Government of Papua New Guinea

National Action Plan on Antimicrobial Resistance

(AMR) 2019-2023

National Department of Health
Department of Agriculture & Livestock
Conservation and Environment Protection Authority
National Agriculture Quarantine & Inspection Authority

August 2019

National Department of Health

Conservation and Environment Protection Authority

Foreword

Antimicrobial medicines have been the cornerstone of basic and modern medicine for decades and have been used effectively to treat and prevent infections in humans and animals since the first discovery of penicillin by Alexander Fleming in 1928.

After the first discovery of penicillins, other antimicrobials were discovered and used widely in the treatment of various infections in humans and animals. Over decades - these antimicrobials were used inappropriately resulting in the development and spread of resistance.

The antimicrobial resistance phenomenon was predicted years ago in 1945 by Alexander Fleming himself while receiving his Nobel Prize for the discovery of penicillin. In fact this prediction was confirmed five years before that speech.

Today, Antimicrobial Resistance (AMR) poses a significant national and global threat to human and animal health. If no action is taken, antimicrobial resistance has the potential to reverse all gains made in modern medicine and seriously put the lives of people and animals at risk of dying, from infections that were once treatable. This situation is alarming given that current pipeline for newer antimicrobials is drying up.

In response to this looming crisis, the World Health Assembly (WHA) in May 2015, adopted a Global Action Plan on Antimicrobial resistance, and urged member states to develop their own national action plans.

Papua New Guinea (PNG) started discussions in 2015 and hosted two consultative workshops in 2016 and 2017 where relevant stakeholders from health, agriculture and environment were engaged to provide direction, concluding in the development of the PNG Country Action Plan on Antimicrobial Resistance 2019 – 2023.

This is a multi-stakeholder plan, involving the health, agriculture and environment sectors that are impacted directly by this emerging crisis. Better implementation will require closer cooperation by adopting the 'One Health' approach as a guiding principle for working together on AMR.

It is the first National Action Plan on AMR developed for the Country to address the AMR crisis for the period until 2023. It includes a Multi-Sectoral Governance Framework and an Operational Plan with activities tied to 5 Strategic Objectives as per the WHO Policy Package on AMR. Implementing Government Agencies and partners should proactively adopt the Operational Plan and fund activities appropriately to move this important agenda forward.

We, the Secretaries of Health (NDoH), Agriculture and Livestock (DAL) and Managing Directors of Conservation and Environment Protection Authority (CEPA) and National Agriculture Quarantine & Inspection Authority (NAQIA) commit to take full ownership of this Plan. We understand the potential threat of AMR to the health and security of our Country and its potential impact on the achievement of the PNG Vision 2050.

It is our hope that the Country actions implemented through this Plan will contribute meaningfully to national and global efforts to reduce the spread of antimicrobial resistance and ensure PNG continues to benefit from the use of available antimicrobials for a long time yet.

We, hereby, pledge to commit necessary resources and to ensure our Agencies and our partners work together to implement this Plan and address this growing health and security threat.

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Mr Pascoe Kase
Secretary for Health

Date: 9/8/2019

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Mr Daniel O. Kombuk
Secretary for Agriculture & Livestock

OFFICE OF THE SECRETARY
DANIEL KOMBUK
08/08/2019
DEPARTMENT OF AGRICULTURE & LIVESTOCK

Date: 08/08/19

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Mr Gunther Joku
Managing Director
Conservation & Environment Protection Authority

Date: 08/08/19

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Mr Joel Alu
Managing Director
National Agriculture Quarantine & Inspection Authority

Date: 06/08/19

Acronyms and abbreviations

AAHL	Australian Animal Health Laboratory
AMR	Antimicrobial Resistance
AST	Antimicrobial Sensitivity Testing
CDC	Centres for Disease Control
CEPA	Conservation and Environment Protection Authority
CPHL	Central Public Health Laboratory
CSA	Country Situation Analysis
DAL	Department of Agriculture and Livestock
DFAT	Department of Foreign Affairs & Trade
FAO	Food and Agriculture Organisation
GDP	Gross Domestic Product
HIV	Human Immunodeficiency Virus
IPC	Infection Program Control
JICA	Japanese International Cooperation Agency
M&E	Monitoring and Evaluation
MDR	Multi-drug Resistance
MSF	Medicines Sans Frontier
NAMRSC	National Antimicrobial Resistance Steering Committee
NAQIA	National Agriculture Quarantine & Inspection Authority
NDoH	National Department of Health
NGO	Non-government Organisations
NTP	National Tuberculosis Program
OIE	World Organisation for Animal Health
PMGH	Port Moresby General Hospital
PNG	Papua New Guinea
PNGIMR	Papua New Guinea Institute of Medical Research
PSSB	Pharmaceutical Services Standards Branch
SDG	Sustainable Development Goal
TB	Tuberculosis
TWG	Technical Working Group
UN	United Nations
UPNG	University of Papua New Guinea
USAID	United States Agency for International Development
WAAW	World Antibiotic Awareness Week
WHO	World Health Organization
XDR	Extensive Drug Resistance

Contents

1. Introduction

Antimicrobial resistance (AMR) poses a profound threat to health and society. It has recently been recognized as a global health security risk that threatens the achievements of modern medicine and the Sustainable Development Goals (SDGs). AMR is considered as one of the biggest global health threats of our time. It poses a major challenge to health, food security, and development. It can affect anyone, of any age, in any country.

Antimicrobial resistance happens when microorganisms (such as bacteria, fungi, viruses, and parasites) change when they are exposed to antimicrobial drugs (such as antibiotics, antifungals, antivirals, antimalarial, and anthelmintic). Microorganisms that develop antimicrobial resistance are sometimes referred to as "superbugs". As a result of AMR, medicines become ineffective and infections persist in the body, increasing the risk of spread to others.

In response to this threat, the World Health Organization (WHO) developed the Global Strategy on AMR in 2001, and on the World Health Day 2011, the Organization launched a six-point policy package outlining actions governments need to take to combat AMR and to change the approach of all stakeholders. Additional discussions within WHO led the Organization to propose Country Situation Analysis (CSA) on AMR as a priority action to inform the development and implementation of national action plans.

The Papua New Guinea Medicines Policy 2014, recognizes AMR as a threat and proposes to adopt global measures to mitigate the emergence of resistance to AMR.

In 2015, the Global Action Plan on Antimicrobial Resistance, endorsed at the Sixty-eighth session of the World Health Assembly, called member states to complete their national action plans on AMR by May 2017.

Papua New Guinea (PNG) conducted a Country Situation Analysis (CSA) on Antimicrobial Resistance (AMR) in 2016 with technical assistance from the WHO Country Office. As a result of the CSA, antimicrobial resistance has now been placed as a high priority agenda of the Ministries of Health, Agriculture and Environment.

The CSA in general revealed that the current level of activities addressing AMR in PNG across the six elements outlined in the WHO Policy Package on AMR is low. The most significant challenge relates to rational use of medicines in humans and animals.

The findings from the CSA were used to inform the development of the National Action Plan on Antimicrobial Resistance 2019 – 2023 which is organized under The WHO policy package on AMR and involves:

- National coordination mechanisms;
- Surveillance and laboratory capacity;
- Access to, and quality of, essential medicines;
- Rational use of medicines in humans and animals;
- Infection prevention and control; and
- Research and development

Papua New Guinea faces significant challenges with systems of government and capacity. Although some mechanisms are in place to monitor, collect information and respond to the threat of AMR, generally, the systems need improvement and support to better deal with the AMR issue in the country.

The involvement of three major government ministries including health, agriculture and environment in AMR also requires better working relationships to be developed and maintained to allow coordinated implementation of AMR strategies and actions in the country. The *One Health* approach is the key guiding principle for working together on AMR. It recognizes that the health of the people is connected to the health of animals and the environment and therefore requires cooperation by all government stakeholders.

