobial stewardships	MOH	17,500.00	2	3	0	105,000.00	Budget covers the cost of DTC peer review workshops per year at a cost of 17500 per workshop	GOG, DPs, Corporate Institutions, NGOs
Budget: Sub-objective 2						424,919.35		
Activities								
8.2.1.1.1 Hold inter-sectoral meetings on responsible antibiotics use in non-health settings	MOFA	13,410.14	1	5	0	67,050.69		GOG, DPs, Corporate Institutions, NGOs
8.2.1.1.2 Develop training scheme and train veterinary personnel on responsible use of antibiotics in veterinary and aquaculture [This is linked with activity 8.1.1.1.1]	VSD, GHS	2,845.62	1	3	26,820.28	35,357.14	[This is linked with activity 8.1.1.1.1] Budget covers the cost of 3 technical working group meetings and 2 stakeholder workshops	GOG, DPs, Corporate Institutions, NGOs
8.2.1.2.1 Develop monitoring tools for antibiotic use in veterinary and aquaculture [This is linked with activity 8.1.1.1.2]	AMR platform technical working group	5,000.00	1	1	0	5,000.00	[This is linked with activity 8.1.1.1.2]	GOG, DPs, Corporate Institutions, NGOs
8.2.1.2.2 Monitor the use of antibiotics in veterinary and aquaculture. Quarterly monitoring reports to be shared with appropriate offices and with the AMR stakeholder platform	GHS, VSD	22,741.94	1	4	0	90,967.74	Budget covers annual monitoring budgets for 4 years [This is linked with activity 8.1.1.1.3]	GOG, DPs, Corporate Institutions, NGOs
8.2.1.3.1 Develop communication kit and educate public on the existence and role of the veterinary services via campaigns on radio, TV, print media, web and social media	VSD	2,845.62	1	1	26,820.28	29,665.90		GOG, DPs, Corporate Institutions, NGOs
8.2.1.4.1 Implement and monitor adherence to standards, treatment guidelines, benchmarks, SOPs, protocols, lists of medicines etc. for antimicrobial use in veterinary and aquaculture	VSD	22,741.94	1	4	0	90,967.74		GOG, DPs, Corporate Institutions, NGOs
8.2.1.5.1 Set-up technical working group to define standards, treatment guidelines, benchmarks, SOPs, protocols, lists of medicines etc. for antimicrobial use in veterinary and aquaculture. [include FDA and GSA, EPA]	MOFA, VSD, GSA	2,845.62	1	8	4,608.29	27,373.27	Budget covers the cost due to technical consultancy and working group of experts	GOG, DPs, Corporate Institutions, NGOs
8.2.1.6.1 Upgrade veterinary laboratories with capacity to perform culture and sensitivity testing based on comprehensive needs assessment	MOFA	2,845.62	1	3	70,000.00	78,536.87		GOG, DPs, Corporate Institutions, NGOs
Budget: Sub-objective 3						65,184.33		
Activities								
8.3.1.1.1 Setup a technical committee with clear TORs to develop guidelines for biomedical waste and effluents for all sectors	AMR platform technical subgroup	2,845.62	1	8	0	22,764.98		GOG, DPs, Corporate Institutions, NGOs
8.3.1.2.1 Explore and institute possibilities of incentives to encourage the return of unused and unwholesome antimicrobial agents	EPA, CSIR, AMR platform technical subgroup	2,845.62	1	3	0	8,536.87		GOG, DPs, Corporate Institutions, NGOs
8.3.1.2.2 Educate public on the need to return unused and unwholesome antimicrobial agents	EPA, CSIR	2,845.62	1	2	20,000.00	25,691.24		GOG, DPs, Corporate Institutions, NGOs

3,424,081.11

Activities	Lead implementer/ Responsibility	Cost per Unit Activity (USD)	factor	freq.	Other Cost	Indicative Budget (USD)	Budget narrative	Source of Funding
8.3.1.2.3 Identify and setup collection points for receiving unused and unwholesome antimicrobial agents	AMR platform technical subgroup, CPPA, EPA, CSIR	2,845.62	1	2	2,500.00	8,191.24		GOG, DPs, Corporate Institutions, NGOs
Budget-Strategic Objective 5						3,113,356.22		
Budget: Sub-objective 1						638,619.82		
Activities								
9.1.1.1.1 Develop research agenda for AMR and incorporate into research agenda of MDAs in affected sectors (humans, animals, plants)	Academia	3,000.00	1	3	11000	20,000.00		GOG, DPs, Corporate Institutions, NGOs
9.1.1.1.2 Research into costs of hospital acquired infections.	Academia	25,000.00	1	1	0	25,000.00	Budget covers field data collection, analysis etc.	GOG, DPs, Corporate Institutions, NGOs
9.1.1.1.3 Research to identify antimicrobial resistance in specific zoonotic diseases	Academia, Research Institutions	35,000.00	1	1	0	35,000.00		GOG, DPs, Corporate Institutions, NGOs
9.1.1.1.4 Research in new point-of-care diagnostic tools and methods	Academia, Research Institutions	100,000.00	1	1	100000	200,000.00	Cost include research cost of 100,000 and a budget for trial of 100,000	GOG, DPs, Corporate Institutions, NGOs
9.1.1.1.5 Conduct AMR prevalence studies	Academia, Research Institutions	35,000.00	1	1	0	35,000.00		GOG, DPs, Corporate Institutions, NGOs
9.1.1.1.6 Research into economic costs and implications of AMR in agriculture, aquaculture etc. and it's relatedness to human health	Academia	54,389.40	1	1	0	54,389.40	Study in collaboration with Academia in a structured programme	GOG, DPs, Corporate Institutions, NGOs
9.1.1.2.1 Train and equip various practitioners on basic operational research that can yield useful data to refine operations as well as data of national interest.	GHS, VSD, Academia	21,394.01	3	2	0	128,364.06	Training workshop to be organised in three country zones, southern, middle and northern belt	GOG, DPs, Corporate Institutions, NGOs
9.1.1.2.2 Develop tools and methodologies to aid operational research in all affected sectors	GHS, VSD, Academia	2,845.62	1	5	0	14,228.11		GOG, DPs, Corporate Institutions, NGOs
For activities towards the development of new antimicrobial agents, See section under intervention 9.2.1.7								
9.1.1.3.1 Set up a web-based repository for research on antimicrobial use and resistance for reports and published papers from all sectors (human, animal, plant and the environment)	GNDP, Academia	771.89	1	20	28,412.44	43,850.23	Budget covers local tachnical assistance for development of web repository, quarterly editorial group meetings for for 5 years, annual web hosting fees (USD 300) and quarterly web maintenance and communications support fees USD 1000.	DPs, GoG, Corporate Institutions, NGOs
9.1.1.3.1 Organise national and international scientific fora for research into potential antimicrobial agents, antimicrobial use and resistance in Ghana (with a secondary objective of seeding interest for investments into the development of antimicrobial agents)	MOH, MOFA, MESTI	21,394.01	1	2	40,000.00	82,788.02		GOG, DPs, Corporate Institutions, NGOs
Budget: Sub-objective 2						1,321,460.37		
Activities								
9.2.1.1.1 Advocate for stringent enforcement of regulation on antimicrobials. [This activity is linked with activity 9.3.1.1.1]	FDA	2,845.62	1	3	20000	28,536.87		GOG, DPs, Corporate Institutions, NGOs

Activities	Lead implementer/ Responsibility	Cost per Unit Activity (USD)	factor	freq.	Other Cost	Indicative Budget (USD)	Budget narrative	Source of Funding
9.2.1.2.1 Enforce minimum standards for manufacture of antimicrobial agents of acceptable quality amongst local manufacturers in Ghana, based on current international standards and GMP	FDA	4,608.29	1	1	0	4,608.29		GOG, DPs, Corporate Institutions, NGOs
9.2.1.2.2. Implement GMP roadmap for local manufacture of antimicrobials in country	MOH, FDA	2,845.62	1	3	13,410.14	21,947.00		GOG, DPs, Corporate Institutions, NGOs
9.2.1.3.1 Advocate and implement a national bioequivalence centre strategy in a PPP mode	MOH, MOF, MOTI, Ministry for Business Development	2,845.62	1	5	1000000	1,014,228.11	Budget for advocacy activities	GOG, DPs, Corporate Institutions, NGOs
9.2.1.4.1 Advocate for the active implementation of the FDA roadmap for local manufacturers in support of the local manufacture of antimicrobials of acceptable quality [This activity is lined with 9.2.1.2.1, 9.2.1.2.2]	FDA, AMR Platform Adocacy Team	2,845.62	1	2	0	5,691.24	Budget covers advocacy activities	GOG, DPs, Corporate Institutions, NGOs
9.2.1.5.1 Develop policy framework governing the research between stakeholders including academia and industry. [This intervention is linked with activities under intervention 9.2.1.7]	MOH, MOFA	2,845.62	1	10	26,820.28	55,276.50		GOG, DPs, Corporate Institutions, NGOs
9.2.1.6.1 Create an incentive package to encourage the local manufacture of antimicrobials of acceptable quality	MOH, FDA	2,845.62	1	3	13,410.14	21,947.00		GOG, DPs, Corporate Institutions, NGOs
9.2.1.6.2 Set-up a fund to support local manufacture of antimicrobials (based on transparent criteria informed by a demonstrable commitment to quality)	MOH, MOTI	2,845.62	1	3	2,845.62	11,382.49		GOG, DPs, Corporate Institutions, NGOs
9.2.1.7.1 Scan the research repositories of existing research institutions for existing research on medicinal agents of potential antimicrobial value.	Academia, research instituions	3,456.22	1	5	0	17,281.11		GOG, DPs, Corporate Institutions, NGOs
9.2.1.7.2 Assess the economic viability of investment into such medicinal agents	Academia, researh institutions	4,608.29	1	1	3200	7,808.29		GOG, DPs, Corporate Institutions, NGOs
9.2.1.7.3 Develop a clear action plan and investment model for long term drug development of potential agents	Consultant	4,608.29	1	1	4000	8,608.29		GOG, DPs, Corporate Institutions, NGOs
9.2.1.7.4 Explore the development of potential antimicrobial medicinal agents in-country (in collaboration with academia, research institutions and centres)	Academia, research instituions	2,845.62	1	2	56000	61,691.24		GOG, DPs, Corporate Institutions, NGOs
9.2.1.7.5 Support specific research into local medicinal plants with antimicrobial activity as well as the development of such agents	CSRIPM, Academia	62,453.92	1	1	0	62,453.92		GOG, DPs, Corporate Institutions, NGOs

3,113,356.22

Budget: Sub-objective 3						220,924.88		
Activities								
9.3.1.1.1 Collaborate with implementers of key Acts of government to regulate the supply, storage and distribution of antimicrobials in formal and informal markets [This activity is linked with activity 9.2.1.1.1]	MOH, FDA	2,845.62	1	5	0	14,228.11		GOG, DPs, Corporate Institutions, NGOs
9.3.1.2.1 Conduct post market surveillance (PMS) of antimicrobial agents. [This activity is linked with activity 8.1.1.1.4]	FDA	11,200.00	2	4	0	89,600.00	PMS activities covering products for both human and non-human sectors	GOG, DPs, Corporate Institutions, NGOs

