

Terms of Reference for Request for Proposals

First Fleming Fund Country Grant to Papua New Guinea

1 Overview of this grant

This is a Request for Proposals (RFP) for the first Country Grant to address critical gaps in surveillance of antimicrobial-resistant bacteria in Papua New Guinea. The RFP has been created to support the Government of Papua New Guinea. The grant will be funded by the UK Department of Health and Social Care, under its Fleming Fund Grants Programme, which is managed by Mott MacDonald, the Management Agent.

This first Fleming Fund Country Grant for Papua New Guinea will focus on strengthening the antimicrobial resistance (AMR) and antimicrobial use (AMU) surveillance systems, and antimicrobial consumption (AMC) data capture in both the human and animal health sectors. It will facilitate a stronger One Health approach to surveillance, bringing together multi-sectoral stakeholders to share surveillance data and gain a better understanding of AMR, AMU and AMC.

This grant will align with the national AMR policy framework and with the investments made by other donors and stakeholders in this area. The focus will be on a One Health approach with improved coordination and data sharing of AMR, AMU and AMC across the human health, animal health and environmental sectors.

In the human health sector, the grant will seek to strengthen the Central Public Health Laboratory (CPHL), so that it can provide national reference laboratory functions for AMR, and also support improvement of bacterial culture services for the main hospital laboratories: Port Moresby General Hospital (PMGH), Angau Memorial General Hospital (in Lae), Mt Hagen General Hospital, Nonga General Hospital (in Rabaul), and Goroka Provincial Hospital. In the animal health sector, the grant will support the improvement of AMR surveillance and the monitoring of AMU and AMC, with the development of bacteriology including antimicrobial susceptibility testing (AST) at the National Animal Health and Food Testing Laboratory (NAHFTL).

The Grantee will be responsible to Mott MacDonald for all aspects of the grant, including the management of any partners, their performance, technical delivery and financial accountability. The Grantee will be required to sign a Grant Agreement and will be expected to enter into sub-granting arrangements with partners on the same back-to-back terms, if required.

The Grantee will need to work in close coordination with the National Antimicrobial Resistance Steering Committee (NAMRSC), as well as with Mott MacDonald and other stakeholders. The Grantee will be required to harmonise efforts on this Country Grant with other types of grants under the Fleming Fund Grants Programme, such as the Regional Grants and the Fleming Fellowship Scheme. The grant should also align with other development partners and the Government's Medium-Term Development Plan III 2018-2022.

This grant is expected to last 21 months ending no later than September 2021. Grant applications are expected to be in the region of £6-8 million, including all capital and recurrent costs, overheads and management costs.

2 Overview of the Fleming Fund

2.1 Introduction

The UK Government has established the Fleming Fund to respond to the global threat of increasing AMR. The Fleming Fund will be a critical support in achieving the resolution of the 68th World Health Assembly, 2015 (WHA A68/20), and in realising the Political Declaration of the High-Level Meeting of the United Nations General Assembly (UNGA) on Antimicrobial Resistance, 2016. These recognise that urgent cross-sectoral rationalisation of antimicrobial use in humans, animals, food, agriculture and aquaculture sectors are key to tackling AMR, and call for innovative research and development; affordable and accessible antimicrobial medicines and vaccines; improved surveillance and monitoring; increased governance on antimicrobial use; and increased international cooperation to control and prevent AMR.

The Fleming Fund aims to address critical gaps in the surveillance of antimicrobial-resistant bacteria in low- and middle-income countries (LMICs) in Asia and Sub-Saharan Africa. Countries in these areas are set to bear the highest burden of antimicrobial-resistant infections. A Global Action Plan on AMR has been developed by the World Health Organization which acts as the blueprint for a multi-stakeholder global response to averting a global health crisis caused by AMR.¹

The Fleming Fund comprises a number of workstreams. One workstream provides support to the Tripartite Alliance – the Food and Agriculture Organization (FAO), the World Organisation for Animal Health (OIE) and the World Health Organization (WHO) – as part of the ‘One Health’ approach. Through funding to the Tripartite Alliance, the Fleming Fund has contributed to the development of National Action Plans in Sub-Saharan Africa, South and South East Asia, and to the building of the evidence base and guidance for AMR surveillance. The Fleming Fund also funds initiatives in academic institutions to develop guidance on the development of AMR surveillance systems, such as the LSHTM Roadmap for developing an AMR surveillance protocol in human health systems.²