The strategies and activities included in the Operational Plan resulted from discussions between AMR stakeholders during the consultation workshops in 2016 and 2017. The activities are for implementation by the government agencies concerned and their partners. Some activities are policy level while others are practical; for example, awareness campaigns for raising the profile of AMR in the country.

The coordination of implementation and monitoring of AMR activities in the Operational Plan in Papua New Guinea will be based on the Multi-sectoral Governance Structure outlined in Section 3 of this Plan.

There is a huge challenge for action on AMR to be taken at the national level in order to contribute meaningfully to the global response. PNG realizes this as a matter of national importance and hopes that this Plan will set the platform for action on AMR in the country.

2. Country Situational Analysis on AMR

2.1 Findings of the Country Situation Analysis on AMR

Papua New Guinea is a lower-middle-income country located in the Western Pacific Region, one of the six regions of the World Health Organization. In 2015, the population of Papua New Guinea was projected to be 7 619 320, and in 2014 the Gross Domestic Product (GDP) per capita (at current US$) was estimated at US$ 2 268.

A total of 40% of the population is under 15 years of age, and 4% is over 60 years of age. The urban population currently stands at 12% of the total population. The adult literacy rate for the population over 15 years is 60%.

Communicable diseases continue to be the major cause of morbidity and mortality, with malaria, tuberculosis, diarrheal diseases and acute respiratory infections at the top of the list. Studies conducted by the PNG Institute of Medical Research (PNGIMR) indicate that the incidence of malaria is declining. Tuberculosis (TB) remains a problem of public health significance with drug resistant strains becoming increasingly common and extremely drug resistant (XDR) TB being reported in some areas. The HIV prevalence amongst pregnant women has stabilized at 0.56% (2013) however resistance has been observed.

PNG faces health system challenges including a rapid population growth, limited resources, limited access to services, high maternal mortality ratio, double burden of communicable and non-communicable diseases, shortages of qualified human resources for health and inadequate access to essential medicines, insufficient funding for service delivery, poor laboratory capacity, and culture and beliefs of general population fuel the misuse of antibiotics.

The observed state of AMR response capacity in PNG organized under the six elements of the WHO policy package on AMR is shown below. The assessment scores represent the independent view of the CSA conducted by WHO in 2016, and does not represent the situation at the time of writing the National Action Plan on AMR.

Table 1. Country Situation Score Card based on the Country Situation Analysis

	Activity-based score*						
WHO policy package element:	1	2	3	4	5	6	7
1. National coordination mechanisms	√						
2. Surveillance and laboratory capacity	√	√	√				
3. Access to, and quality of, essential medicines	√	√	√				
3. Rational use of medicines in humans and animals	√						
4. Infection prevention and control	√	√					
5. Research and development	√	√					

** 1: Minimal activity on AMR; 7: Significant activity on AMR.*

2.2 Current State of Antimicrobial Resistance (AMR) in Papua New Guinea

2.2.1 Human Health

Available data to confirm the state and extent of drug resistance patterns and trends in the country are fragmented and not readily available. The Country Situation Analysis (CSA) conducted by WHO in 2016 noted this situation and recommended establishing a baseline for AMR in the country. Part of the reason at that time was the absence of a National AMR Steering Committee to coordinate all issues related to AMR in Papua New Guinea.

Despite this setback, some very useful information on AMR have been gathered by the Papua New Guinea Institute of Medical Research (PNGIMR), the Central Public Health Laboratory (CPHL) and the pathology department of the Port Moresby General Hospital (PMGH), the largest referral hospital in PNG. The findings are strongly suggestive of a similar situation in the country, though a representative survey is needed to establish a clear national baseline.

Table 2 presents resistance data provided by PNGIMR. Isolates were obtained from multiple studies conducted at various points in time between 2004 and 2015. A number of pathogens showed high resistance to sulphamethoxazole/trimethoprim (also known as co-trimoxazole or septrin) and tetracycline.

Table 2. Resistance and susceptibility rates from PNGIMR, multiple years

		Antibiotic:						
Pathogen:	**N**	AMC	AMP	AZM	C	CIP	CN	CRO
*Shigella spp**	47	NT	91.5% R	NT	55.3% R 23.4% I	100% S	NT	100% S
*Salmonella typhi**	5	NT	80% R	NT	40% R	100% S	NT	100% S
*N. gonorrhoea***	106	100% S	NT	100% S	NT	1% R	NT	100% S (52/52)
*H. influenzae****	33	NT	61%	NT	55% R 3% I	NT	NT	6% R
*S. pneumoniae****	73	NT	NT	NT	10% R	NT	NT	100% S
S. aureus[#]	53	NT	NT	NT	4% R	NT	100% S	NT
GNB[##]	27	NT	52% R	NT	33% R	4% R	30% R	NT

		Antibiotic:						
Pathogen:	**N**	E	NA	OX/MET	P	SH	SXT	TE
*Shigella spp**	47	NT	100% S	NT	NT	NT	70.2% R 2.1% I	76.6% R
*Salmonella typhi**	5	NT	20% R	NT	NT	NT	60% R	60% R
*N. gonorrhoea***	106	100% S	NT	NT	51% R	100% S	NT	32% R
*H. influenzae****	33	NT	NT	NT	NT	NT	61% R	67% R
*S. pneumoniae****	73	1% R 1% I	NT	27% 1% I	NT	NT	34% R 5% I	12% R 1% I
S. aureus[#]	53	8% R	NT	79% R	NT	NT	100% S	2% R
GNB[##]	27	NT	NT	NT	NT	NT	48% R	33% R

Notes:
- R (Resistant), S (Sensitive), I (Intermediate)
* Isolates obtained from a diarrheal disease study conducted from 2009-2011 in EHP. Majority of *Shigella spp* were *S. flexeneri*.

** Isolates collected between 2004 and 2005 (n=52), and between 2009 and 2010 (n=54) from 3 sites: Goroka, Mt. Hagen and POM.
*** Isolates obtained from meningitis cases and Aetiology of ALRI and meningitis study over last 5 years (EHP). As well as from sick visits from PCV study participants (2012-2015).
[#] Mainly from osteomyelitis cases in 2012 from Kundiawa, but also from sick visits from PCV study participants.
[##] GNB=Gram negative bacteria. Largely obtained from osteomyelitis cases in 2012 from Kundiawa, but also from meningitis cases in Goroka and sick visits from PCV study participants.
MDR (Resistance to 2 or more antibiotics) was common for Shigella spp (91%), Salmonella Typhi (60%), and H. Influenzae (67%).
Antibiotics:
AMC: Amoxicillin/Clavulanic Acid (Augmentin); AMP: Ampicillin; AZM: Azithromycin; C: Chloramphenicol; CIP: Ciprofloxacin; CN: Gentamicin; CRO: Ceftriaxone; E: Erythromycin; MET: Methicillin; NA: Nalidixic Acid; OX: Oxacillin; P: Penicillin; SH: Spectinomycin; SXT: Sulphamethoxazole/Trimethoprim (AKA: Co-trimoxazole or Septrin); TE: Tetracycline.

Shigella spp. and *Salmonella typhi* isolates, obtained from a diarrheal disease study, also showed additional, and relatively high, resistant to ampicillin and chloramphenicol. Gram-negative bacteria, largely obtained from osteomyelitis cases, showed resistance to a number of antibiotics. Most pathogens exhibited resistance to chloramphenicol. Multi-drug resistance (MDR) to 2 or more antibiotics was common for *Shigella spp* (91%), *Salmonella typh*i (60%), and *H. influenzae* (67%).

PMGH pathology laboratory also has capacity for Antimicrobial Sensitivity Testing (AST). The laboratory performs disk diffusion susceptibility testing and focuses on supporting medical practice within the hospital. Data from 2011 showed that the PMGH lab received over 10,000 clinical samples for microbiological assessment, including urine, blood, pus swaps, and cerebrospinal fluid. From 3,246 urine samples, for example, a total of 302 (or 9%) bacterial isolates were observed.