Activities	Lead implementer/ Responsibility	Cost per Unit Activity (USD)	factor	freq.	Other Cost	Indicative Budget (USD)	Budget narrative	Source of Funding
9.3.1.2.2 Engage the private, public and mission sectors on stricter management model for the results of post market surveillance	MOH, FDA	2,845.62	1	2	0	5,691.24		GOG, DPs, Corporate Institutions, NGOs
9.3.1.2.3 Collaborate with FDA to collate pharmacovigilance data on antimicrobial treatments	FDA	54,389.40	1	1	0	54,389.40		GOG, DPs, Corporate Institutions, NGOs
9.3.1.2.4. Institute special courts for regulatory offences	MOH, MOJAG, FDA	2,845.62	1	5	42,788.02	57,016.13	Budget covers meetings multi-stakeholder engagement processes as well as high level policy dialogue	GOG, DPs, Corporate Institutions, NGOs
Budget: Sub-objective 4						932,351.15		
Activities								
9.4.1.1.1 Set-up of an inter-ministerial commission on AMR from relevant ministries.	MOH	2,845.62	1	2	0	5,691.24	Budget covers the inauguration activities and initial meetings	GOG, DPs, Corporate Institutions, NGOs
9.4.1.1.2 Convene meetings of the inter-ministerial commission bi-annually	MOH	13,410.14	1	10	0	134,101.38	Budget covers 10 meetings of the interministerial commission on AMR	GOG, DPs, Corporate Institutions, NGOs
9.4.1.2.1 Develop policy briefs and technical briefs for the ministerial commission on key AMR issues as needed.[On 9.4.1.2.1 Note: AMR technical team would provide such advise. The team could co-opt technical expertise as needed to strengthen its advisory functions.]	AMR TWG	2,845.62	1	10	0	28,456.22	Budget covers the development of policy briefs to inform high level dialogue on AMR policy agenda	GOG, DPs, Corporate Institutions, NGOs
9.4.1.3.1 Engage district and regional structures on the implementation of AMR policy covering: intent, roles and responsibilities, interactions, etc.	MOH	21,394.01	1	10	5,691.24	219,631.34	Budget for engagement of northern and southern sectors	GOG, DPs, Corporate Institutions, NGOs
9.4.1.4.1 Setup/identify and strengthen a secretariat within the ministry of Health to coordinate AMR issues in country	MOH	806.45	1	53	-	42,741.94		GOG, DPs, Corporate Institutions, NGOs
9.4.1.4.2 Engage national coordinators with clear TORs for the implementation of the NAP on AMR for the various sectors in Ghana	MOH	1,958.53	1	53	25,139.17	128,941.01	Budget covers salaries and office running support for AMR NAP coordinators for 5 years	GOG, DPs, Corporate Institutions, NGOs
9.4.1.5.1 Convene quarterly AMR platform meetings	AMR platform chair and secretariat	2,845.62	1	19	0	54,066.82	Cost of holding AMR platform meetings for the 5 year period	GOG, DPs, Corporate Institutions, NGOs
9.4.1.6.1 Develop a monitoring and evaluation framework as part of the NAP development process	AMR platform	4,608.29	2	1	0	14,907.83	Budget covers 2 consultancies	GOG, DPs, Corporate Institutions, NGOs
9.4.1.6.2 Conduct a data mapping exercise to support the monitoring and evaluation framework and identify cost-effective (efficient) means to monitor and evaluate implementation of the NAP	AMR platform	4,608.29	2	1	0	14,907.83	Budget covers 2 consultancies with 2 TWG meetings	GOG, DPs, Corporate Institutions, NGOs
9.4.1.6.3 Monitor implementation of the AMR NAP in Ghana half-yearly	AMR platform	22,741.94	1	8	0	181,935.48	Budget covers 8 monitoring activities for the NAP over a 5 year period	GOG, DPs, Corporate Institutions, NGOs
9.4.1.6.4 Conduct annual multi-stakeholder project implementation review meetings for the AMR policy and NAP	AMR platform	21,394.01	1	5	0	106,970.05		GOG, DPs, Corporate Institutions, NGOs
Total Budget						21,276,047.93		

REFERENCES

1. World Health Organisation. WHO-Antimicrobial resistance [Internet]. WHO Website on Antimicrobial Resistance. 2017 [cited 2017 Mar 7]. Available from: http://www.who.int/antimicrobial-resistance/en/

2. World Health Organisation. Sixty-seventh World Health Assembly [Internet]. WHO 67th World Health Assembly Webpage. 2014 [cited 2017 Mar 7]. Available from: http://www.who.int/mediacentre/events/2014/wha67/en/

3. World Health Organisation. Sixty-eighth World Health Assembly [Internet]. WHO 68th World Health Assembly Webpage. 2015 [cited 2017 Mar 7]. Available from: http://www.who.int/mediacentre/events/2015/wha68/en/

4. John-Arne Røttingen. Making a global action plan for antibiotics [Internet]. Norwegian Institute of Public Health. 2014 [cited 2017 Mar 7]. Available from: http://www.fhi.no/en/news/2014/making-a-global-action-plan-for-ant/

5. World Assembly of Delegates of the OIE. Combating Antimicrobial Resistance through a One Health Approach: Actions and OIE Strategy-RESOLUTION No. 36 [Internet]. OIE; 2016. Available from: http://www.oie.int/fileadmin/Home/eng/Our_scientific_expertise/docs/pdf/AMR/A_RESO_AMR_2016.pdf

6. OIE. OneHealth: OIE - World Organisation for Animal Health - One Health "at a glance" [Internet]. [cited 2017 Mar 7]. Available from: http://www.oie.int/en/for-the-media/onehealth/

7. Centers for Disease Control and Prevention. One Health Basics [Internet]. 2016 [cited 2017 Mar 7]. Available from: https://www.cdc.gov/onehealth/basics/index.html

8. OIE. The "One Health" concept: the OIE approach [Internet]. OIE bulletin No. 2013-1. [cited 2017 Mar 7]. Available from: http://www.oie.int/fileadmin/Home/eng/Publications_%26_Documentation/docs/pdf/bulletin/Bull_2013-1-ENG.pdf

9. Founou LL, Founou RC, Essack SY. Antibiotic Resistance in the Food Chain: A Developing Country-Perspective. Front Microbiol. 2016;7:1881.

10. World Health Organisation. WHO Factsheet on Antimicrobial Resistance [Internet]. WHO Factsheet on Antimicrobial Resistance. 2013 [cited 2015 Aug 8]. Available from: http://www.who.int/

11. Newman, Mercy J; Frimpong, Enoch; Donkor, Eric S; Opintan, Japheth A. Resistance to antimicrobial drugs in Ghana. Infect Drug Resist. 2011;(4):215–20.

12. Tatfeng YM, Agbonlahor DE, Tchounga KS, Omolu PI, Okodua M, Yah CS, et al. Chloroquine prophylaxis associated with high prevalence of Plasmodium falciparum pfcrt K76T mutation in people with sickle-cell

disease in Benin City, Nigeria. J Vector Borne Dis. 2008 Mar;45(1):51–5.

13. Nweneka CV, Tapha-Sosseh N, Sosa A. Curbing the menace of antimicrobial resistance in developing countries. Harm Reduct J. 2009 Nov 19;6:31.

14. Bonsu, Frank A; Boateng, Boakye. Assessment of the performance of TB surveillance in Ghana Main findings, Key recommendations and associated Investment plan [Internet]. WHO Website. 2013 [cited 2014 Oct 20]. Available from: http://www.who.int/tb/advisory_bodies/impact_measurement_taskforce/meetings/accra2013_1_checklist_ghana_boateng.pdf

15. Schmidt AS, Bruun MS, Dalsgaard I, Pedersen K, Larsen JL. Occurrence of Antimicrobial Resistance in Fish-Pathogenic and Environmental Bacteria Associated with Four Danish Rainbow Trout Farms. Appl Environ Microbiol. 2000 Nov 1;66(11):4908–15.

16. Donkor, Eric S; Tetteh-Quarcoo, Patience B; Nartey, Patrick; Agyeman, Isaac O. Self-Medication Practices with Antibiotics among Tertiary Level Students in Accra, Ghana: A Cross-Sectional Study. Int J Environ Res Public Health. 2012 Oct;(9):3519–29.

17. Union of Concerned Scientists. Prescription for Trouble: Using Antibiotics to Fatten Livestock [Internet]. Food and Agriculture, Industrial Agriculture. 2015 [cited 2015 Aug 8]. Available from: http://www.ucsusa.org

18. Agga GE, Arthur TM, Durso LM, Harhay DM, Schmidt JW. Antimicrobial-Resistant Bacterial Populations and Antimicrobial Resistance Genes Obtained from Environments Impacted by Livestock and Municipal Waste. PLOS ONE. 2015 Jul 21;10(7):e0132586.

19. Osei Sekyere J. Antibiotic Types and Handling Practices in Disease Management among Pig Farms in Ashanti Region, Ghana. J Vet Med. 2014 Sep 11;2014:e531952.

20. Turkson PK. Use of drugs and antibiotics in poultry production in Ghana. Ghana J Agric Sci [Internet]. 2008 Jan 1 [cited 2017 Mar 14];41(1). Available from: http://www.ajol.info/index.php/gjas/article/view/46142

21. Boi Kikimoto. The state of veterinary health services in Ghana. 2014.

22. Government of Ghana. Ghana Public Health Law Act, 851. 2nd Edition. Accra, Ghana: Ghana Publishing Corporation; 2012.

23. Rassmusen. ADMER Project website [Internet]. ADMER Project website. 2014. Available from: http://www.admerproject.org/

24. Hane-Weijman, S; Trads, S. ADMER Project website [Internet]. ADMER Project website. 2014. Available from: http://www.admerproject.org/

APPENDIX - 1, MONITORING AND EVALUATION FRAMEWORK

INDICATOR MATRIX

AMR M&E Framework				
AMR Goal:				
SO 1: Improve awareness and understanding of antimicrobial resistance through effective communication, education and training	**SO 2:** Strengthen Knowledge and Evidence base through surveillance and research	**SO 3:** Reduce the incidence of infection through effective sanitation, hygiene and infection prevention measures and good agricultural and biosecurity practices	**SO 4:** Optimize the use of antimicrobial agents in humans, aquaculture, plant production and animal health in the "ONE HEALTH" approach	**SO 5:** Develop the economic case and create an enabling environment for sustainable investment that takes into account Ghana's needs, and increase investment in new machines, diagnostic tools, vaccines and other interventions
Outcome Statement: Awareness and knowledge of AMR improved.	**Outcome Statement:** Evidence based knowledge to reduce the burden of AMR increased.	**Outcome Statement:** Occurrence of infections in establishments reduced	**Outcome Statement:** Use of antimicrobials in animal and human health optimized.	**Outcome Statement:** Enabling environment for sustainable investment of AMR reduction enhanced.

Outcome Indicators	**Outcome Indicators**	**Outcome Indicators**	**Outcome Indicators**	**Outcome Indicators**
a) Percentage of authorized medical/veterinary personnel dispensing AM with prescriptions. b) Proportion of persons using non-prescribed antimicrobials for treatment. c) Proportion of persons (patients/farmers) adhering to AM prescriptions. d) Proportion of primary health care/vet personnel who adhere to guidelines on antibiotic treatment.	a) Proportion of personnel (health and vets) using AMR and AMC surveillance and research data for decision making. b) #, list of evidence based policies/ strategies under implementation	a) Incidence of establishment acquired infections b) Prevalence of drug resistant infections c) Proportion (%) of healthcare facilities with established infection prevention and control (IPC) programs d) Proportion of farms with infectious disease outbreaks e) Proportion of MMDA implementing the biomedical waste guidelines f) Proportion of front line health personnel vaccinated against relevant infections (rabies; Hepatitis B)	a) Percentage of prescriptions that contain antibiotics b) Proportion of prescriptions compliant with clinical guidelines c) Proportion (%) of prescriptions based on Antimicrobial Sensitivity Test (AST) d) Overall antibiotic consumption level (DDD) per capita for key classes of antibiotics.	a) Burden of AMR b) Proportion of Total Government expenditure that is spent on research and development to address AMR c) Proportion of local manufacturers with WHO/ISO certification d) # of potential candidate antimicrobial agent from domestic R&D
Output statement: Communication, education and training of AMR enhanced.	**Output statement:** AMR Surveillance enhanced.	**Output statement:** Sanitation, hygiene and IPC measures improved	**Output statement:** Access to quality antimicrobial medicines expanded	**Output statement:** Mechanisms for local AM production strengthened.