The Fleming Fund Grants Programme is the largest stream of financial support available through the wider Fleming Fund. The UK Department of Health and Social Care has appointed Mott MacDonald as the Fleming Fund Management Agent for the Fleming Fund Grants Programme. Mott MacDonald is a global company with expertise in multi-sectoral international development and fund management. On behalf of the UK Government, Mott MacDonald is responsible for funding allocation and oversight of all investments made across a wide portfolio of grants in different activities and in different countries.

Part of the aim of the Fleming Fund Grants Programme, particularly through Country Grants, is to improve the ability of recipient countries to diagnose drug-resistant infections, with an emphasis on bacterial infections, and to improve data and surveillance to inform policy and practice at national and international levels. The overall goal is to reduce the human and economic burden of AMR.

The geographic focus of the Fleming Fund Grants Programme is 20-24 LMICs from Sub-Saharan Africa, and South and South East Asia. It is providing financial support over a five-year period from 2017 to 2021 to participating countries via three funding channels:

- Country Grants

¹ <http://www.who.int/antimicrobial-resistance/global-action-plan/en/>

² <https://amr.lshtm.ac.uk/wp-content/uploads/sites/12/2016/11/AMR-Surveillance-Protocol.pdf>

- Fleming Fellowship Scheme Grants
- Regional Grants

Resources may also be available to conduct Operational Research on selected topics within these funding channels. These studies will provide an opportunity to better examine implementation ‘blockages’ or undertake more detailed case study analysis in themes of interest (e.g. value-for-money) for programme learning and adaption purposes.

The Fleming Fund will be independently evaluated by Itad, a specialist evaluation firm appointed by the UK Department of Health and Social Care.

2.2 Problem statement to be addressed by the Fleming Fund Country Grants

The main issues to be addressed by Fleming Fund Country Grants are:

- There are too few trained microbiologists to undertake the volume of testing required for representative surveillance on AMR.
- There are few health facilities that routinely undertake bacterial culture; no facilities that meet the requirements for accreditation, or who do routine antimicrobial susceptibility testing.
- Routine AMR surveillance in healthcare delivery is not practised, or there is no culture of surveillance for AMR in healthcare delivery and there are barriers to developing it.
- There is little perceived use of surveillance data at any level, including low demand for information related to AMR from policy makers.
- There is a lack of knowledge on the use and consumption of antimicrobial agents across One Health sectors.
- There is a lack of antimicrobial stewardship.
- Logistical challenges are significant – transporting samples in a safe and secure manner under often challenging transport conditions; ensuring a quality assured and sustained supply chain for reagents and consumables; and ensuring appropriate servicing of equipment for example.
- Surveillance systems (national, regional and global) that do exist are often vertical in nature, are not linked across sectors, and are often unwilling to integrate.
- There is a mixed picture across countries and regions in terms of starting points, political will, capability, and donor interest and engagement.
- There are poorly defined and applied quality assurance standards in laboratory testing.
- There is a lack of understanding from basic surveillance of pathogens on transmission patterns and drivers such as inappropriate use of antimicrobial drugs across all sectors.

2.3 Fleming Fund investment areas and outputs

To address the problems above, the Fleming Fund Grants Programme invests in:

- Laboratory infrastructure enhancement.
- Human resource strengthening and workforce reforms.
- Surveillance systems strengthening.
- Establishing mechanisms for AMR surveillance data use.
- Promoting rational use of antimicrobial medicines.

Investment in these areas is expected to achieve the following outputs:

- Improved laboratory conditions for bacterial identification and antimicrobial susceptibility testing (AST) and improved data quality.
- Strengthened One Health workforce with the necessary skills for AMR surveillance.
- Stronger AMR surveillance systems and processes at country and regional levels.
- Stronger demand for AMR data at regional, country, subnational and facility levels.
- Better knowledge of country level practices and use of antimicrobials (particularly for bacterial infection) across sectors.

Fleming Fund outputs are expected to contribute to the following country outputs:

- Increase in quality and quantity of AMR data collected.
- AMR data shared in country to support evidence-based policy and practices.
- AMR data shared internationally to improve and inform the global response.