The three most common bacteria isolated were *E. coli* (43%), *K. pneumoniae* (27%), and *P. aeruginosa* (3%). The data, which is reported in the latest draft of the National Infection Prevention and Control Policy, also suggest varying susceptibility patterns with many organisms showing multiple drug resistant patterns.

Some additional data collected during 2015 from the PMGH pathology laboratory did provide some statistics on resistant patterns. Tables 3 and 4 below summarizes resistant patterns to a number of antibiotics for those pathogens where the number of isolates was large enough to produce reliable rates.

Table 3 indicates that urinary infections in adults are intrinsically resistant to penicillin, and highly resistant to ampicillin, augmentin, and co-trimoxazole. It also shows that infections from *Proteus* species are 100% resistant to nitrofuran.

Table 3. Susceptibility rates from PMGH, urinary isolates, adults, 2015

		Antibiotic:							
Pathogen:	N	Pen	Amp	Aug	Ceftriax	Cotrim	Genta	Cipro	Nitro
E. coli	358	R	14%	25%	88%	24%	89%	89%	92%
Klebsiella species	187	R	2%	25%	54%	28%	61%	78%	52%
Enterobacter-like species	47	R	9%	15%	60%	43%	68%	68%	38%
Proteus species	37	R	24%	70%	89%	33%	73%	94%	0%
All *Enterobacteriaceae*	629	R	11%	27%	76%	27%	78%	84%	71%

Notes:
R: intrinsically resistant.
Pen: penicillin, amp: ampicillin, aug: augmentin, ceftriax: ceftriaxone, cotrim: co-trimoxazole, genta: gentamicin, Cipro: ciprofloxacin, nitro: nitrofuran

Table 4 indicates that wound and other conditions with pus infections are highly resistant to a number of antibiotics. Although resistant to many antibiotics, *Enterobacter*-like species still show important susceptibility to four main antibiotics.

Table 4. Susceptibility rates from PMGH, wound and pus isolates, adults, 2015

		Antibiotic:									
Pathogen:	N	Fluco	Eryth	Tetrac	Amp	Aug	Ceftriax	Cotrim	Genta	Cipro	Chlor
S. aureus (MRSA and MSSA)	94	60%	76%	94%	R			93%			72%
Streptococcus (beta-haemolytic)	2	S	n/a	n/a	S	S					n/a
E. coli	62	R	R	R	3%	26%	71%	11%	76%	74%	26%
Klebsiella species	120	R	R	R	2%	23%	36%	23%	44%	69%	18%
Enterobacter-like species	28	R	R	R	R	29%	82%	54%	67%	92%	n/a
P. aeruginosa (all ages)	46	R	R	R	R	R	R	R	70%	64%	R

Notes:
R: intrinsically resistant; S: susceptible by extrapolation or intrinsically susceptible; n/a: not available.
Empty cell: this antibiotic is not recommended for therapy.
Flucox: flucoxacillin, erythr: erythromycin, tetra: tetracycline, amp: ampicillin, aug: augementin, ceftriax: ceftriaxone, cotrim: co-trimoxazole, genta: gentamicin, cipro: ciprofloxacin, chlor: chloramphenicol

A population based survey conducted by the National Tuberculosis Program (NTP) and CPHL on the burden of drug-resistant TB in PNG in 2015 showed; among 1,182 TB patients enrolled in the study, MDR-TB was detected in 20 new (2.7%; 95% confidence intervals [CI] 1.1–4.3%) and 24 previously treated (19.1%; 95%CI: 8.5–29.8%) TB cases. No case of extensively drug-resistant TB (XDR-TB) was detected. Thirty percent (6/20) of new and 33.3 % (8/24) of previously treated cases with MDR-TB were detected in a single cluster in Western Province.

2.2.2 Animal Health

Data from the animal health sector was not available at the time of writing this plan. The Department of Agriculture & Livestock (DAL) and the National Agriculture & Quarantine Inspection Authority (NAQIA) have been trying to establish baseline information for AMR in animals in PNG but have not been able to do so. This is an important activity covered under this plan, and following implementation, data will be generated through baseline studies proposed by the DAL and NAQIA to establish the AMR situation for animals in PNG.

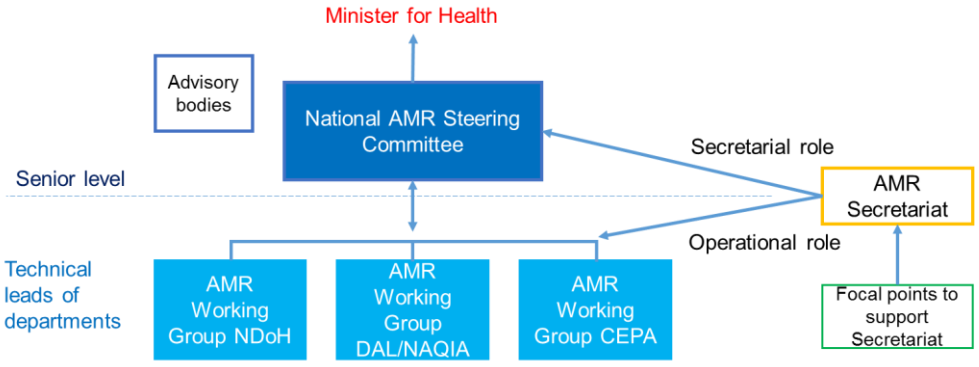
3. Multi-Sectoral Governance on AMR

In Papua New Guinea, a multi-stakeholder Governance Committee was proposed by the Country Situation Analysis (CSA) that was conducted by the WHO in 2016. The proposal was discussed and accepted by stakeholders that attended two workshops organized by the NDoH and the WHO in September 2016 and January 2017. Participants from the NDoH, Department of Agriculture (DAL), NAQIA, Papua New Guinea Institute of Medical Research (PNGIMR), University of Papua New Guinea (UPNG) and multilateral stakeholders including the WHO, Food and Agriculture Organization (FAO) and World Organization for Animal Health (OIE), Burnet Institute, Medicines Sans Frontier (MSF) and the private sector attended.

The Multi-Sectoral Governance Framework for AMR as accepted for PNG is in line with the One Health approach required to provide strong and significant leadership to recognize the importance of AMR in Papua New Guinea. Three main bodies will provide a strong leadership program to profile AMR as a national priority:

1. **National AMR Steering Committee** with a decision making role
2. **AMR Secretariat** with a dual coordination and secretariat role
3. **AMR Technical Working Groups** to implement the plan and report to the steering committee.
    - ✓ **Nominated focal points** to support the secretariat
    - ✓ **Advisory roles**: Medical Society AMR Committee, Pharmacy Board of PNG, National CODEX Committee, and other external consultants as needed

Figure 1: Governance Framework for AMR in Papua New Guinea



3.1 National AMR Steering Committee

The National AMR Steering Committee (NAMRSC) is the highest level of governance with some degree of authority for AMR in PNG. Reporting to the Minister for Health, it will have an annual rotating chair amongst the Secretary for Health, Secretary for Agriculture and Livestock and Managing Director for Conservation & Environment Protection Authority (CEPA). The members shall be representatives from the organizations as outlined below.