Output Indicators:	**Output Indicators:**	**Output indicators:**	**Output indicators:**	**Output indicators:**
a) Proportion of animal and human health training institutions that include antimicrobial resistance modules in their curricula. b) % of persons knowledgeable on the factors that lead to the emergence and spread of AMR. c) #, list of public education campaigns that promote the appropriate use of antibiotics. d) Proportion of prescriptions informed by culture and sensitivity tests for causative bacteria.	a) Proportion of functional sentinels sites to support AMR surveillance. b) Proportion of AMR confirmed cases reported through the surveillance system c) Average number of days from sample collection to diagnostic result to date of report.	a) Proportion of farms implementing biosecurity and biosafety measures b) Proportion of health care facilities reporting on IPC adherence c) Proportion of health care facilities reporting on HAIs d) Proportion of farms classified as pathogen and disease free status of animal husbandry e) Proportion of authorized slaughter facilities implementing food safety practices	a) Proportion of health care facilities with antimicrobial stewardship programs b) Percentage of farmers attended to by veterinary personnel over the last 12 months c) Percentage of patients accessing health care services	a) Fund to support local manufacturers across sectors in place. b) Incentives for local medicine manufacturers established c) Proportion of farm animals covered by locally produced pharmaceuticals (including vaccines) d) AMR coordination platform established e) Research agenda for the affected sectors developed with AMR included. f) Model for long-term medicine development established.

COMPENDIUM

SO: 1	Improve awareness and understanding of antimicrobial resistance through effective communication, education and training
Outcome Statement:	Awareness and knowledge of AMR improved.
Indicator:	**1A:** Percentage of authorized medical/veterinary personnel dispensing AM with prescriptions
	DESCRIPTION:
Expected/desired change:	It is expected that the number of authorized medical/veterinary personnel dispensing AM with prescriptions will **increase** over time.
Definition of key terms (as applicable):	**Authorized medical/vet personnel**:Vets - any health practitioner who has acquired license from the Ghana Veterinary Council or who is working under the authority of a licensed veterinary officer. **Prescription**: a written instruction by a medical/vet practitioner that authorizes a patient/farmer to be issued with a medicine **Dispensing:** the preparation, packaging, labelling, record keeping and transfer of a prescription drug to a patient or an intermediary who is responsible for administering the drug.
	MEASUREMENT:
Unit of Measure:	Percentage (%)
Calculation:	**a. Numerator:** Those authorized medical/veterinary practitioners sampled that dispense AM with prescriptions **b. Denominator:** All authorized medical/veterinary practitioners sampled
Disaggregated by:	1. Professional group (vet or medical officer) 2. Region 3. Sex
	PLAN FOR DATA COLLECTION AND REPORTING:
Frontline Data Source:	MOH records (specific?); MOFA records; Private vet clinics data; Ghana Health Service records
Means of data collection:	Surveys; Desk top review
Means of Verification	Prescriptions logs; Pharmacy sales records
Frequency of Reporting:	Annually (Cumulative)
Reporting Partner(s):	MOH; MOA; Fisheries; Private Medical Service Providers; Quasi Government
	TARGETS AND BASELINE:

Year	Baseline	Target	Actual	Notes
Yr1				**Where data is not available, the data collected in Yr 1 will be considered as baseline data. Targets will subsequently be set as informed by the baseline data.**
Yr2				
Yr3				
Yr 4				
Yr 5				

OPTIONAL REMARKS:	
Limitations/ Considerations:	The assumption is that all authorized medical/vet practitioners dispense AMs.

THIS SHEET LAST UPDATED ON: 16/08/2017

SO: I	Improve awareness and understanding of antimicrobial resistance through effective communication, education and training
Outcome Statement	Awareness and knowledge of AMR improved.
Indicator:	1B Proportion of persons using non-prescribed antimicrobials for treatment.
DESCRIPTION:	
Expected/desired change:	It is expected that the number of people using non-prescribed antimicrobials for treatment will **reduce** over time.
Definition of key terms (as applicable):	**Persons**: patient/farmer or intermediaries administering the AM drug **Non-prescribed antimicrobials**: medicines issued without a written instruction by an authorized medical/vet practitioner
MEASUREMENT:	
Unit of Measure:	Percentage (%)
Calculation:	**a. Numerator:** all patients/farmers or intermediaries using non-prescribed AMs for treatment **b. Denominator**: all patients/farmers or intermediaries using AMs for treatment
Disaggregated by:	1. Sex 2. Region 3. Purpose of use (treatment or growth promotion)
PLAN FOR DATA COLLECTION AND REPORTING:	
Frontline Data Source:	Survey respondents

Means of data collection:	Survey
Means of Verification:	Survey report
Frequency of Reporting:	Annually (Cumulative)
Reporting Partner(s):	MOH; MOFA; MOFAD

TARGETS AND BASELINE:

Year	Baseline	Target	Actual	Notes
Yr1				Where data is not available, the data collected in Yr 1 will be considered as baseline data. Targets will subsequently be set as informed by the baseline data.
Yr2				
Yr3				
Yr4				
Yr5				

OPTIONAL REMARKS:

Limitations/ Considerations:	The disaggregation on use will enable us to collect data for use of AMs outside of treatment e.g. for growth promotion.

THIS SHEET LAST UPDATED ON: 16/08/2017

SO: 1	Improve awareness and understanding of antimicrobial resistance through effective communication, education and training
Outcome Statement:	Awareness and knowledge of AMR improved.
Indicator:	1C: Proportion of persons (patients/farmers) adhering to AM prescriptions.

DESCRIPTION:

Expected/desired change:	It is expected that the number of persons (patients/farmers) adhering to AM prescriptions will **increase** over time.
Definition of key terms (as applicable):	**Adherence to AM prescriptions**: the extent to which the patient/farmer or intermediary continues an agreed-upon mode of treatment (the dosage prescribed) without supervision.

MEASUREMENT:

Unit of Measure:	Percentage (%)
Calculation:	**a. Numerator:** All patients/farmers adhering to prescribed AMs. **b. Denominator:** All patients/farmers using prescribed AMs
Disaggregated by:	1. Sex 2. Region 3. District 4. Farmer type (livestock, poultry, fisheries, crops)

PLAN FOR DATA COLLECTION AND REPORTING:

Frontline Data Source:	Survey respondents
Means of data collection:	Survey
Means of Verification:	Survey report
Frequency of Reporting:	Annually (Cumulative)
Reporting Partner(s):	MOH, MOFAD, MOFA

TARGETS AND BASELINE:

Year	Baseline	Target	Actual	Notes
Yr1				Where data is not available, the data collected in Yr 1 will be considered as baseline data. Targets will subsequently be set as informed by the baseline data.
Yr2				
Yr3				
Yr4				
Yr5				

OPTIONAL REMARKS:

Limitations/ Considerations:	In the case of the child being the patient, the reference of supervision is directed to the intermediary not the child.

THIS SHEET LAST UPDATED ON: 16/08/2017

SO: 1	Improve awareness and understanding of antimicrobial resistance through effective communication, education and training
Outcome Statement:	Awareness and knowledge of AMR improved.
Indicator:	1D: Proportion of primary health care/vet personnel who adhere to guidelines on antibiotic treatment.

DESCRIPTION:

Expected/desired change:	It is expected that the number of primary health care/vet personnel who adhere to guidelines on antibiotic treatment will **increase** over time.
Definition of key terms (as applicable):	**Health care personnel**: any health practitioner who has acquired statutory license or who is working under the authority of a licensed officer. **Veterinarian personnel:** Vets - any health practitioner who has acquired license from the Ghana Veterinary Council or who is working under the authority of a licensed veterinary officer. **Adherence to guidelines on antibiotic treatment:** the extent to which the health practitioners comply with official guidelines established by government regulators on antibiotic treatment

MEASUREMENT:

Unit of Measure:	Percentage (%)
Calculation:	**a. Numerator:** primary health care/vet personnel who adhere to guidelines on antibiotic treatment. **b. Denominator:** primary health care/vet personnel sampled.

Disaggregated by:	1. Sex 2. Region 3. District
PLAN FOR DATA COLLECTION AND REPORTING:	
Frontline Data Source:	Survey respondents
Means of data collection:	Survey
Means of Verification:	Survey report
Frequency of Reporting:	Annually (Cumulative)
Reporting Partner(s):	MOH, MOFA, MOFAD

TARGETS AND BASELINE:

Year	Baseline	Target	Actual	Notes
Yr1				Where data is not available, the data collected in Yr 1 will be considered as baseline data. Targets will subsequently be set as informed by the baseline data.
Yr2				
Yr3				
Yr4				
Yr5				

OPTIONAL REMARKS:	
Limitations/ Considerations:	The assumption is that guidelines on AM treatment exist. Perhaps to avoid respondent bias, the data collection tools should contain a guideline checklist that helps in simulation of a prescription exercise for verification.
THIS SHEET LAST UPDATED ON: 16/08/2017	
SO: 1	Improve awareness and understanding of antimicrobial resistance through effective communication, education and training
Outcome Statement:	Awareness and knowledge of AMR improved.
Output:	Communication, education and training of AMR enhanced.
Indicator:	1.1 a: Proportion of animal and human health training institutions that include antimicrobial resistance modules in their curricula.
DESCRIPTION:	
Expected/desired change:	It is expected that the number of animal and human health training institutions that include antimicrobial resistance modules in their curricula will **increase** over time.
Definition of key terms (as applicable):	**Animal health training institutions:** accredited learning schools that provide training in animal health and production **Human health training institutions:** accredited learning schools that provide training in human health
MEASUREMENT:	
Unit of Measure:	Percentage (%)

Calculation:	**a. Numerator:** accredited learning schools that provide training in animal/ human and production that have modified their curricula to include AMR modules. **b. Denominator:** all animal and human health training institutions
Disaggregated by:	1. Institution type 2. Region
PLAN FOR DATA COLLECTION AND REPORTING:	
Frontline Data Source:	Institution
Means of data collection:	
Means of Verification:	Modified curricula
Frequency of Reporting:	Annually (cumulative)
Reporting Partner(s):	MOH, MOFA, MOFAD

TARGETS AND BASELINE:

Year	Baseline	Target	Actual	Notes
Yr1				Where data is not available, the data collected in Yr 1 will be considered as baseline data. Targets will subsequently be set as informed by the baseline data.
Yr2				
Yr3				
Yr4				
Yr5				

OPTIONAL REMARKS:	
Limitations/ Considerations:	The review of curricula is not an annual event. Therefore not having data during the specific reporting period, should not be interpreted that the institution did not review their curricula.
THIS SHEET LAST UPDATED ON: 16/08/2017	
SO: 1	Improve awareness and understanding of antimicrobial resistance through effective communication, education and training
Outcome Statement:	Awareness and knowledge of AMR improved.
Output:	Communication, education and training of AMR enhanced.
Indicator:	1.1 b: Percentage of persons knowledgeable on the factors that lead to the emergence and spread of AMR.
DESCRIPTION:	
Expected/desired change:	It is expected that the number of persons knowledgeable on the factors that lead to the emergence and spread of AMR will **increase** over time.