The RFPs for Country Grants have been designed to ensure that investments and activities contribute directly to these outputs. Grantees are expected to adhere to and demonstrate this alignment and contribution to outputs in their applications.

2.4 Core principles within the Fleming Fund Grants Programme

The Fleming Fund is built on four core principles. Grantees are expected to demonstrate how they will align with these principles while implementing the grant.

- 1. Country Ownership:** The Fleming Fund Grants Programme will work closely with national governments to ensure that country plans and aspirations, as laid out in their National Action Plans, are implemented; Mott MacDonald as the Fleming Fund Management Agent will consult and work hand-in-hand with national governments to agree the approach and ensure sustainability. Grants and RFPs will conform to national priorities outlined in the National Action Plan and as articulated during Country Assessment visits. Unless there are good reasons not to do so, Fleming Fund grants will chiefly invest in public sector laboratories and surveillance systems, thereby supporting national public health systems.
- 2. One Health:** The Fleming Fund recognises that the problem of AMR is a great danger to human health and cannot be controlled without a One Health approach. A specific set of One Health investment parameters has also been developed and is summarised below. This approach is aligned with key documents and guidelines from OIE³ and FAO⁴ as well as the Global Action Plan.
 - a. Collaborative multi-sectoral governance of AMR:** Leadership and resourcing of AMR surveillance and mitigation measures in all sectors that directly contribute to the emergence of AMR.
 - b. Integrated AMR and antimicrobial use and consumption surveillance in all sectors:** Surveillance, data collection and analysis in humans, livestock, aquaculture, crops, food and the environment to

³ OIE Standards, Guideline and Resolution on Antimicrobial resistance and the use of antimicrobial agents;

⁴ The FAO Action Plan on Antimicrobial Resistance, 2016-2020.

produce information that is interpreted by multi-sectoral teams to help understand factors associated with AMR emergence within and between sectors

- c. **AMR mitigation policies and programmes prioritised across multiple sectors:** Evidence-based policies and programmes for AMR mitigation measures that are prioritised across the relevant sectors, based on information generated through AMR and AMU/AMC surveillance in all sectors.

3. Alignment of Approach: The Fleming Fund Grants Programme will seek to invest in areas which complement and build on work done to date, rather than create new systems. Grant applicants will need to demonstrate that they understand other actors' work in the field of improved laboratory capacity (both within and outside the sphere of AMR surveillance), improved disease surveillance and the One Health approach. The Fleming Fund Grants Programme will assess grants for duplication of efforts and/or the development of parallel systems. To the extent possible, prospective Grantees will need to demonstrate how their proposals add value to existing and planned investments and systems.

4. Sustainability: The Fleming Fund Grants Programme will focus assistance on national systems with a view to long-term sustainability. Investment size and scope should, as far as possible, be aligned with national government spending so that systems created with Fleming Fund grants are sustainable within the public health system. We also recognise that the public good of conducting AMR surveillance means medium- to long-term support.

A clear preference will be given when evaluating proposals to those bidders who can demonstrate that they have:

- Specifically examined the technical, institutional, political and other barriers that restrict the usage of AMR evidence in policy and implementation;
- Included in their bids real-time feedback mechanisms to determine if the laboratory inputs and outputs are being used by decision makers to improve AMR resistance policy and practices;
- demonstrated they have a realistic budget for preventive maintenance for key laboratory and scientific equipment and / or other specific mechanisms to ensure sustainability of the investments made.

2.5 Fleming Fund activities in Papua New Guinea to date

This is the first RFP for a Fleming Fund Country Grant to be released in Papua New Guinea through the Fleming Fund Grants Programme. In preparation for this grant, Mott MacDonald carried out an early desk-based assessment, followed by a visit by the Regional Coordinator in early January 2019 to assess interest and the realities on the ground. Following a positive response to the mission, a Scoping Visit was undertaken by a

technical team in early February 2018 and the Positioning Activities Visit in mid-March 2019 to detail the scope of the Country Grant.

Key stakeholders in the animal and human health sectors have been consulted throughout the process, including government officials, UN agencies and other development partners. This is to assist in the alignment of Fleming Fund grant investments with national priorities and other proposed activities.