Members:

Three (3) Co-chairs: Secretary for Health, Secretary for Agriculture & Livestock and Managing Director for Conservation and Environment Protection Authority (CEPA)

- ✓ National Department of Health
  - CPHL
  - Pharmaceutical Service Standard Branch (PSSB)
  - Infection Prevention & Control (IPC) Committee
  - (legal rep as advisory role or ad hoc member when needed not regular member)
- ✓ Department of Agriculture and Livestock
- ✓ Conservation and Environment Protection Authority
- ✓ National Agriculture Quarantine and Inspection Authority
- ✓ Institute of Medical Research
- ✓ University of Papua New Guinea
- ✓ Medical Society of PNG
- ✓ Nurse Association of PNG
- ✓ Pharmaceutical Society of Papua New Guinea
- ✓ Veterinary Clinic representation
- ✓ Non-government Organizations (NGO) representation
- ✓ Representative of the private sector (pharmacy and hospital)

Observers:

- ✓ WHO and Food & Agriculture Organization(FAO) of the United Nations
- ✓ Department of Foreign Affairs & Trade (DFAT)
- ✓ Centre for Disease Control (CDC) /United State Agency International Development (USAID)
- ✓ Japanese International Cooperate Agency (JICA)
- ✓ Global Fund (Principle recipients)
- ✓ Burnet Institute
- ✓ Other relevant donors/partners

Advisory bodies:

- ✓ Medical Society AMR Committee
- ✓ External Consultants (as needed)
- ✓ Pharmacy Board of PNG
- ✓ National CODEX Committee

Term of Reference:

- Coordinate all efforts to address AMR in the country
- Oversee the implementation of the national action plan
- Membership should reflect all sectors involved in containing AMR at senior level
- Chair to rotate every year among the three co-chairs
- Meet twice a year (and other times on an ad-hoc basis)
- Have some degree of authority
- Report to the Minister of Health
- Supported by the AMR secretariat and Technical Working Groups

3.2 AMR secretariat

The National Department of Health (NDoH) through its Pharmaceutical Service Standard Branch (PSSB) is providing the AMR Secretariat for AMR response in Papua New Guinea.

The Secretariat is tasked with coordination between different stakeholders and ensuring the AMR governance structure is operational. To better perform its role the AMR Secretariat needs to be appropriately resourced.

Supported by focal points from:

- ✓ Central Public Health Laboratory (CPHL)
- ✓ Managers of Disease Programmes
- ✓ DAL Chief Codex Officer
- ✓ Chief Veterinarian
- ✓ Chief Pediatrician
- ✓ Chief Physician
- ✓ Chief Surgeon
- ✓ Chief Obstetrician
- ✓ Representative from the private sector
- ✓ Infection Control Committee
- ✓ WHO and FAO

Terms of Reference:

- Have dedicated personnel
- Service two roles:
    - The focal point for national AMR data, information collection and sharing, and resources in the country
    - Secretariat for the AMR Steering Committee and Technical Working Group.
- Support Monitoring &Evaluation (M&E) of the implementation of the AMR national action plan including the operational plan
- Provide brief update in the National Antimicrobial Resistance Steering Committee (NAMRSC) meetings and the Technical Working Groups (TWG) quarterly meetings
- Produce, at least, a yearly report with an inventory of AMR information, including AMR patterns and M&E of the national plan
- Supported by nominated TWG focal points

3.3 Technical Working Groups

The AMR Technical Working Groups shall be internally organized within the National Department of Health (NDoH), the Department of Agriculture (DAL) and the Conservation and Environment Protection Authority (CEPA). The Technical Working groups will be responsible for overseeing implementation of national AMR response within each sector and report to the National AMR Steering Committee.

Three technical working groups:

- ✓ National Department of Health (Chair – Deputy Secretary)
- ✓ Department of Agriculture and Livestock (Chair – Deputy Secretary)
- ✓ Department of Environment & Conservation(Chair – Deputy Secretary)

Terms of Reference:

- Members should be composed from a sub-group of technical experts from the AMR Steering Committee Members
- Should meet on a regular basis (and ad hoc when needed)
- Leads for the implementation of the national action plan activities
- Provide regular reporting on the National Action Plan including the operational plan implementation to the AMR steering committee
- Supported by the AMR secretariat

4. Papua New Guinea National Action Plan on Antimicrobial Resistance (AMR) – One Health Approach

The PNG National Action Plan on AMR is a multi-stakeholder plan for the sectors directly impacted by AMR; including human health, animal health, and the environment.

The plan serves as the country road map for action on AMR and therefore, requires the political commitment at the highest level to support the strategies and interventions detailed in the operational plan. The NDoH, DAL and the CEPA will take leading roles based on the governance framework and ensure the One Health approach is observed and maintained by all stakeholders.

Vision: A country that continues to benefit from the use of effective antimicrobials for the treatment of infections in humans and animals for a long time.

Mission: For Papua New Guinea to do its part to minimize the spread of drug resistance so that our country can continue to benefit from effective antimicrobials.

4.1 Strategic Objectives

Objective 1: Establish and ensure governance, sustainable investment and actions to combat antimicrobial resistance

Strategies:

1. Finalize the national action plan on AMR
2. Establish a multi-sectoral mechanism for finalizing and implementing the National Action Plan
3. Ensure sustainable investment in combating AMR

Objective 2. Improve awareness and understanding of antimicrobial resistance through effective communication, education and training

Strategies:

1. Promote regular information sharing on the situation of AMR and use of antimicrobials across sectors
2. Raise awareness of health-care professionals

Objective 3. Strengthen surveillance, diagnostic capacity and research on AMR

Strategies:

1. Develop a national AMR surveillance system with a reference laboratory
2. Strengthen food safety capacity to combat AMR
3. Strengthen research and information sharing on AMR

Objective 4. Strengthen sanitation, hygiene and infection prevention and control across all sectors

Strategies:

1. Establish a national infection prevention and control programme to strengthen hospital infection control
2. Strengthen infection control for MDR/XDR-TB patients in health-care facilities, community, public spaces and transport
3. Promote good infection control and biosecurity practices in animal husbandry

Objective 5. Strengthen appropriate access and optimize the use of antimicrobial medicines in all sectors

Strategies;

1. Strengthen regulations to promote responsible use of antimicrobials with prescription only
2. Strengthen procurement and supply of antimicrobials

5. Implementation, Monitoring and Evaluation

The National Action Plan on Antimicrobial Resistance 2019 – 2023 serves as the national road map for action on AMR in Papua New Guinea. The lead government departments responsible for implementing this plan are the National Department of Health (NDoH), Department of Agriculture and Livestock (DAL) and the Conservation and Environment Protection Authority (CEPA) as direct impact sectors of AMR.

Various other stakeholders including national, international and multilateral organizations that support the work of these three departments on AMR will implement certain activities within their specialty areas for example; the PNG Institute of Medical Research shall be involved in conducting baseline studies and operational researches on AMR..

Activities for implementation are aligned to the Strategic Objectives of the Plan and are detailed in the Operational Plan, which is a 4-year plan until 2023. Certain activities have marked funding while others are intended for potential counterpart funding by government agencies and/or international and multilateral organizations such as the DFAT, WHO or FAO.

During the period of implementation, each implementing agency will report on the progress of their activities and achievement of activity related indicators, be it process or impact indicators. The monitoring reports will be presented to the respective TWG meetings chaired by the Deputy Secretary for each Department. These progress reports will be compiled by the AMR Secretariat for presentation to the National AMR Steering Committee annually for review and decisions on next steps.

At this stage impact indicators for monitoring and evaluation of the country responses to AMR has not been established. These indicators will form part of the discussions during the bi-annual monitoring and evaluation meetings for the National Action Plan. All stakeholders will be engaged during those discussions to formulate appropriate impact indicators based on data available from baseline surveys.

Progress will be reported to the Minister for Health and to WHO to measure the country response to AMR and how PNG is performing compared with other countries. Any new findings and feedbacks observed during implementation will serve as the basis for review of the country strategies and actions to combat AMR and ensuing review of the PNG National Action Plan on AMR 2019– 2023.