Definition of key terms (as applicable):	**Persons:** General public **Factors that lead to emergence and spread of AMR:** a) Readily available AMs that can be purchased as a commodity without prescriptions and from non-authorized dispensers. b) Self-medication by patients, farmers and intermediaries c) Non-compliance with recommended mode of treatment (dosage prescribed)
MEASUREMENT:	
Unit of Measure:	Percentage (%)
Calculation:	**a. Numerator:** General public sampled that can correctly cite at least two factors that lead to the emergence and spread of AMR **b. Denominator:** General public sampled
Disaggregated by:	1. Sex 2. District 3. Level of education 4. Income status 5. Age classification
PLAN FOR DATA COLLECTION AND REPORTING:	
Frontline Data Source:	Survey respondents
Means of data collection:	Survey
Means of Verification:	Survey report
Frequency of Reporting:	Annually (Cumulative)
Reporting Partner(s):	MOH, MOFA, MOFAD

TARGETS AND BASELINE:

Year	Baseline	Target	Actual	Notes
Yr1				Where data is not available, the data collected in Yr 1 will be considered as baseline data. Targets will subsequently be set as informed by the baseline data.
Yr2				
Yr3				
Yr4				
Yr5				

OPTIONAL REMARKS:	
Limitations/ Considerations:	Explore to see the viability of collecting this information at least twice a year
THIS SHEET LAST UPDATED ON: 16/08/2017	

SO: 1	Improve awareness and understanding of antimicrobial resistance through effective communication, education and training
Outcome Statement:	Awareness and knowledge of AMR improved.
Output:	Communication, education and training of AMR enhanced.
Indicator:	1.1 c: #, list of public education campaigns that promote appropriate use of antibiotics.
DESCRIPTION:	
Expected/desired change:	It is expected that the public education campaigns coverage will **expand** over time to reach a higher number of people.
Definition of key terms (as applicable):	**Public education campaigns:** Information, Education and Communication (IEC) materials developed and disseminated using various communication mediums (print, electronic, theatre, etc) **Appropriate use of AM:** a) Only procuring prescribed AMs from authorized dispensers. b) Only administering medication prescribed by authorized health practitioners. c) Only complying with recommended mode of treatment (dosage prescribed or alternative treatment recommended)
MEASUREMENT:	
Unit of Measure:	Sum
Calculation:	**a. Sum:** all the public education campaigns developed that promote the appropriate use of antibiotics. **b. List:** Index of all public education campaigns developed that promote the appropriate use of antibiotics.
Disaggregated by:	1. Communication medium 2. Type of IEC campaign
PLAN FOR DATA COLLECTION AND REPORTING:	
Frontline Data Source:	Communication Units of Reporting Partners
Means of data collection:	Desk review
Means of Verification:	IEC materials
Frequency of Reporting:	Biannual
Reporting Partner(s):	MOH, MOFA, MOFAD

TARGETS AND BASELINE:

Year	Baseline	Target	Actual	Notes
Yr1				Where data is not available, the data collected in Yr 1 will be considered as baseline data. Targets will subsequently be set as informed by the baseline data.
Yr2				
Yr3				
Yr4				
Yr5				

OPTIONAL REMARKS:	
Limitations/ Considerations:	
THIS SHEET LAST UPDATED ON: 16/08/2017	

SO: 1	Improve awareness and understanding of antimicrobial resistance through effective communication, education and training
Outcome Statement:	Awareness and knowledge of AMR improved.
Output:	Communication, education and training of AMR enhanced.
Indicator:	1.1 d: Proportion of prescriptions informed by culture and sensitivity tests for causative bacteria.
DESCRIPTION:	
Expected/desired change:	It is expected that the number of prescriptions informed by culture and sensitivity tests for causative bacteria will **increase** over time.
Definition of key terms (as applicable):	**Prescription**: a written instruction by a medical/vet practitioner that authorizes a patient/farmer to be issued with a medicine **Culture and sensitivity tests:** laboratory tests done to determine what kind of medicine such as antibiotics, will be effective for the treatment of an infection (type of bacteria).
MEASUREMENT:	
Unit of Measure:	Percentage (%)
Calculation:	**a. Numerator:** Total number of prescriptions issued that contain antibiotics where a culture and sensitivity test was done prior to issuance. **b. Denominator:** Total number of prescriptions issued that contain antibiotics
Disaggregated by:	1. Professional type 2. Sex 3. District
PLAN FOR DATA COLLECTION AND REPORTING:	
Frontline Data Source:	Hospital records; Pharmacy records
Means of data collection:	Desk review
Means of Verification:	Lab reports;
Frequency of Reporting:	Biannual
Reporting Partner(s):	MOH, MOFA, MOFAD
TARGETS AND BASELINE:	

Year	Baseline	Target	Actual	Notes
Yr1				Where data is not available, the data collected in Yr 1 will be considered as baseline data. Targets will subsequently be set as informed by the baseline data.
Yr2				
Yr3				
Yr4				
Yr5				

OPTIONAL REMARKS:	
Limitations/ Considerations:	
THIS SHEET LAST UPDATED ON: 16/08/2017	
SO: 2	**SO 2:** Strengthen Knowledge and Evidence base through surveillance and research
Outcome Statement:	Evidence based knowledge to reduce the burden of AMR increased.
Indicator:	**2A:** Proportion of frontline personnel (health and vets) using AMR and AMC surveillance and research data for decision making.
DESCRIPTION:	
Expected/desired change:	It is expected that the number of frontline personnel (health and vets) using AMR and AMC surveillance and research data for decision making will **increase** over time.
Definition of key terms (as applicable):	**Frontline medical/vet personnel**: Vets - any health practitioner who has acquired license from the Veterinary Council of Ghana or who is working under the authority of a licensed veterinary officer. **AMR/AMC Surveillance data**: AMC – is the consumption of the AMs; AMR is the resistance to AMs; The surveillance data is the systematic collection, collation, analysis and dissemination of AMC and AMR data for action.
MEASUREMENT:	
Unit of Measure:	Percentage (%)
Calculation:	**a. Numerator:** All authorized medical/veterinary practitioners sampled that use AMR and AMC surveillance and research data for decision making. **b. Denominator:** All authorized medical/veterinary practitioners sampled.
Disaggregated by:	1. Professional group (vet or medical officer) 2. Region 3. Sex
PLAN FOR DATA COLLECTION AND REPORTING:	
Frontline Data Source:	Hospital records; Surveillance units
Means of data collection:	Desk top review
Means of Verification	Treatment records; Surveillance plans; policies/strategies

Frequency of Reporting:	Annually (Cumulative)
Reporting Partner(s):	MOH; MOFA; MOFAD, MESTI
TARGETS AND BASELINE:	

Year	Baseline	Target	Actual	Notes
Yr1				Where data is not available, the data collected in Yr 1 will be considered as baseline data. Targets will subsequently be set as informed by the baseline data.
Yr2				
Yr3				
Yr 4				
Yr 5				

OPTIONAL REMARKS:	
Limitations/ Considerations:	For this indicator, we will be working with research institutions and academia.
THIS SHEET LAST UPDATED ON: 16/08/2017	
SO: 2	**SO 2:** Strengthen Knowledge and Evidence base through surveillance and research
Outcome Statement:	Evidence based knowledge to reduce the burden of AMR increased.
Indicator:	**2B:** #, list of evidence based policies/strategies under implementation
DESCRIPTION:	
Expected/desired change:	It is expected that the number of evidence based policies/strategies under implementation will **increase** over time.
Definition of key terms (as applicable):	**Evidence based**: any decision that is driven by empirical data. **Policy** – a framework for action **Strategy**: is the instrument used to roll out the policy.
MEASUREMENT:	
Unit of Measure:	Percentage (%)
Calculation:	**a. Sum:** Total number of all policies/strategies informed by evidence that are under implementation. **b. List:** An index of all policies/strategies informed by evidence that are under implementation.
Disaggregated by:	1. Sector
PLAN FOR DATA COLLECTION AND REPORTING:	
Frontline Data Source:	Implementing sectors
Means of data collection:	Desk top review
Means of Verification	Sector reports
Frequency of Reporting:	Annually (Cumulative)
Reporting Partner(s):	MOH; MOFA; MOFAD, MESTI
TARGETS AND BASELINE:	

Year	Baseline	Target	Actual	Notes
Yr1				Where data is not available, the data collected in Yr 1 will be considered as baseline data. Targets will subsequently be set as informed by the baseline data.
Yr2				
Yr3				
Yr 4				
Yr 5				

OPTIONAL REMARKS:	
Limitations/ Considerations:	
THIS SHEET LAST UPDATED ON: 16/08/2017	

SO: 2	**SO 2:** Strengthen Knowledge and Evidence base through surveillance and research
Outcome Statement:	Evidence based knowledge to reduce the burden of AMR increased.
Output Statement:	AMR surveillance enhanced
Indicator:	**2.2a:** Proportion of functional sentinel sites to support AMR surveillance
DESCRIPTION:	
Expected/desired change:	It is expected that the number of functional sentinel sites to support AMR surveillance will **increase** over time.
Definition of key terms (as applicable):	**Functional sentinel site**: is a data collection point equipped with appropriate resources (HR, equipment) **AMR surveillance** – surveillance data is the systematic collection, collation, analysis and dissemination of AMC and AMR data for action.
MEASUREMENT:	
Unit of Measure:	Percentage (%)
Calculation:	**a. Numerator:** Total number of functional sentinel sites able to support AMR surveillance. **b. Denominator:** Total number of functional sentinel sites.
Disaggregated by:	1. Sector 2. Region
PLAN FOR DATA COLLECTION AND REPORTING:	
Frontline Data Source:	Laboratories
Means of data collection:	Desk top review
Means of Verification	Sector reports
Frequency of Reporting:	Biannual
Reporting Partner(s):	MOH; MOFA; MOFAD, MESTI
TARGETS AND BASELINE:	

Year	Baseline	Target	Actual	Notes
Yr1				Where data is not available, the data collected in Yr 1 will be considered as baseline data. Targets will subsequently be set as informed by the baseline data.
Yr2				
Yr3				
Yr 4				
Yr 5				

OPTIONAL REMARKS:	
Limitations/ Considerations:	
THIS SHEET LAST UPDATED ON: 16/08/2017	

SO: 2	**SO 2:** Strengthen Knowledge and Evidence base through surveillance and research
Outcome Statement:	Evidence based knowledge to reduce the burden of AMR increased.
Output Statement:	AMR surveillance enhanced
Indicator:	**2.2b:** Proportion of AMR confirmed cases reported through the surveillance system.
DESCRIPTION:	
Expected/desired change:	It is expected that the number of AMR confirmed cases reported through the surveillance system will **increase** over time.
Definition of key terms (as applicable):	**AMR confirmed case**: is a diagnosis that has been established through an antimicrobial sensitivity test.
MEASUREMENT:	
Unit of Measure:	Percentage (%)
Calculation:	**a. Numerator:** Total number of confirmed AMR cases reported through the surveillance system. **b. Denominator:** Total number of confirmed AMR cases.
Disaggregated by:	1. Sector 2. Region
PLAN FOR DATA COLLECTION AND REPORTING:	
Frontline Data Source:	Surveillance units
Means of data collection:	Desk top review
Means of Verification	Sector reports
Frequency of Reporting:	Quarterly
Reporting Partner(s):	MOH; MOFA; MOFAD, MESTI
TARGETS AND BASELINE:	