3 The current AMR situation in Papua New Guinea

3.1 National Action Plan for AMR

Papua New Guinea developed a multisectoral National Action Plan (NAP) on Antimicrobial Resistance (2017-2020) with technical support from WHO; the NAP has been endorsed by the National Department of Health (NDoH) but is awaiting formal sign-off by the Department of Agriculture and Livestock (DAL) and the Department of Environment and Conservation (DEC). A multisectoral National AMR Steering Committee (NAMRSC) was established as part of this process, and this is to be supported by sectoral Technical Working Groups (TWGs) who will address the strategic objectives of the NAP. The implementation of the NAP to date has been limited with only some awareness and behaviour change communication activities being carried out.

The NAP has five objectives, with indicative strategies, for implementation:

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

Strategies:

- Finalise the national action plan on AMR
- Establish a multi-sectoral mechanism for finalising and implementing the NAP
- Ensure sustainable investment in combating AMR

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

Strategies:

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

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

Strategies:

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

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

Strategies:

- Establish a national infection prevention and control programme to strengthen hospital infection control
 - Strengthen infection control for MDR/XDR-TB patients in health-care facilities, community, public spaces and transport
 - Promote good infection control and biosecurity practices in animal husbandry
- Objective 5. Strengthen appropriate access and optimise the use of antimicrobial medicines in all sectors.

Strategies:

- Strengthen regulations to promote responsible use of antimicrobials with prescription only
- Strengthen procurement and supply of antimicrobials

While the predominant focus of the Fleming Fund Country Grant is to strengthen laboratory and surveillance capacity for AMR, focussing mainly on the relevant parts of Objectives 1 and 3, there are other objectives that will also benefit directly or indirectly. It should be noted, however, that Objective 4 is considered outside the scope of the Fleming Fund investment, that the Country Grant programme does not fund research (within Objective 3) or directly ‘strengthen access to antimicrobial medicines’ (part of Objective 5), and that the focus is on surveillance for bacterial antimicrobial resistance (other than mycobacteria) and particularly the drug-resistant bacterial infections caused by the organisms identified by the WHO Global Antimicrobial Surveillance System (GLASS) as priorities for surveillance.

While this RFP directly supports some objectives of the NAP, it is expected that the data generated by the surveillance system will have direct impact on strategy(ies) related to other objectives of the NAP – for example, by making use of data to promote policy and/or practice change.

3.2 One Health

While the NAP for AMR describes the One Health approach, to date there has been limited progress in implementing the plan. The Food and Agriculture Organization of the United Nations (FAO) are separately developing a ‘One Health Programme’ with an inception meeting planned in 2019; at the time of publishing this RFP, the focus area had not yet been finalised.

The ‘Field Epidemiology Training Program of Papua New Guinea’ (FETPNG) was a joint programme between human health and animal health. FETPNG was implemented to address a critical shortage in field epidemiology expertise and to help address national public health challenges; it was implemented in the period 2013–2017. The programme was a collaboration between the NDoH, WHO, Hunter New England Health and the US CDC. Five FETPNG cohorts were delivered and a total of 69 field epidemiologists are now working across the 22 provinces of Papua New Guinea. One animal health officer from the National Agriculture Quarantine and Inspection Authority (NAQIA) was trained in the programme.

An advanced epidemiology programme for Papua New Guinea, ‘Accelerating the Development of Evidence-based Policy and Practice’ (ADEPpt), has been developed and was scheduled to commence in March 2019. ADEPpt is to re-engage with FETPNG graduates in a structured two-year programme of field epidemiology and operational research. The ADEPpt Project aims to bring together senior policymakers with trained frontline health care practitioners.

The role of the multisectoral NAMRSC is to guide the delivery of the NAP on AMR; it is to have annual chairs rotating between NDoH, DAL and DEC. The wider NAMRSC membership is made up of representatives from

NDoH, DAL, DEC and agencies including NAQIA, the Institute of Medical Research (IMR), the University of Papua New Guinea, the Nurse Association of Papua New Guinea, the Pharmaceutical Society of Papua New Guinea, veterinary clinics, NGOs and the private sector. Observers from international agencies include WHO, FAO, DFAT, US CDC USAID, JICA and the Burnet Institute.