6. Operational Plan (4 Years: 2019-2023)

SUB-ACTIVITY	DATE	COST (USD)	IMPLEMENTER	SOURCE OF FUNDING	INDICATOR
1. Establish and ensure governance, sustainable investment and actions to combat antimicrobial resistance					
1.1 Finalize the national action plan on AMR					
1.1.1 Establish roles and responsibilities for key stakeholders and ensure commitment					
Finalize the national action plan with a four year operational plan on AMR	2019-2021	10,000.00	AMR secretariat	NDoH/WHO	High level signing completed
Mapping out of responsibilities of authority of the food chain from farm to fork	2019-2021	12,200.00	NDOH DAL WHO FAO	DAL/NAQIA	Mapping report finalized and disseminated
1.1.2 Develop a budget for implementation of the action plan and identify funding sources					
Facilitate with key stakeholders for costing activities identified in their respective activities	2019	-	AMR Secretariat	-	Costing completed
1.1.3 Regular monitoring and evaluation of the implementation of the national action plan					
Hold quarterly meetings of the TWG chairs to discuss implementation of the national action plan	2019-2021	18,300.00	TWG and AMR secretariat		Quarterly meeting minutes disseminated
Bi-annual meeting for M&E of AMR action plan implementation and review group to draft amendments to the national action plan for discussion with stakeholders.	2020-2023	100,500.00	AMR steering committee		Bi-annual review conducted
Review/endorsement of amended AMR National Action Plan once a year at AMR Steering Committee meeting	2019-2023	70,750.00	AMR steering committee AMR secretariat		Review conducted
1.1.3 Inclusion of the national action plan into the Medicines and Cosmetics Act review					
Inclusion of AMR as a topic in national stakeholders' consultation on Medicines and Cosmetics Act 1999	2019	10, 000.00	PSSB/WHO	WHO DFAT	Appropriate clauses included in revised Act
Conduct a consultation to ensure incorporation of veterinary medicines into the Medicines and Cosmetics Act 1999	2020	6,100.00	NDOH DAL		Appropriate clauses included in revised

SUB-ACTIVITY	DATE	COST (USD)	IMPLEMENTER	SOURCE OF FUNDING	INDICATOR
			NAQIA		Act
Delegate power of authority for veterinary regulation and capacity building to detect unregistered antimicrobials under the national medicines policy to National Agriculture Quarantine Inspection Authority (NAQIA)	2019-2120	-	NAQIA		NAQIA empowered to inspect
Hold biannual meetings of the Pharmaceutical Society including chief veterinarian (OIE representative) / Chief Codex Officer	2019-2021	13,725.00	NDOH NAQIA / DAL		Quarterly meeting minutes shared
1.1.4 Demonstrate the economic impact of AMR on PNG					
Conduct economic and biosecurity impact study of AMR on PNG to inform ongoing priorities	2019-2023	120, 500.00	NDOH DAL NAQIA IMR Burnet Institute		Findings published
Conduct operational research training courses to strengthen capacity for surveillance research	2019-2021	14, 030.00	Burnet Institute		Training course conducted
1.2 Establish a multi-sectoral coordinating mechanism to oversee the implementation of the plan					
1.2.1 Establish an AMR steering committee supported by an AMR secretariat					
High level agreement for establishment of the AMR steering committee and secretariat	2019	8, 000.00	NDOH DAL DEC	NDOH	AMR steering committee first meeting held
Develop working arrangements for implementation of the national action plan (Operational support)	2019-2023	30,500.00	All stakeholders AMR Secretariat		Operational plan endorsed
1.2.2 Set up technical working groups to support implementation of the national action plan					
Set up technical working group in NDOH and identify chair	2020	5, 000.00	NDOH		First meeting held
Set up technical working group in DAL and identify chair	2020	5, 000.00	DAL		First meeting held
Set up technical working group in DEC and identify chair	2020	5, 000.00	DEC		First meeting held
Hold regular TWG meetings	2019-2023	30,500.00	TWG AMR Secretariat		Regularly meeting minutes shared to stakeholders
Hold an annual stakeholder meeting on AMR	2017-2023	200,000.00	All stakeholders		Annual meeting minutes shared to stakeholders
1.3 Strengthen national regulations and quality assurance to ensure safeguarding of effective antimicrobials					
1.3.1 Legislate for prescription only sales of antimicrobials in licensed pharmacies					

SUB-ACTIVITY	DATE	COST (USD)	IMPLEMENTER	SOURCE OF FUNDING	INDICATOR
Introduce legislation (or regulation) to mandate large producers to have a veterinarian/para veterinarian to monitor the use of antimicrobials	2019-2021	30, 000.00	DAL NAQIA		Legislation introduced
1.3.2 Improve legislation of AMR in the animal sector					
Legislate against feeding offal to animals to stop transmission of AMR in livestock	2020	-	DAL NAQIA		Legislation introduced
Improve regulation of offal consumption by humans to avoid transmission of infections	2021	-	DAL NAQIA		Updated regulation endorsed
Improve legislation for animal mid-product handlers to be free from TB and skin diseases	2021	-	DAL NAQIA		Updated regulation endorsed
Review legislation of the Animal Slaughter Act to ensure animals are free of TB and other pathogenic microorganisms	2019-2021	30,500.00	DAL NAQIA		Review report finalized
Develop meat inspection standards that will cover quality assurance from farm to fork.	2019-2021	10,764.54	NAQIA NDOH DAL		Inspection standards developed and printed
1.3 Ensure sustainable investment in combating AMR					
1.3.1 Create an enabling environment for access to effective antimicrobials (e.g. infrastructure, roads, supply chain)					
Collaborate with other partners to strengthen vaccination roll out capacity including cold chain	2019-2020	2,250,000	ILTA – HHISP	DFAT	M-Supply rolled out to all AMS, TS and PHs
Strengthen mSupply inventory database for monitoring antimicrobial consumption in the public sector	2019-2020	400,000	ILTA - HHISP	DFAT	mSupply rolled out to all AMS, TS and PHs
Develop a roadmap to establish a Medicines Information Centre with emphasis on rational use of antimicrobials (including food and veterinary medicines)	2019-2023	30,500.00	NDOH/PSSB WHO		Roadmap developed
Improve collaboration of CPHL, PMGH and UPNG Pathology services for AMR testing	2019-20223	30,500.00	CPHL PMGH UPNG		Joint report shared to stakeholders
Improve dissemination of AMR data from laboratory services to decision-makers and researchers for evidence-based action	2019-2023	18,300.00	CPHL IMR AMR Secretariat		
1.3.2 Invest in appropriate human resources to ensure sustainable implementation of the national action plan					
Ensure one dedicated staff for AMR secretariat	2017 -	36,600.00	AMR secretariat		HR recruited

SUB-ACTIVITY	DATE	COST (USD)	IMPLEMENTER	SOURCE OF FUNDING	INDICATOR
	2020				
1.4 Relevant legislation in place to combat AMR					
1.4.1 Review of relevant legislations relevant to AMR					
Map out the legislations that are relevant to combating AMR in PNG (review health practitioners bill, food and sanitation Act and regulation, and other legislations for applicable legislations)	2018 - 2019	10, 000.00	All stakeholders		Mapping report finalized
Hold a stakeholder workshop to review existing legislation and identifying revisions required	2017	15,250.00	All stakeholders		Revisions agreed upon
Update relevant legislations	2018-2020	45,750.00	All stakeholders		Legislation updated and adopted
2. Improve awareness and understanding of antimicrobial resistance through effective communication, education and training					
2.1 Promote regular information sharing on the situation of AMR and use of antimicrobials across sectors					
2.1.1 Develop awareness raising materials and conduct awareness activities					
Develop IEC materials on AMR for the general public and policy makers	2019	28,975.00	WHO Burnet Institute		IEC materials printed
Conduct regular AMR advocacy and awareness using all means of communication/ mass media	2019-2023	61,000.00	AMR secretariat and TWGs		10 awareness raising communication conducted annually
Hold annual awareness campaign to celebrate World Antibiotic Awareness Week (WAAW)	2019-2023	30,500.00	All stakeholders WHO/FAO		Awareness week campaigns conducted annually
Conduct regular awareness raising for farmers, importers, exporters, food processors, animal production officers	2019-2023	29,073.21	DAL NAQIA		10 awareness raising communication conducted annually
Engage & train community leaders, NGO's , Civil societies, churches, sports groups to raise awareness on AMR	2019-2021	30,500.00	Burnet Institute		Training conducted
Conduct regular AMR advocacy through free air time of talk back shows	2019-2023	40,000.00	Media, All stakeholders		8 talk back shows held with AMR messaging annually
Conduct an awareness raising workshop for private pharmacies on AMR and rational use of antimicrobials	2019-2021	38,300.00	Private pharmacies NDoH		Workshop held