Year	Baseline	Target	Actual	Notes
Yr1				Where data is not available, the data collected in Yr 1 will be considered as baseline data. Targets will subsequently be set as informed by the baseline data.
Yr2				
Yr3				
Yr 4				
Yr 5				

OPTIONAL REMARKS:	
Limitations/ Considerations:	
THIS SHEET LAST UPDATED ON: 16/08/2017	

SO: 2	**SO 2:** Strengthen Knowledge and Evidence base through surveillance and research
Outcome Statement:	Evidence based knowledge to reduce the burden of AMR increased.
Output Statement:	AMR surveillance enhanced
Indicator:	**2.2c:** Average number of days from sample collection to diagnostic results to date of report.
DESCRIPTION:	
Expected/desired change:	It is expected that the number of days from sample collection to date of report will **reduce** over time.
Definition of key terms (as applicable):	**N/A**
MEASUREMENT:	
Unit of Measure:	**Count**
Calculation:	**a. Count:** The average number of days from sample collection to date of report.
Disaggregated by:	1. Sector 2. Region
PLAN FOR DATA COLLECTION AND REPORTING:	
Frontline Data Source:	Surveillance units and Laboratories
Means of data collection:	Desk top review
Means of Verification	Sector reports
Frequency of Reporting:	Quarterly
Reporting Partner(s):	MOH; MOFA; MOFAD, MESTI
TARGETS AND BASELINE:	

Year	Baseline	Target	Actual	Notes
Yr1				Where data is not available, the data collected in Yr 1 will be considered as baseline data. Targets will subsequently be set as informed by the baseline data.
Yr2				
Yr3				
Yr 4				
Yr 5				
OPTIONAL REMARKS:				
Limitations/ Considerations:				
THIS SHEET LAST UPDATED ON: 16/08/2017				

SO: 3	**SO 3:** Reduce the incidence of infection through effective sanitation, hygiene and infection prevention measures and good agricultural and biosecurity practices
Outcome Statement:	Occurrence of infections in establishments reduced
Indicator:	**3A** Incidence of establishment acquired infections
DESCRIPTION:	
Expected/desired change:	It is expected that the frequency of infection occurrences in establishments will **reduce** over time.
Definition of key terms (as applicable):	**Infections:** The invasion and multiplication of microorganisms such as bacteria, viruses, and parasites that are not normally present within the body.
MEASUREMENT:	
Unit of Measure:	**Percentage**
Calculation:	**a. Numerator:** The total number of patients admitted in the health facility who acquired infections in the course of their admission. **b. Denominator**: The total number of patients admitted in the health facility.
Disaggregated by:	1. Sex 2. Facility type 3. Region
PLAN FOR DATA COLLECTION AND REPORTING:	
Frontline Data Source:	Health facility
Means of data collection:	Desk top review
Means of Verification	Sentinel Health records
Frequency of Reporting:	Quarterly
Reporting Partner(s):	MOH; MOFA; MOFAD
TARGETS AND BASELINE:	

Year	Baseline	Target	Actual	Notes
Yr1				Where data is not available, the data collected in Yr 1 will be considered as baseline data. Targets will subsequently be set as informed by the baseline data.
Yr2				
Yr3				
Yr 4				
Yr 5				

OPTIONAL REMARKS:	
Limitations/ Considerations:	This will only capture data from in-patients in health facilities.
THIS SHEET LAST UPDATED ON: 16/08/2017	

SO: 3	**SO 3:** Reduce the incidence of infection through effective sanitation, hygiene and infection prevention measures and good agricultural and biosecurity practices
Outcome Statement:	Occurrence of infections in establishments reduced
Indicator:	**3B** Prevalence of drug resistant infections
DESCRIPTION:	
Expected/desired change:	It is expected that the prevalence of drug resistant infections will **reduce** over time.
Definition of key terms (as applicable):	**Drug resistant infections:** Infections that do not respond to known antibiotics as treatment.
MEASUREMENT:	
Unit of Measure:	**Percentage**
Calculation:	**a. Numerator:** The total number of infections treated that do not respond to medication. **b. Denominator**: The total number of infections treated.
Disaggregated by:	1. Sex 2. Facility type 3. Region
PLAN FOR DATA COLLECTION AND REPORTING:	
Frontline Data Source:	Health facility; treatment centers
Means of data collection:	Desk top review
Means of Verification	Sentinel Health records; farm records
Frequency of Reporting:	Quarterly
Reporting Partner(s):	MOH; MOFA; MOFAD
TARGETS AND BASELINE:	

Year	Baseline	Target	Actual	Notes
Yr1				Where data is not available, the data collected in Yr 1 will be considered as baseline data. Targets will subsequently be set as informed by the baseline data.
Yr2				
Yr3				
Yr 4				
Yr 5				

OPTIONAL REMARKS:	
Limitations/ Considerations:	
THIS SHEET LAST UPDATED ON: 16/08/2017	

SO: 3	**SO 3:** Reduce the incidence of infection through effective sanitation, hygiene and infection prevention measures and good agricultural and biosecurity practices
Outcome Statement:	Occurrence of infections in establishments reduced
Indicator:	**3C** Proportion of health care facilities with established Infection Prevention and Control (IPC) programs
DESCRIPTION:	
Expected/desired change:	It is expected that the number of health care facilities with established IPC programs will **increase** over time.
Definition of key terms (as applicable):	**IPC program:** Systems within hospitals that ensure hygiene, availability of clean water and sanitation facilities.
MEASUREMENT:	
Unit of Measure:	**Percentage**
Calculation:	**a. Numerator:** The total number of hospitals with established IPC programs. **b. Denominator**: The total number of all hospitals.
Disaggregated by:	1. Facility type 2. Region
PLAN FOR DATA COLLECTION AND REPORTING:	
Frontline Data Source:	Health/Veterinary facility
Means of data collection:	Survey
Means of Verification	Health/Veterinary facility records
Frequency of Reporting:	Quarterly
Reporting Partner(s):	MOH; MOFA; MOFAD
TARGETS AND BASELINE:	

Year	Baseline	Target	Actual	Notes
Yr1				Where data is not available, the data collected in Yr 1 will be considered as baseline data. Targets will subsequently be set as informed by the baseline data.
Yr2				
Yr3				
Yr 4				
Yr 5				

OPTIONAL REMARKS:	
Limitations/ Considerations:	This data will be collected in both public and private hospitals and veterinary facilities.
THIS SHEET LAST UPDATED ON: 16/08/2017	

SO: 3	**SO 3:** Reduce the incidence of infection through effective sanitation, hygiene and infection prevention measures and good agricultural and biosecurity practices
Outcome Statement:	Occurrence of infections in establishments reduced
Indicator:	**3D** Proportion of farms with infectious disease outbreaks
DESCRIPTION:	
Expected/desired change:	It is expected that the number of infectious outbreaks on farms will **reduce** over time.
Definition of key terms (as applicable):	**Disease outbreak:** the occurrence of cases of diseases on farms in excess of what would be normally expected.
MEASUREMENT:	
Unit of Measure:	**Percentage**
Calculation:	**a. Numerator:** The total number of sampled farms with infectious disease outbreaks. **b. Denominator**: The total number of sampled farms.
Disaggregated by:	1. Sector 2. Region 3. Disease type
PLAN FOR DATA COLLECTION AND REPORTING:	
Frontline Data Source:	Farm level
Means of data collection:	Survey
Means of Verification	Surveillance reports
Frequency of Reporting:	Quarterly
Reporting Partner(s):	MOH; MOFA; MOFAD; MESTI
TARGETS AND BASELINE:	

Year	Baseline	Target	Actual	Notes
Yr1				Where data is not available, the data collected in Yr 1 will be considered as baseline data. Targets will subsequently be set as informed by the baseline data.
Yr2				
Yr3				
Yr 4				
Yr 5				

OPTIONAL REMARKS:	
Limitations/ Considerations:	

THIS SHEET LAST UPDATED ON: 16/08/2017

SO: 3	**SO 3:** Reduce the incidence of infection through effective sanitation, hygiene and infection prevention measures and good agricultural and biosecurity practices
Outcome Statement:	Occurrence of infections in establishments reduced
Indicator:	**3E** Proportion of MMDA implementing the biomedical waste guidelines
DESCRIPTION:	
Expected/desired change:	It is expected that the number of MMDA implementing the biomedical waste guidelines will **increase** over time.
Definition of key terms (as applicable):	**Biomedical waste:** any waste which is generated during diagnosis, treatment and immunization of humans and animals.
MEASUREMENT:	
Unit of Measure:	**Percentage**
Calculation:	**a. Numerator:** The total number of MMDAs implementing the biomedical waste guidelines. **b. Denominator**: The total number of MMDAs.
Disaggregated by:	1. District 2. Sector
PLAN FOR DATA COLLECTION AND REPORTING:	
Frontline Data Source:	MMDA & facility (health & veterinary)
Means of data collection:	Survey
Means of Verification	Survey report
Frequency of Reporting:	Annual (cumulative)
Reporting Partner(s):	MOH; MOFA; MOFAD; MESTI
TARGETS AND BASELINE:	

Year	Baseline	Target	Actual	Notes
Yr1				Where data is not available, the data collected in Yr 1 will be considered as baseline data. Targets will subsequently be set as informed by the baseline data.
Yr2				
Yr3				
Yr 4				
Yr 5				

OPTIONAL REMARKS:	
Limitations/ Considerations:	Need to develop a checklist to determine the extent to which the guidelines are being implemented (score chart)
THIS SHEET LAST UPDATED ON: 16/08/2017	

SO: 3	**SO 3:** Reduce the incidence of infection through effective sanitation, hygiene and infection prevention measures and good agricultural and biosecurity practices
Outcome Statement:	Occurrence of infections in establishments reduced
Indicator:	**3F** Proportion of frontline health personnel vaccinated against relevant infections (rabies, hepatitis B)
DESCRIPTION:	
Expected/desired change:	It is expected that the number of frontline health personnel vaccinated against relevant infections will **increase** over time.
Definition of key terms (as applicable):	**Vaccination:** administration of a biological preparation that improves immunity against a particular disease.
MEASUREMENT:	
Unit of Measure:	**Percentage**
Calculation:	**a. Numerator:** The total number of frontline health personnel vaccinated against relevant infections (rabies, hepatitis B) **b. Denominator**: The total number of frontline health personnel.
Disaggregated by:	1. Sex 2. District 3. Sector
PLAN FOR DATA COLLECTION AND REPORTING:	
Frontline Data Source:	Facility (health & veterinary)
Means of data collection:	Desk review
Means of Verification	Vaccination records
Frequency of Reporting:	Annual (cumulative)
Reporting Partner(s):	MOH; MOFA; MOFAD; MESTI
TARGETS AND BASELINE:	

Year	Baseline	Target	Actual	Notes
Yr1				Where data is not available, the data collected in Yr 1 will be considered as baseline data. Targets will subsequently be set as informed by the baseline data.
Yr2				
Yr3				
Yr 4				
Yr 5				

OPTIONAL REMARKS:	
Limitations/ Considerations:	Rabies (vets) and hepatitis B (medical personnel) will be used as proxy indicators
THIS SHEET LAST UPDATED ON: 16/08/2017	