The Secretariat of the NAMRSC is to be provided by the Pharmaceutical Services Standards Branch (PSSB) of NDoH. The TWGs in each department – NDoH, DAL (with NAQIA) and DEC (with the Conservation and Environment Protection Authority) – are responsible for delivering the plan.

The NAP recognises that implementation will require close cooperation between the sectors and has adopted a ‘One Health’ approach as a guiding principle for working together to address AMR issues.

3.3 AMR surveillance and laboratory capacity – human health

The AMR NAP sets out the steps to be taken to understand how resistance might be developing and spreading in the country. This is to be achieved by implementing a ‘nationwide AMR surveillance system in place along with a national early warning system to identify the emergence of resistance in priority pathogens and to critical antimicrobials by 2019’. However, this is unlikely to be achieved within this year. By the end of the 2018 data call, PNG had not enrolled in GLASS.

The surveillance system in Papua New Guinea is managed by the surveillance unit of the NDoH. This department produces a monthly epidemiology bulletin but does not currently have any role or input into AMR surveillance.

Papua New Guinea participated in the WHO Gonorrhoea Antimicrobial Surveillance Programme (GASP) until 2010, when funding ceased. Penicillin resistance was noted to be a significant issue during the programme. Since 2010, there have been no specific bacterial AMR surveillance programmes, although a number of disease-specific programmes have collected some AMR data.

CPHL has been identified to perform the national reference laboratory function for AMR, and the focus for investment is to develop national reference capacity for development of national antibiograms. CPHL should be supported to become an effective AMR coordinating laboratory.

In addition to CPHL, five hospitals have been selected for strengthening of their bacteriology laboratories, as part of the national AMR surveillance programme:

- PMGH – this is the largest hospital in Papua New Guinea and serves as the tertiary referral hospital for the entire country; it is also a major teaching hospital.
- Angau Memorial General Hospital (in Lae)
- Mount Hagen General Hospital
- Nonga General Hospital (in Rabaul)
- Goroka Provincial Hospital

Transport of samples to and from these hospital laboratories is limited by poor infrastructure, systems and limited resources. Travel between many of the main centres in the country is by air and is costly, further limiting surveillance efforts.

3.4 AMR surveillance and laboratory capacity – animal health

As in the human health sector, there is not yet any formal AMR surveillance programme in animals and currently no data is available from the animal health sector on AMR.

Although DAL oversees overall sectoral policy, animal health in Papua New Guinea is overseen by NAQIA, which is an autonomous authority within DAL. NAQIA is mandated to protect animals, plants, and the environment from exotic pests and diseases and endemics. There is a NAQIA Board of Directors that provides strategic policy directives; DAL is a member of the NAQIA Board.

The sole veterinary laboratory in the country is the National Animal Health and Food Testing Laboratory (NAHFTL) at Kilakila (near Port Moresby), provided under the NAQIA mandate. The NAHFTL has two main capabilities: a food testing laboratory and an animal disease diagnostic laboratory. The Food Testing Laboratory can conduct basic bacteriology but no antimicrobial susceptibility testing (AST) is carried out; there is currently no diagnostic bacteriology capability at NAHFTL.

There is no veterinary school in Papua New Guinea and there is no Papua New Guinean national veterinarian working for DAL or NAQIA. Some Provincial DAL officers and NAQIA officers have received training as veterinary paraprofessionals including in meat inspection. The meat inspection programme is operated or supervised by NAQIA in the regional and provincial centres. No samples are collected for bacteriology or AMR testing as part of the meat inspection programme, and there is no testing of samples from clinical cases by bacterial culture.

A major limitation in the implementation of AMR activities in Papua New Guinea is the lack of human resources and operational funding. There are no bacteriologists working at NAHFTL and epidemiology skills are limited. Confounding these limitations is the lack of good livestock demographic information – there are estimates on animal population at district, provincial or national levels on animal species, production systems, slaughterhouses or processors – but no official statistics.

DAL is the focal point for the Codex Alimentarius. The OIE Papua New Guinea Country Delegate is usually the Chief Veterinary Officer (CVO) or the Chief Quarantine Officer Animals who sits in NAQIA.