SUB-ACTIVITY	DATE	COST (USD)	IMPLEMENTER	SOURCE OF FUNDING	INDICATOR
			DAL		
2.1.2 Promote effective sanitation and hand hygiene in the community setting					
Conduct annual hand hygiene day activities	2019-2023	45,750.00	NDOH		Activities held
Develop promotional materials to raise awareness of hand hygiene and effective sanitation in the community	2020	29,073.21	NDOH		IEC materials printed and disseminated
Awareness Campaign, talk back show on Radio, TV on cough checks & healthy living environment practices	2019-2023	61,000.00	IMR NDOH WHO media		8 sessions held with AMR messaging annually
2.1.3 Develop simple, translated advocacy materials on the responsible use of antimicrobials for use (IEC materials)					
Conduct perception survey on general public understanding of AMR and responsible use to inform targeted messaging	2020	40,000.00	IMR		Perception survey report finalized
Design, Develop and print simple advocacy messages targeting general public	2020	28,975.00	NDOH Burnet Institute		IEC materials printed and disseminated
Based on the survey results; to apply its results into radio messages for general public	2019-2023	28,975.00	NDOH Burnet Institute		Radio messages conducted
Design and print posters, brochures and booklets to raise awareness on introducing two vaccines in the communities**.**	2020	23,665.00	WHO		IEC materials printed and awareness carried out in communities
2.1.4 Develop an educational programme for schools (all levels) on AMR and rational use with key targeted messages					
Revise the Department of Education curriculum on Healthy Living to capture AMR and basic sanitation and hand hygiene awareness raising in all schools	2019-2021	48,096.06	NDoH Department of Education Burnet Institute		Curriculum revised and integrated
Incorporate hand hygiene practices into kindergarten and pre-school curriculum	2019-2020	40,000.00	NDoH Burnet Institute Department of Education		Hand hygiene activities undertaken
Incorporate hand hygiene and basic sanitation into school curriculums	2019-	48,096.06	NDoH		Hand hygiene

SUB-ACTIVITY	DATE	COST (USD)	IMPLEMENTER	SOURCE OF FUNDING	INDICATOR
	2021		Burnet Institute Department of Education		activities undertaken
2.2 Raise awareness of health-care professionals					
2.2.1 Empower community health workers and other cadre of health workers to promote awareness in rural areas with appropriate messaging and language					
Conduct workshop on AMR for key target groups including CHW, Aid post orderly, Village Health Volunteers	2019-2021	620,000.00	NDOH		20 workshops conducted
2.2.2 Develop targeted messaging to health-care professionals and health care students and strengthen university curricular for health professionals on AMR					
Mapping of existing content on AMR in university curricula	2020	35,000.00	UPNG,		Mapping report finalized
Insert in the training curriculum the relevant subject on AMR and rational use for all health professional training institutions.	2020-2021	20,000.00	UPNG		Curriculum updated and integrated
Conduct perception surveys on healthcare workers understanding of AMR and rational use to inform targeted messaging	2019-2021	40,000.00	IMR		Perception survey report disseminated
Develop targeted IEC materials for health-care professionals and students	2019-2021	28,975.00	Burnet Institute WHO		IEC materials developed and disseminated
Conduct 4 regional MTC training for health-care workers on the rational use of antimicrobials and AMR	2019-2021	30,500.00	NDOH Burnet Institute/AAHL		4 trainings conducted
Develop targeted messaging and IEC materials for agriculture and veterinary professionals and students	2019-2020	22,875.00	NAQIA Burnet Institute		IEC materials developed and disseminated
Update existing curriculum for agriculture and veterinary students to include AMR and rational use of antimicrobials	2020	48,096.06	UPNG Burnett Institute		Curriculum updated and integrated

SUB-ACTIVITY	DATE	COST (USD)	IMPLEMENTER	SOURCE OF FUNDING	INDICATOR
3. Strengthen surveillance, diagnostic capacity and research on AMR					
3.1 Develop a national AMR surveillance system with a reference laboratory					
3.1.1 Strengthen CPHL national support capacity for training on microbiology and quality antimicrobial susceptibility testing					
Identify current capacity in-country as well as specialists to identify strengths and weaknesses for antibiotic susceptibility testing	2019-2020	30,000.00	CPHL PNGIMR		External consultation report
Strengthen CPHL capacity based on the weaknesses identified	2019-2021	100,000.00	CPHL		
Engage an international long-term adviser (ILTA) to strengthen CPHL activities for programmatic management of drug resistance TB and support the development of an integrated disease surveillance and response system	2017	154,029.00	ILTA - HHISP	DFAT	ILTA engaged
Strengthen the role of CPHL as a resource for laboratory testing within the national diseases integrated surveillance system	2020	50,000.00	CPHL Surveillance and Emergency Response Unit (NDoH)		System developed
3.1.2 Strengthen laboratory capacity for AMR surveillance					
Conduct regular sensitivity/resistance tests on standard antimicrobials from across the country through CPHL and PNGIMR	2019-2021	93,903.40	CPHL PNGIMR		Antibiogram developed and launched
Build capacity to provide bacterial external quality assurance (EQA) for bacterial antibiotic susceptibility testing	2020	46,951.70	CPHL		Capacity built
Implement EQA programmes in all laboratories that conduct antibiotic susceptibility testing	2019-2020	46,951.70	CPHL		EQA conducted bi-annually at laboratories
Build laboratory capacity of four pilot regional hospital for antibiotic susceptibility testing for sentinel site surveillance	2019-2021	120,000.00	CPHL PNGIMR		Capacity built 4 regional hospitals
Develop drug susceptibility testing capacity for other bacterial diseases of public health importance at CPHL.	2019-2020	46,951.70	PHA CPHL		DST for anti-bacterials conducted.
Develop regional /provincial hospital laboratories testing facilities to support CPHL whilst retaining CPHL as the reference laboratory.	2019-2020	366,000.00	CPHL Burnet Institute		Regional hospitals capacities upgraded
Develop regional second veterinary laboratory in Lae for AMR surveillance (agriculture hub)	2019-2021	366,000.00	DAL		Second veterinary laboratory developed