SO: 3	**SO 3:** Reduce the incidence of infection through effective sanitation, hygiene & infection prevention measures & good agricultural and biosecurity practices
Outcome Statement:	Occurrence of infections in establishments reduced
Output Statement:	Sanitation, hygiene and IPC measures improved
Indicator:	**3.3a** Proportion of farms implementing biosecurity and biosafety measures
DESCRIPTION:	
Expected/desired change:	It is expected that the number of farms implementing biosecurity and biosafety measures will **increase** over time.
Definition of key terms (as applicable):	**Biosafety:** the process of application of safety precaution measures in a laboratory setting to prevent infections. **Biosecurity:** measures taken to stop the spread or introduction of harmful organisms to human, animal and plant life.
MEASUREMENT:	
Unit of Measure:	**Percentage**
Calculation:	**a. Numerator:** Total number of farms sampled that implement biosafety and biosecurity measures. **b. Denominator**: Total number of farms sampled
Disaggregated by:	1. District 2. Farm type 3. Biosafety levels 4. Biosecurity levels
PLAN FOR DATA COLLECTION AND REPORTING:	
Frontline Data Source:	Facility (farm & laboratory)
Means of data collection:	Survey
Means of Verification	Survey reports
Frequency of Reporting:	Annual (cumulative)
Reporting Partner(s):	MOFA; MOFAD; MESTI

TARGETS AND BASELINE:				
Year	**Baseline**	**Target**	**Actual**	**Notes**
Yr1				Where data is not available, the data collected in Yr 1 will be considered as baseline data. Targets will subsequently be set as informed by the baseline data.
Yr2				
Yr3				
Yr 4				
Yr 5				
OPTIONAL REMARKS:				
Limitations/ Considerations:	Use the FAO biosafety and biosecurity farm classification. Need to develop a checklist to determine the extent to which biosafety and biosecurity measures are being implemented. (Score card)			
THIS SHEET LAST UPDATED ON: 16/08/2017				

SO: 3	**SO 3:** Reduce the incidence of infection through effective sanitation, hygiene and infection prevention measures and good agricultural and biosecurity practices
Outcome Statement:	Occurrence of infections in establishments reduced
Output Statement:	Sanitation, hygiene and IPC measures improved
Indicator:	**3.3b** Proportion of health care facilities adhering to IPC standards
DESCRIPTION:	
Expected/desired change:	It is expected that the number of health care facilities adhering to IPC standards will **increase** over time.
Definition of key terms (as applicable):	**IPC:** Systems within hospitals that ensure hygiene, availability of clean water and sanitation facilities
MEASUREMENT:	
Unit of Measure:	**Percentage**
Calculation:	**a. Numerator:** Total number of health care facilities adhering to IPC standards **b. Denominator**: Total number of health care facilities with IPC programs
Disaggregated by:	1. Facility type 2. District 3. Sector
PLAN FOR DATA COLLECTION AND REPORTING:	
Frontline Data Source:	Facility (health & veterinary)
Means of data collection:	Survey
Means of Verification	Survey reports
Frequency of Reporting:	Annual (cumulative)
Reporting Partner(s):	MOH; MOFA; MOFAD; MESTI
TARGETS AND BASELINE:	

Year	Baseline	Target	Actual	Notes
Yr1				Where data is not available, the data collected in Yr 1 will be considered as baseline data. Targets will subsequently be set as informed by the baseline data.
Yr2				
Yr3				
Yr 4				
Yr 5				

OPTIONAL REMARKS:	
Limitations/ Considerations:	Need to develop an IPC adherence checklist
THIS SHEET LAST UPDATED ON: 16/08/2017	

SO: 3	**SO 3:** Reduce the incidence of infection through effective sanitation, hygiene and infection prevention measures and good agricultural and biosecurity practices
Outcome Statement:	Occurrence of infections in establishments reduced
Output Statement:	Sanitation, hygiene and IPC measures improved
Indicator:	**3.3c** Proportion of health care facilities reporting on health facility acquired infections (HAIs)
DESCRIPTION:	
Expected/desired change:	It is expected that the number of health care facilities reporting on HAIs will **increase** over time.
Definition of key terms (as applicable):	**HAIs:** Health Facility Acquired Infections
MEASUREMENT:	
Unit of Measure:	**Percentage**
Calculation:	**a. Numerator:** All health facilities reporting on HAIs **b. Denominator**: All health facilities
Disaggregated by:	1. Facility type 2. Region 3. Sector
PLAN FOR DATA COLLECTION AND REPORTING:	
Frontline Data Source:	Facility (health & veterinary)
Means of data collection:	Desk review
Means of Verification	Facility records
Frequency of Reporting:	Quarterly
Reporting Partner(s):	MOH; MOFA; MOFAD; MESTI
TARGETS AND BASELINE:	

Year	Baseline	Target	Actual	Notes
Yr1				Where data is not available, the data collected in Yr 1 will be considered as baseline data. Targets will subsequently be set as informed by the baseline data.
Yr2				
Yr3				
Yr 4				
Yr 5				

OPTIONAL REMARKS:	
Limitations/ Considerations:	Need to develop additional data capture tool
THIS SHEET LAST UPDATED ON: 16/08/2017	

SO: 3	**SO 3:** Reduce the incidence of infection through effective sanitation, hygiene and infection prevention measures and good agricultural and biosecurity practices
Outcome Statement:	Occurrence of infections in establishments reduced
Output Statement:	Sanitation, hygiene and IPC measures improved
Indicator:	**3.3d** Proportion of farms classified as pathogen and disease free status of animal husbandry
DESCRIPTION:	
Expected/desired change:	It is expected that the number of farms classified as pathogen and disease free status of animal husbandry will **increase** over time.
Definition of key terms (as applicable):	**Pathogen:** Disease causing agent **Disease free status:** Zero incidence of specific disease/infection in a defined geographical area._
MEASUREMENT:	
Unit of Measure:	**Percentage**
Calculation:	**a. Numerator:** Total number of sampled farms classified as pathogen/disease free **b. Denominator**: Total number of sampled farms
Disaggregated by:	1. Farm type 2. District 3. Sector
PLAN FOR DATA COLLECTION AND REPORTING:	
Frontline Data Source:	District vet office
Means of data collection:	Passive Surveillance
Means of Verification	Surveillance reports
Frequency of Reporting:	Quarterly
Reporting Partner(s):	MOFA; MOFAD; MESTI

TARGETS AND BASELINE:				
Year	**Baseline**	**Target**	**Actual**	**Notes**
Yr1				Where data is not available, the data collected in Yr 1 will be considered as baseline data. Targets will subsequently be set as informed by the baseline data.
Yr2				
Yr3				
Yr4				
Yr5				

OPTIONAL REMARKS:	
Limitations/ Considerations:	
THIS SHEET LAST UPDATED ON: 16/08/2017	

SO: 3	**SO 3:** Reduce the incidence of infection through effective sanitation, hygiene and infection prevention measures and good agricultural and biosecurity practices
Outcome Statement:	Occurrence of infections in establishments reduced
Output Statement:	Sanitation, hygiene and IPC measures improved
Indicator:	**3.3e** Proportion of authorized slaughter facilities implementing food safety practices
DESCRIPTION:	
Expected/desired change:	It is expected that the number authorized slaughter facilities implementing food safety practices will **increase** over time.
Definition of key terms (as applicable):	**Food safety practices:** It is the appropriate handling, preparation, storage and transport of meat/fish and meat/fish products
MEASUREMENT:	
Unit of Measure:	**Percentage**
Calculation:	**a. Numerator:** The total number of authorized slaughter facilities implementing food safety practices **b. Denominator**: The total number of authorized slaughter facilities.
Disaggregated by:	1. Slaughter facility type 2. District 3. Sector
PLAN FOR DATA COLLECTION AND REPORTING:	
Frontline Data Source:	Slaughter facility
Means of data collection:	Survey
Means of Verification	Survey report
Frequency of Reporting:	Quarterly
Reporting Partner(s):	MOFA; MOFAD; MESTI
TARGETS AND BASELINE:	

Year	Baseline	Target	Actual	Notes
Yr1				Where data is not available, the data collected in Yr 1 will be considered as baseline data. Targets will subsequently be set as informed by the baseline data.
Yr2				
Yr3				
Yr 4				
Yr 5				

OPTIONAL REMARKS:	
Limitations/ Considerations:	Need to develop a checklist on appropriate food safety practices Slaughter House Audit
THIS SHEET LAST UPDATED ON: 16/08/2017	

SO: 4	**SO 4:** Optimize the use of antimicrobial agents in humans, aquaculture, plant production and animal health in the "ONE HEALTH" approach
Outcome Statement:	Use of antimicrobials in animal and human health optimized.
Indicator:	**4A** Percentage of prescriptions that contain antibiotics
DESCRIPTION:	
Expected/desired change:	It is expected that the number prescriptions that contain antibiotics will **decrease** over time.
Definition of key terms (as applicable):	N/A
MEASUREMENT:	
Unit of Measure:	**Percentage**
Calculation:	**a. Numerator:** The total number of sampled prescriptions that contain antibiotics **b. Denominator**: The total number of prescriptions sampled.
Disaggregated by:	1. Sex 2. District 3. Sector
PLAN FOR DATA COLLECTION AND REPORTING:	
Frontline Data Source:	Facility (health & veterinary)
Means of data collection:	Desk review
Means of Verification	Vaccination records
Frequency of Reporting:	Quarterly
Reporting Partner(s):	MOH; MOFA; MOFAD; MESTI
TARGETS AND BASELINE:	

Year	Baseline	Target	Actual	Notes
Yr1				Where data is not available, the data collected in Yr 1 will be considered as baseline data. Targets will subsequently be set as informed by the baseline data.
Yr2				
Yr3				
Yr 4				
Yr 5				

OPTIONAL REMARKS:	
Limitations/ Considerations:	Threshold is 20%
THIS SHEET LAST UPDATED ON: 16/08/2017	

SO: 4	**SO 4:** Optimize the use of antimicrobial agents in humans, aquaculture, plant production and animal health in the "ONE HEALTH" approach
Outcome Statement:	Use of antimicrobials in animal and human health optimized.
Indicator:	**4B** Proportion of prescriptions compliant with clinical guidelines
DESCRIPTION:	
Expected/desired change:	It is expected that the number prescriptions compliant with clinical guidelines will **increase** over time.
Definition of key terms (as applicable):	**Prescription**: a written instruction by a medical/vet practitioner that authorizes a patient/farmer to be issued with a medicine_
MEASUREMENT:	
Unit of Measure:	**Percentage**
Calculation:	**a. Numerator:** The total number of sampled prescriptions compliant with clinical guidelines **b. Denominator**: The total number of prescriptions sampled.
Disaggregated by:	1. Facility type 2. District 3. Sector
PLAN FOR DATA COLLECTION AND REPORTING:	
Frontline Data Source:	Facility (health & veterinary)
Means of data collection:	Desk review
Means of Verification	Facility records
Frequency of Reporting:	Quarterly
Reporting Partner(s):	MOH; MOFA; MOFAD; MESTI
TARGETS AND BASELINE:	

Year	Baseline	Target	Actual	Notes
Yr1				Where data is not available, the data collected in Yr 1 will be considered as baseline data. Targets will subsequently be set as informed by the baseline data.
Yr2				
Yr3				
Yr4				
Yr5				

OPTIONAL REMARKS:	
Limitations/ Considerations:	