SUB-ACTIVITY	DATE	COST (USD)	IMPLEMENTER	SOURCE OF FUNDING	INDICATOR
Increase sample through-put for cultures, AST, anti-parasitic testing and antibiotic residue testing including procurement of sample transport containers and transport costs.	2019-2023	69,753.50	NAQIA		Residue testing conducted
Conduct training for meat inspectors and laboratory personnel on relevant sampling techniques for the different sample types I.e. diagnostic samples, cultures, environmental samples and animal feed samples.	2020	45,000.00	NAQIA		Trainings conducted
Improve existing laboratory capacity building for antimicrobial testing for NAQIA National Animal Health and Food Testing Laboratory.	2019-2021	25,925.00	NAQIA		Antimicrobial testing conducted
Build capacity for data collection, analysis and dissemination through purchasing of necessary ICT equipment for data recording communication and resource information gathering	2020	15,250.00	NAQIA		AMR data collected, analysed and disseminated
Develop database for real-time collection of information on emergence of AMR	2019-2020	30,000.00	PNGIMR Burnet Institute		Database developed
Strengthen NAQIA National Animal Health and Food Testing Laboratory capacity for training on microbiology and quality antimicrobial susceptibility testing including consumables and regents for testing.	2019-2021	29,788.60	NAQIA		Capacity strengthened
3.2 Strengthen food safety capacity to combat AMR					
3.2.1 Build capacity for antibiotic residue testing (food safety)					
Develop NARI Laboratory, CODEX testing capacity for antibiotic residues	2019-2021	59,577.20	DAL NARI		Antibiotic residue tests results reported
3.2.2 Promote random and regular testing on meat and other food product imports for AMR pathogens and antibiotic residues					
Undertake random sample collection and testing for AMR and antibiotic residues.	2019-2021	69,753.50	NAQIA		Number of sampled tested and reported
3.3 Strengthen research and information sharing on AMR					
3.3.1 Promote collaborative research projects between universities, departments and research institutes on AMR in human and animal health and the environment					
Provide research grant for human and animal health research for addressing knowledge gaps in combating AMR	2020-2021	152,500.00	All stakeholders		5 publications submitted to journals
3.3.2 Conduct bacteria susceptibility survey/profile (pathogen/regions)					
Establish a programme activity for sample collection, testing and data consolidation.	2019-2021	10,980	NAQIA		A Sampling Framework developed

SUB-ACTIVITY	DATE	COST (USD)	IMPLEMENTER	SOURCE OF FUNDING	INDICATOR
Conduct sentinel site surveillance to profile AMR in the human health and animal sector including aquaculture	2019-2021	152,500.00	NAQIA NARI IMR CPHL PMGH pathology lab Burnet/AAHL NFA		Surveillance report published
3.3.3 Ensure sharing of AMR surveillance and use data					
Regular sharing of AMR surveillance and antimicrobial consumption to the stakeholders and other regional and international stakeholder / authorities	2019-2021	5,776.40	AMR secretariat		Reports disseminated
4. Strengthen sanitation, hygiene and infection prevention and control across all sectors					
4.1 Establish a national infection prevention and control programme to strengthen hospital infection control					
4.1.1 Finalize the national infection control policy					
Develop and finalize and endorse the national infection control policy	2019	25,925.00	NDOH	NDOH	National IC policy endorsed
Print and disseminate the national infection control policy	2020	6,100.00	NDOH		500 copies printed
Establish/strengthen a national infection control committee	2019-2021	13,725.00	NDOH		IC committees established in all tertiary hospitals
Revise National IPC Guidelines based on above policy	2020	7,625.00	NDOH WHO		IPC guidelines revised and launched
Review public health Act for infection control including handling food (SPS police sanitation and phyto-sanitation)	2019-2021	13,725.00	NDOH		Act review conducted
4.2 Strengthen infection control for MDR/XDR-TB patients in health-care facilities, community, public spaces and transport					
4.2.1 Strengthen health-care workers occupation health and safety					
Improve TB program coordination and implementation	2018	430,000	ILTA - HHISP	DFAT	ILTA engaged Improved TB program coordination and implementation
Ensure continuing supply of PPEs in particular N95 respirator in health-care facilities	2019-2021	166,000.00	PHO DGH		No stock out of N95 reported

SUB-ACTIVITY	DATE	COST (USD)	IMPLEMENTER	SOURCE OF FUNDING	INDICATOR
Ensure appropriate equipment for FIT test equipment and conduct regular trainings in health-care facilities	2020-2021	105,000.00	NDoH DGH Burnet Institute		2 trainings conducted annually
Investigate appropriate administrative and engineering interventions for the prevention of TB transmission in health-care facilities in Daru, Lae and East Sepik	2019-2020	52,500.00	NTP PHO DGH		Reports disseminated
Conduct regular TB screening for hospital health-care workers twice a year	2019-2020	249,000.00	PHO DGH		No of screenings conducted
Upgrade laboratory testing for TB testing in animals	2019 - 2021	100,000.00	DAL NAQIA FAO		Laboratory upgraded
Mandate the testing of TB in animals and monitor TB in animals	2019 - 2023	31,930.00	DAL NAQIA FAO		TB testing in animals made mandatory
4.2.2 Disposal of expired drugs and non-registered drugs and medical waste					
Technical assistance to assess medical disposal system including disposal of antimicrobials and recommend action to be taken	2019	35,000.00	NDoH WHO		Report disseminated
Develop guidelines on disposal of unused antibiotics (including veterinary medicines	2019-2020	63,830.00	DAL NDoH NAQIA CEPA		Guidelines published
Establish a model site for the disposal a)pharmaceuticals, b) medical waste and, c) veterinary waste	2019-2020	610,000.00	NDOH DAL CEPA		3 model sites established and checklist developed
4.3 Promote good infection control and biosecurity practices in animal husbandry					
4.3.1 Strengthen infection prevention and control in animal husbandry					
Continue to conduct infection prevention and control in farms, slaughter houses and Feed Mills	2019-2023	40,000.00	NAQIA		Infection Control visits undertaken
Microorganism profiling in slaughter houses to be conducted for surveillance of AMR and antibiotic residues	2019 – 2023	6011.50	NAQIA		Microorganism profiling conducted
Strengthen capacity for inspection of safe food	2017-2020	8,753.50	NAQIA		Number of staff trained
5. Strengthen appropriate access and optimize the use of antimicrobial medicines in all sectors					

SUB-ACTIVITY	DATE	COST (USD)	IMPLEMENTER	SOURCE OF FUNDING	INDICATOR
5.1 Strengthen regulations to promote responsible use of antimicrobials with prescription only					
5.1.1 Promote prescription only use of antimicrobials (legislation and enforcement) in the human and animal sector					
Promote prescription only use and veterinary supervision of the use of antimicrobials in the animal husbandry sector, aquaculture sector	2019-2023	20,000.00	DAL NAQIA/ NFA		Reports submitted
Conduct Spot checks of supply chain to monitor over the counter sales of antimicrobials	2019-2022	40,000.00	PSSB police customs NAQIA		Annual report developed and published
Inspection of spot inspections at markets to capture illegal sales of antimicrobials	2019-2023	40,00.00	PSSB police customs NAQIA		Annual report developed and published
Conduct training for capacity building of veterinary inspectors	2019-2023	45,750.00	NAQIA		Training conducted
5.1.2 Develop PNG antimicrobials guidelines based on available AMR for human and animal use and development of new antimicrobials and to mainstreamed into the standard treatment guidelines					
Conduct baseline survey on the consumption of antimicrobials in the animal and aquaculture sector	2019-2020	120,000.00	DAL NAQIA FAO / NFA		Report published
Conduct baseline survey on the consumption of antimicrobials in the health sector	2019-2020	120,000.00	NDOH WHO		Report published
Strengthen the national health information systems to incorporate antimicrobial consumption and resistant patient data	2019-2020	45,000.00	NDOH		Data on AMR captured
To develop national antimicrobial guidelines for human use based on resistance and consumption data	2020	20,000.00	NDOH		Guidelines published
Develop list of veterinary antimicrobials for pet and food animals	2019	10,000.00	DAL NAQIA		List published
5.1.3 Regular update and dissemination of the standard treatment guidelines based on available antibiograms for evidence based empirical treatment					
Meetings for disease groups to integrate antimicrobial guidelines into STGs for human use	2020	30,500.00	NDOH		Meeting conducted
Update STGs for human use based on the disease groups consensus	2020	20,000.00	PSSB		STGs updated
Meetings for veterinary practitioners to develop STGs for animal use and	2020	30,500.00	NAQIA		Meeting conducted