THIS SHEET LAST UPDATED ON: 16/08/2017

SO: 4	**SO 4:** Optimize the use of antimicrobial agents in humans, aquaculture, plant production and animal health in the "ONE HEALTH" approach
Outcome Statement:	Use of antimicrobials in animal and human health optimized.
Indicator:	**4C** Proportion (%) of prescriptions based on Antimicrobial Sensitivity Test (AST)
DESCRIPTION:	
Expected/desired change:	It is expected that the number prescriptions based on Antimicrobial Sensitivity Test (AST) will **increase** over time.
Definition of key terms (as applicable):	**Antimicrobial Sensitivity Test**: laboratory tests done to determine what kind of medicine such as antibiotics, will be effective for the treatment of an infection (type of bacteria).
MEASUREMENT:	
Unit of Measure:	**Percentage**
Calculation:	**a. Numerator:** The total number of sampled prescriptions that contain antibiotics informed by AST **b. Denominator**: The total number of sampled prescriptions that contains antibiotics.
Disaggregated by:	1. Facility type 2. District 3. Sector
PLAN FOR DATA COLLECTION AND REPORTING:	
Frontline Data Source:	Facility (health & veterinary)
Means of data collection:	Desk review
Means of Verification	Facility records
Frequency of Reporting:	Quarterly
Reporting Partner(s):	MOH; MOFA; MOFAD; MESTI
TARGETS AND BASELINE:	

Year	Baseline	Target	Actual	Notes
Yr1				Where data is not available, the data collected in Yr 1 will be considered as baseline data. Targets will subsequently be set as informed by the baseline data.
Yr2				
Yr3				
Yr4				
Yr5				

OPTIONAL REMARKS:	
Limitations/ Considerations:	
THIS SHEET LAST UPDATED ON: 16/08/2017	

SO: 4	**SO 4:** Optimize the use of antimicrobial agents in humans, aquaculture, plant production and animal health in the "ONE HEALTH" approach
Outcome Statement:	Use of antimicrobials in animal and human health optimized.
Indicator:	**4D** Overall antibiotic consumption level (DDD) per capita for key classes of antibiotics.
DESCRIPTION:	
Expected/desired change:	It is expected that the Daily Defined Dose (DDD) consumed per capita will **reduce** proportionately over time.
Definition of key terms (as applicable):	**DDD:** Daily Defined Dose is the assumed average maintenance dose per day for a drug used for its main indication in adults.
MEASUREMENT:	
Unit of Measure:	**Count**
Calculation:	**a. Numerator:** total DDDs consumed **b. Denominator**: total target population
Disaggregated by:	1. Facility type 2. District 3. Sector 4. Antibiotic type
PLAN FOR DATA COLLECTION AND REPORTING:	
Frontline Data Source:	Facility (health & veterinary)
Means of data collection:	Desk review
Means of Verification	Facility records
Frequency of Reporting:	Quarterly
Reporting Partner(s):	MOH; MOFA; MOFAD; MESTI
TARGETS AND BASELINE:	

Year	Baseline	Target	Actual	Notes
Yr1				Where data is not available, the data collected in Yr 1 will be considered as baseline data. Targets will subsequently be set as informed by the baseline data.
Yr2				
Yr3				
Yr4				
Yr5				

OPTIONAL REMARKS:	
Limitations/ Considerations:	
THIS SHEET LAST UPDATED ON: 16/08/2017	

SO: 4	**SO 4:** Optimize the use of antimicrobial agents in humans, aquaculture, plant production and animal health in the "ONE HEALTH" approach
Outcome Statement:	Use of antimicrobials in animal and human health optimized.
Output Statement:	Access to quality antimicrobial medicines expanded
Indicator:	**4.4a** Proportion of health care facilities with functional antimicrobial stewardship programs
DESCRIPTION:	
Expected/desired change:	It is expected that the number of health care facilities with antimicrobial stewardship programs will **increase** over time.
Definition of key terms (as applicable):	**Stewardship programs:** Coordinated programs that promote the appropriate use of Antimicrobials
MEASUREMENT:	
Unit of Measure:	**Percentage**
Calculation:	**a. Numerator:** The total number of sentinel sites with functional antimicrobial stewardship programs **b. Denominator**: The total number of sentinel sites.
Disaggregated by:	1. Facility type 2. District 3. Sector
PLAN FOR DATA COLLECTION AND REPORTING:	
Frontline Data Source:	Sentinel site
Means of data collection:	Desk review
Means of Verification	Stewardship program report
Frequency of Reporting:	Biannual
Reporting Partner(s):	MOH; MOFA; MOFAD; MESTI
TARGETS AND BASELINE:	

Year	Baseline	Target	Actual	Notes
Yr1				Where data is not available, the data collected in Yr 1 will be considered as baseline data. Targets will subsequently be set as informed by the baseline data.
Yr2				
Yr3				
Yr 4				
Yr 5				

OPTIONAL REMARKS:	
Limitations/ Considerations:	Need to develop a standard format for reporting Need to develop a checklist
THIS SHEET LAST UPDATED ON: 16/08/2017	

SO: 4	**SO 4:** Optimize the use of antimicrobial agents in humans, aquaculture, plant production and animal health in the "ONE HEALTH" approach
Outcome Statement:	Use of antimicrobials in animal and human health optimized.
Output Statement:	Access to quality antimicrobial medicines expanded
Indicator:	**4.4b** Percentage of farmers attended to by veterinary personnel over the last 12 months
DESCRIPTION:	
Expected/desired change:	It is expected that the number of farmers attended to by veterinary/fish health personnel will **increase** over time.
Definition of key terms (as applicable):	**Attended to:** Number of farm visits by a veterinary/fish health officer
MEASUREMENT:	
Unit of Measure:	**Percentage**
Calculation:	**a. Numerator:** The total number of sampled farms visited at least twice in a year **b. Denominator**: The total number of sampled farms
Disaggregated by:	1. Farm type 2. District 3. Sector
PLAN FOR DATA COLLECTION AND REPORTING:	
Frontline Data Source:	Vet Office / Fish Health Unit; Sampled Farms
Means of data collection:	Survey
Means of Verification	Survey report
Frequency of Reporting:	Annual
Reporting Partner(s):	MOFA; MOFAD; MESTI
TARGETS AND BASELINE:	

Year	Baseline	Target	Actual	Notes
Yr1				Where data is not available, the data collected in Yr 1 will be considered as baseline data. Targets will subsequently be set as informed by the baseline data.
Yr2				
Yr3				
Yr 4				
Yr 5				

OPTIONAL REMARKS:	
Limitations/ Considerations:	Threshold (minimum of 2 farm visits) Registration of farms (animals and fish) to be incorporated – mapping of farms
THIS SHEET LAST UPDATED ON: 16/08/2017	

SO: 4	**SO 4:** Optimize the use of antimicrobial agents in humans, aquaculture, plant production and animal health in the "ONE HEALTH" approach
Outcome Statement:	Use of antimicrobials in animal and human health optimized.
Output Statement:	Access to quality antimicrobial medicines expanded
Indicator:	**4.4c** Percentage of patients accessing health care services
DESCRIPTION:	
Expected/desired change:	It is expected that the number of patients accessing health care services will **increase** over time.
Definition of key terms (as applicable):	**Accessing:** _
MEASUREMENT:	
Unit of Measure:	**Percentage**
Calculation:	**a. Numerator:** The total number of authorized slaughter facilities implementing food safety practices **b. Denominator**: The total number of authorized slaughter facilities.
Disaggregated by:	1. Slaughter facility type 2. District 3. Sector
PLAN FOR DATA COLLECTION AND REPORTING:	
Frontline Data Source:	Slaughter facility
Means of data collection:	Survey
Means of Verification	Survey report
Frequency of Reporting:	Quarterly
Reporting Partner(s):	MOFA; MOFAD; MESTI
TARGETS AND BASELINE:	

Year	Baseline	Target	Actual	Notes
Yr1				Where data is not available, the data collected in Yr 1 will be considered as baseline data. Targets will subsequently be set as informed by the baseline data.
Yr2				
Yr3				
Yr 4				
Yr 5				

OPTIONAL REMARKS:	
Limitations/ Considerations:	Need to develop a checklist on appropriate food safety practices Slaughter House Audit
THIS SHEET LAST UPDATED ON: 16/08/2017	

SO: 5	**SO 5:** Develop the economic case and create an enabling environment for sustainable investment that takes into account Ghana's needs, and increase investment in new machines, diagnostic tools, vaccines and other interventions
Outcome Statement:	Enabling environment for sustainable investment of AMR reduction enhanced.
Indicator:	**5A** Burden of AMR
DESCRIPTION:	
Expected/desired change:	It is expected that the socio-economic effects of AMR is documented.
Definition of key terms (as applicable):	**N/A**
MEASUREMENT:	
Unit of Measure:	**Quantitative**
Calculation:	The additional cost of treating AMR conditions
Disaggregated by:	1. Sex 2. Region 3. Sector
PLAN FOR DATA COLLECTION AND REPORTING:	
Frontline Data Source:	Survey respondents; health (human/vet) facility
Means of data collection:	Survey
Means of Verification	Survey report
Frequency of Reporting:	Twice during LOP
Reporting Partner(s):	MOH; MOFA; MOFAD; MESTI
TARGETS AND BASELINE:	

Year	Baseline	Target	Actual	Notes
Yr1				Where data is not available, the data collected in Yr 1 will be considered as baseline data. Targets will subsequently be set as informed by the baseline data.
Yr2				
Yr3				
Yr4				
Yr5				

OPTIONAL REMARKS:	
Limitations/ Considerations:	Need to commission survey
THIS SHEET LAST UPDATED ON: 16/08/2017	

SO: 5	**SO 5:** Develop the economic case and create an enabling environment for sustainable investment that takes into account Ghana's needs, and increase investment in new machines, diagnostic tools, vaccines and other interventions
Outcome Statement:	Enabling environment for sustainable investment of AMR reduction enhanced.
Indicator:	**5B** Proportion of Total Government expenditure that is spent on research and development to address AMR
DESCRIPTION:	
Expected/desired change:	It is expected that Total Government expenditure that is spent on research and development to address AMR will **increase** proportionately over time
Definition of key terms (as applicable):	**N/A**
MEASUREMENT:	
Unit of Measure:	**Percentage**
Calculation:	**a. Numerator:** The total GoG budget expenditure on R&D in Health, Agric, Fisheries & Environment dedicated to AMR **b. Denominator:** The total GoG budget expenditure on R&D in Health, Agric, Fisheries & Environment
Disaggregated by:	1. Sector
PLAN FOR DATA COLLECTION AND REPORTING:	
Frontline Data Source:	Sector Budget
Means of data collection:	Desk review
Means of Verification	Sector budget performance report
Frequency of Reporting:	Annual
Reporting Partner(s):	MOH; MOFA; MOFAD; MESTI
TARGETS AND BASELINE:	

Year	Baseline	Target	Actual	Notes
Yr1				Where data is not available, the data collected in Yr 1 will be considered as baseline data. Targets will subsequently be set as informed by the baseline data.
Yr2				
Yr3				
Yr4				
Yr5				

OPTIONAL REMARKS:	
Limitations/ Considerations:	
THIS SHEET LAST UPDATED ON: 16/08/2017	