SUB-ACTIVITY	DATE	COST (USD)	IMPLEMENTER	SOURCE OF FUNDING	INDICATOR
integrate antimicrobial guidelines					
Update STGs for use based on the veterinary practitioners consensus	2020	20,000.00	NAQIA		Veterinary STGs published
Conduct workshop to review and update STGs including an informational page on AMR developed	2020	30,500.00	PSSB		AMR informational page finalized
Incorporate AMR informational page into all STGs in human and animal health sectors	2018	10,000.00	NDOH DAL NAQIA		AMR informational page inserted into all STGs
Develop the STGs for surgery	2022	10,000.00	NDOH		STG for surgery printed
Printing and dissemination of 10,000 units of STGs	2019-2020	15,250.00	NDoH		10,000 units distributed
5.1.4 Review the drug catalogue (A,B,C etc.) in particular for antibiotics					
Meeting of technical group to review antimicrobials in the Medical and Dental Catalogue 2012	2019	30,500.00	NDOH/PSSB		Review completed
5.1.5 Establish Medicines Therapeutic Committee in all hospitals (public and private)					
Conduct training workshops for MTCs in collaboration with disease control programmes (HIV, Malaria, TB)	2019	15,250.00	NDOH/PSSB		Training completed
Conduct quarterly monitoring of functionality of 4 regional hospital MTCs	2019-2020	15,250.00	NDOH/PSSB		Quarterly monitoring reports shared with 4 hospitals
Conduct internal prescription audits in 4 regional hospitals	2019-2020	30,000.00	NDOH/PSSB		Audits conducted
Annual review of internal prescription audits	2019-2020	15,000.00	NDOH/PSSB		Report developed
Roll out of internal prescription audits to all hospitals	2019 - 2020	45,000.00	NDOH/PSSB		Audits conducted in 20 hospitals
5.1.6 Increase capacity building for responsible prescribing in the human and animal sectors					
Strengthen capacity of para-veterinarians to enable restricted prescribing under supervision by a superior	2019-2020	75,000.00	NAQIA UPNG FAO		No of para-veterinarians trained

SUB-ACTIVITY	DATE	COST (USD)	IMPLEMENTER	SOURCE OF FUNDING	INDICATOR
Strengthen capacity of rural health-care workers and pharmacists to prescribe/dispense antimicrobials responsibly	2019-2021	105,000.00	NDOH UPNG PHAs WHO		No of health workers trained
5.1.7 Strengthen border control for detection of unregistered antimicrobials being brought into PNG					
Strengthen capacity for border controls including declaration of all antimicrobials and food products being brought into the country	2020	37, 743.75	PNG Customs NAQIA		No of trainings conducted for border officers
5.1.8 Strengthen patient information and counseling					
Establishment and strengthening of medicine information system	2019-2020	15,000.00	NDOH/PSSB		Medicines information Service established
Improve labelling of prescriptions including a cautionary label to complete the prescription	2020	1000.00	NDOH		New prescription form with labelling rolled out
5.1.9 Strengthen the appropriate use of traditional medicine and its use of antimicrobials					
Strengthen the legislation to include the commercialization of traditional medicines	2019-2021	35,000.00	NDOH		Revised legislation endorsed
Establish a registry of traditional medicine practitioners	2020	20,000.00	NDOH		Registry established
Promote the appropriate use of traditional medicine	2019-2021	20,000.00	NDoH UPNG		Trainings conducted
5.2 Strengthen procurement and supply of antimicrobials					
5.2.1 Strengthen product registration of antimicrobials to ensure quality assured antimicrobials					
Introduce a module of antimicrobial procurement and supply into planned trainings on PSM	2019-2020	50,500.00	NDOH/MSDP		Module incorporated
Strengthen capacity of medicine evaluators and GMP inspectors on prequalification of antimicrobials including regular training workshops	2019-2020	91,500.00	NDOH WHO		No of staff trained on assessment of dossiers
Introduce AMR issues into the bi-annual pharmaceutical inspectors conference specific to antimicrobials and falsified medicines for all relevant enforcement agencies	2019-2023	60,500.00	NDOH		AMR session held at conference
Conduct training of veterinary medicine assessor	2020	18,300.00	DAL NAQIA		Trainings conducted

SUB-ACTIVITY	DATE	COST (USD)	IMPLEMENTER	SOURCE OF FUNDING	INDICATOR
5.2.2 Ensure access to quality antimicrobials in PNG					
Implementing good distribution and good storage practices along the supply chain through development of national GSP and GDP guidelines	2019-2023	45,750.00	NDOH		Number of GSP and GDP inspections conducted
Upgrade 2 district hospital pharmacies in the Central Province taking into consideration proper conditions for storage as a pilot for ideal storage conditions for antimicrobials.	2019	61,000.00	PHAs NDOH/PSSB		2 pharmacies upgraded and checklist developed
5.2.3 Develop a road map for a phase establishment of the Medicines Quality Control Laboratory (NMQCL)					
Establishment of the MQCL to facilitate the monitoring of the quality of medical products including antimicrobials	2019-2020	800,000.00	WHO NDOH		NMQCL established to facilitate monitoring of the quality of medical products
Strengthening NMQCL capacity for antimicrobial quality testing including reference library and technologies	2018-2021	91,500.00	NDOH		ISO accreditation
Conduct a forum with suppliers on the importance of quality antimicrobials	2020	15,000.00	WHO PSSB		Forum conducted
Strengthen capacity for inspection of safe food	2019-2023	67,938.75	NAQIA		Training workshop held

Cost Summary of Operational Plan (USD)	
Total Cost (USD):	11, 211,020.00
Funded (USD):	3,262,029.00
Unfunded (USD):	7,948,991.09
TOTAL COST:	11,436,643.34

Glossary

Antimicrobial resistance (AMR) – Refers to the natural phenomenon where antimicrobials can no longer be used effectively against infectious diseases caused by microorganisms (bacteria, fungi, viruses and parasites).

Antimicrobials – Are medicines that have antimicrobial activity against pathogenic organisms (such as antibiotics, antifungals, antivirals, antimalarial, and anthelmintic) and are used for humans, animals and agriculture, for the purpose of treating or preventing infectious diseases, or for use as growth promoters in animal feeds.

Extensive Drug Resistance (XDR) - Extensively drug-resistant TB (XDR TB) is a rare type of multidrug-resistant tuberculosis (MDR TB) that is resistant to isoniazid and rifampicin, plus any fluoroquinolone and at least one of three injectable second-line drugs (i.e., amikacin, kanamycin, or capreomycin)

Multi Drug Resistance (MDR) – Is the resistance developed by bacteria to two or more antibiotics from different classes

One Health – Is an approach that recognizes that the health of people is connected to the health of animal and the environment and therefore the different stakeholders including health, agriculture and environment have to work together to address AMR.

Contributors

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Medicines sans Frontier (MSF)
National Agriculture and Quarantine Inspection Authority (NAQIA)
National Agriculture and Research Institute (NARI)
National Fisheries Authority (NFA)
National Department of Health (NDoH)
Papua New Guinea Institute of Medical Research (PNGIMR)
Port Moresby General Hospital (PMGH)
University of Papua New Guinea, School of Medicine & Health Sciences
World Health Organization, PNG Country Office (WHO)
World Organization for Animal Health (OIE), PNG delegate
World Vision International, PNG Office

References

1. PNG Ministry of Health and World Health Organization, Papua New Guinea Pharmaceutical Country Profile. National Capital District, 2012.
2. World Health Organization, Country Cooperation Strategy at a glance, May 2014.
3. Papua New Guinea National Medicines Policy, 2014.
4. World Health Organization and National Department of Health, Papua New Guinea Country Situation Analysis – Antimicrobial Resistance, October 2016
5. World Health Organization, Global Action Plan on Antimicrobial Resistance, 2015
6. Aia P, Kal M, Lavu E, John LN, Johnson K, Coulter C, et al. (2016) The Burden of Drug-Resistant Tuberculosis in Papua New Guinea: Results of a Large Population-Based Survey. PLoS ONE 11(3)


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