SO: 5	**SO 5:** Develop the economic case and create an enabling environment for sustainable investment that takes into account Ghana's needs, and increase investment in new machines, diagnostic tools, vaccines and other interventions
Outcome Statement:	Enabling environment for sustainable investment of AMR reduction enhanced.
Indicator:	**5C** Proportion of local manufacturers with WHO/ISO certification
DESCRIPTION:	
Expected/desired change:	It is expected that the total number of local manufacturers with World Health Organization (WHO) / International Standard Organization (ISO) certification will **increase** over time
Definition of key terms (as applicable):	**Local Manufacturers:** Domestic companies that produce pharmaceuticals and other biologicals
MEASUREMENT:	
Unit of Measure:	**Quantitative**
Calculation:	**a. Numerator:** The total number of local manufacturers with WHO/ISO certification **b. Denominator:** The total number of local manufacturers
Disaggregated by:	1. Sector
PLAN FOR DATA COLLECTION AND REPORTING:	
Frontline Data Source:	Manufacturers; Food and Drugs Authority; Ghana Standard Authority
Means of data collection:	Desk review
Means of Verification	WHO/ISO Certificates
Frequency of Reporting:	Annual
Reporting Partner(s):	MOH; MOFA; MOFAD; MESTI
TARGETS AND BASELINE:	

Year	Baseline	Target	Actual	Notes
Yr1				Where data is not available, the data collected in Yr 1 will be considered as baseline data. Targets will subsequently be set as informed by the baseline data.
Yr2	[redacted]			
Yr3				
Yr4				
Yr5				

OPTIONAL REMARKS:	
Limitations/ Considerations:	

THIS SHEET LAST UPDATED ON: 16/08/2017

SO: 5	**SO 5:** Develop the economic case and create an enabling environment for sustainable investment that takes into account Ghana's needs, and increase investment in new machines, diagnostic tools, vaccines and other interventions
Outcome Statement:	Enabling environment for sustainable investment of AMR reduction enhanced.
Indicator:	**5D** Number of potential candidate antimicrobial agent from domestic R&D
DESCRIPTION:	
Expected/desired change:	It is expected that the total number of potential candidate antimicrobial agent from domestic R&D will **increase** over time
Definition of key terms (as applicable):	**Potential candidate antimicrobial agent:** is any new medicine with proven antimicrobial activity of clinical and commercial value. _
MEASUREMENT:	
Unit of Measure:	**Count**
Calculation:	**Sum:** to enumerate all the potential antimicrobial agent candidates that have been developed by domestic R&D
Disaggregated by:	1. Sector
PLAN FOR DATA COLLECTION AND REPORTING:	
Frontline Data Source:	Manufacturers; Food and Drugs Authority; Ghana Standard Authority
Means of data collection:	Desk review
Means of Verification	
Frequency of Reporting:	Annual
Reporting Partner(s):	MOH; MOFA; MOFAD; MESTI

TARGETS AND BASELINE:

Year	Baseline	Target	Actual	Notes
Yr1				Where data is not available, the data collected in Yr 1 will be considered as baseline data. Targets will subsequently be set as informed by the baseline data.
Yr2	[redacted]			
Yr3				
Yr4				
Yr5				

OPTIONAL REMARKS:	
Limitations/ Considerations:	
THIS SHEET LAST UPDATED ON: 16/08/2017	

SO: 5	**SO 5:** Develop the economic case and create an enabling environment for sustainable investment that takes into account Ghana's needs, and increase investment in new machines, diagnostic tools, vaccines and other interventions
Outcome Statement:	Enabling environment for sustainable investment of AMR reduction enhanced.
Output Statement:	Mechanisms for local AM production strengthened.
Indicator:	**5.5a** Fund to support local manufacturers across sectors in place.
DESCRIPTION:	
Expected/desired change:	It is expected that the GoG will establish a Fund that support local medicine manufacturers.
Definition of key terms (as applicable):	**Local Manufacturers:** Domestic companies that produce pharmaceuticals and other biologicals
MEASUREMENT:	
Unit of Measure:	**Qualitative (Yes/No)**
Calculation:	**N/A**
Disaggregated by:	N/A
PLAN FOR DATA COLLECTION AND REPORTING:	
Frontline Data Source:	AMR Desk
Means of data collection:	Desk review
Means of Verification	AMR Desk report
Frequency of Reporting:	Annual
Reporting Partner(s):	MOH; MOFA; MOFAD; MESTI

TARGETS AND BASELINE:

Year	Baseline	Target	Actual	Notes
Yr1				Where data is not available, the data collected in Yr 1 will be considered as baseline data. Targets will subsequently be set as informed by the baseline data.
Yr2				
Yr3				
Yr 4				
Yr 5				

OPTIONAL REMARKS:	
Limitations/ Considerations:	
THIS SHEET LAST UPDATED ON: 16/08/2017	

SO: 5	**SO 5:** Develop the economic case and create an enabling environment for sustainable investment that takes into account Ghana's needs, and increase investment in new machines, diagnostic tools, vaccines and other interventions
Outcome Statement:	Enabling environment for sustainable investment of AMR reduction enhanced.
Output Statement:	Mechanisms for local AM production strengthened.
Indicator:	**5.5b** Incentives for local medicine manufacturers established
DESCRIPTION:	
Expected/desired change:	It is expected that appropriate Incentives for local medicine manufacturers will be established
Definition of key terms (as applicable):	**Local Manufacturers:** Domestic companies that produce pharmaceuticals and other biologicals
MEASUREMENT:	
Unit of Measure:	**Qualitative (Yes/No)**
Calculation:	**N/A**
Disaggregated by:	1. Sector
PLAN FOR DATA COLLECTION AND REPORTING:	
Frontline Data Source:	AMR Desk
Means of data collection:	Desk review
Means of Verification	AMR Desk report
Frequency of Reporting:	Annual
Reporting Partner(s):	MOH; MOFA; MOFAD; MESTI

TARGETS AND BASELINE:

Year	Baseline	Target	Actual	Notes
Yr1				Where data is not available, the data collected in Yr 1 will be considered as baseline data. Targets will subsequently be set as informed by the baseline data.
Yr2				
Yr3				
Yr 4				
Yr 5				

OPTIONAL REMARKS:	
Limitations/ Considerations:	
THIS SHEET LAST UPDATED ON: 16/08/2017	

SO: 5	**SO 5:** Develop the economic case and create an enabling environment for sustainable investment that takes into account Ghana's needs, and increase investment in new machines, diagnostic tools, vaccines and other interventions
Outcome Statement:	Enabling environment for sustainable investment of AMR reduction enhanced.
Output Statement:	Mechanisms for local AM production strengthened.
Indicator:	**5.5c** Proportion of farm animals covered by locally produced pharmaceuticals (including vaccines)
DESCRIPTION:	

Expected/desired change:	It is expected that the number farm animals covered by locally produced pharmaceuticals (including vaccines) will **increase** over time.
Definition of key terms (as applicable):	**N/A** _
MEASUREMENT:	
Unit of Measure:	**Percentage**
Calculation:	**a. Numerator:** The total number of sampled farm animals covered by locally produced pharmaceuticals **b. Denominator**: The total number of farm animals sampled.
Disaggregated by:	1. Farm type 2. District 3. Sector
PLAN FOR DATA COLLECTION AND REPORTING:	
Frontline Data Source:	Farm level; vet office
Means of data collection:	Desk review
Means of Verification	Farm records; Vet office reports
Frequency of Reporting:	Quarterly
Reporting Partner(s):	MOFA; MOFAD

TARGETS AND BASELINE:

Year	Baseline	Target	Actual	Notes
Yr1				Where data is not available, the data collected in Yr 1 will be considered as baseline data. Targets will subsequently be set as informed by the baseline data.
Yr2				
Yr3				
Yr 4				
Yr 5				

OPTIONAL REMARKS:	
Limitations/ Considerations:	
THIS SHEET LAST UPDATED ON: 16/08/2017	

SO: 5	**SO 5:** Develop the economic case and create an enabling environment for sustainable investment that takes into account Ghana's needs, and increase investment in new machines, diagnostic tools, vaccines and other interventions
Outcome Statement:	Enabling environment for sustainable investment of AMR reduction enhanced.
Output Statement:	Mechanisms for local AM production strengthened.
Indicator:	**5.5d** AMR coordination platform established
DESCRIPTION:	
Expected/desired change:	It is expected that a functional AMR coordination platform would be established

Definition of key terms (as applicable):	**N/A** _
MEASUREMENT:	
Unit of Measure:	**Qualitative (Yes/No)**
Calculation:	**N/A**
Disaggregated by:	N/A
PLAN FOR DATA COLLECTION AND REPORTING:	
Frontline Data Source:	AMR Desk
Means of data collection:	Desk review
Means of Verification	AMR Desk report
Frequency of Reporting:	Annual
Reporting Partner(s):	MOH; MOFA; MOFAD; MESTI

TARGETS AND BASELINE:

Year	Baseline	Target	Actual	Notes
Yr1				Where data is not available, the data collected in Yr 1 will be considered as baseline data. Targets will subsequently be set as informed by the baseline data.
Yr2				
Yr3				
Yr 4				
Yr 5				

OPTIONAL REMARKS:	
Limitations/ Considerations:	
THIS SHEET LAST UPDATED ON: 16/08/2017	

SO: 5	**SO 5:** Develop the economic case and create an enabling environment for sustainable investment that takes into account Ghana's needs, and increase investment in new machines, diagnostic tools, vaccines and other interventions
Outcome Statement:	Enabling environment for sustainable investment of AMR reduction enhanced.
Output Statement:	Mechanisms for local AM production strengthened.
Indicator:	**5.5e** Research agenda for the affected sectors developed with AMR included
DESCRIPTION:	
Expected/desired change:	It is expected that AMR Research will respond to Sector Research Agenda.
Definition of key terms (as applicable):	**N/A** _
MEASUREMENT:	
Unit of Measure:	**Qualitative (Yes/No)**
Calculation:	**N/A**
Disaggregated by:	1. Sector
PLAN FOR DATA COLLECTION AND REPORTING:	
Frontline Data Source:	Sector Ministries
Means of data collection:	Desk review

Means of Verification	Sector report
Frequency of Reporting:	Annual
Reporting Partner(s):	MOH; MOFA; MOFAD; MESTI
TARGETS AND BASELINE:	

Year	Baseline	Target	Actual	Notes
Yr1				Where data is not available, the data collected in Yr 1 will be considered as baseline data. Targets will subsequently be set as informed by the baseline data.
Yr2				
Yr3				
Yr 4				
Yr 5				

OPTIONAL REMARKS:	
Limitations/ Considerations:	
THIS SHEET LAST UPDATED ON: 16/08/2017	

SO: 5	**SO 5:** Develop the economic case and create an enabling environment for sustainable investment that takes into account Ghana's needs, and increase investment in new machines, diagnostic tools, vaccines and other interventions
Outcome Statement:	Enabling environment for sustainable investment of AMR reduction enhanced.
Output Statement:	Mechanisms for local AM production strengthened.
Indicator:	**5.5f** Model for long-term medicine development established
DESCRIPTION:	
Expected/desired change:	It is expected that the motivation for investments into new drug development will increase over time.
Definition of key terms (as applicable):	**Model:** is a policy, legal, operational/commercial framework that supports the development of new medicines domestically.
MEASUREMENT:	
Unit of Measure:	**N/A**
Calculation:	**N/A**
Disaggregated by:	N/A
PLAN FOR DATA COLLECTION AND REPORTING:	
Frontline Data Source:	MOH; AMR Platform
Means of data collection:	Desk Review
Means of Verification	Model framework document
Frequency of Reporting:	Annual
Reporting Partner(s):	MOH; MOFA; MOFAD; MESTI
TARGETS AND BASELINE:	

Year	Baseline	Target	Actual	Notes
Yr1				Where data is not available, the data collected in Yr 1 will be considered as baseline data. Targets will subsequently be set as informed by the baseline data.
Yr2				
Yr3				
Yr 4				
Yr 5				

OPTIONAL REMARKS:	
Limitations/ Considerations:	

THIS SHEET LAST UPDATED ON: 16/08/2017