NAQIA undertook a limited survey on veterinary antimicrobial usage in Papua New Guinea, using OIE guidelines, in 2016. The survey found that ‘NAQIA recognised the magnitude of the AMR problem as well as the lack of AMR and AMU data in the agro-veterinary sector in the country.’ It went on to say that AMR is considered a ‘serious biosecurity threat to Papua New Guinea vision 2050 and to its unique biodiversity and high animal health status.’

3.5 Rational use of drugs

The legal authority for the oversight of all medicines (human and animal) lies with the NDoH under the Medicines and Cosmetic Act (1999) and the Medicine and Cosmetic Regulations (2002). However, NDoH do not currently exercise any authority over veterinary products including veterinary antimicrobials. The NDoH’s National Medicines Policy (2014) seeks to promote collaboration between NDoH and NAQIA to ensure rational use and importation of veterinary medicines. There is no local manufacture and so all human and veterinary medicines are imported.

The Pharmaceutical Services and Standards Branch (PSSB) of NDoH registers human and veterinary medicines for use in Papua New Guinea and also the registration of importers/wholesalers. PSSB also manages pharmacovigilance in the country.

The Medicine Quality Control Laboratory has the mandate for testing medicine quality and has recently benefited from support from DFAT, WHO and US Pharmacopoeia.

The Medical Supplies, Procurement and the Distribution Branch (MSPDB) of NDoH purchases antimicrobials and other medicines through a tender process managed by the Pharmaceutical Supplies and Tenders Board

(PSTB) with import/distribution by registered ‘pharmaceutical establishments’ (acting as local wholesalers). NDoH have some AMU/AMC information as they provide antimicrobials through the Central Medicine Store and onwards through four ‘Area Medical Stores’ for onward distribution to government hospitals, clinics and health centres where they are provided to patients free of charge; if the designated antimicrobial is not available then they may be purchased from private pharmacies and other outlets. There is virtually no availability of third/fourth line therapies (carbapenems, colistin, linezolid, tigecycline) outside the private sector. Though notionally antimicrobials are prescription only under the Medicines and Cosmetics Act (1999), it is perceived that there is limited enforcement.

A point prevalence survey conducted several years ago found that 60% of hospital inpatients were on antimicrobials at any time, and long intravenous courses were favoured as these were perceived as being more effective. In the community, it is understood that patients frequently self-prescribe, as a prelude or alternative to seeking healthcare advice. First-line antimicrobials are readily available in the community from unauthorised vendors and patients will often buy single tablets or shortened courses according to affordability.

NAQIA has no formal authority to regulate antimicrobials though it can regulate biologicals (vaccines and reagents) under the Quarantine Act (1953) and NAQIA Act (1997). Import licenses are required for all imports – both from NAQIA, for government service delivery, and from the private sector. The import licences provide base level data on AMC. A preliminary study, undertaken by NAQIA, estimated the distribution of antimicrobials and AMU at targeted agricultural stores, commercial producers, human pharmacies and government institutions. There is no legislation in place to restrict the use in animals of critically important medicines for human use, and there is no regulation to restrict the use of antimicrobials as growth promoters.

Private sector pharmacies are able to sell antimicrobials for use in both people and animals, though usually only human products are stocked. The few agricultural supply stores sell veterinary antimicrobials for animal use as injectables and as oral treatments – powders and water-soluble products. Prescriptions are not required for over-the-counter dispensing.

4 Scope of this Country Grant

4.1 Grant Objectives and Outputs

Objectives and outputs for this Country Grant are summarised below, and Section 7 provides more detail. It is expected that applicants will respond to this RFP by developing and proposing activities that are costed and by proposing appropriate indicators (see Section 9). All inputs must be permitted under the list of Eligible Funding Items, as outlined in Annex 1.

For human health, the Country Grant is intended to support / improve implementation of the WHO GLASS programme and Grantees should refer to the roadmap for GLASS participation produced by the London School of Hygiene and Tropical Medicine

(<https://amr.lshhtm.ac.uk/wp-content/uploads/sites/12/2016/11/AMR-Surveillance-Protocol.pdf>)

Objective/Output

Objective 1: Strengthened One Health approaches to information sharing

Output 1.1: Functional NAMRSC established with regular coordination meetings and annual national AMR/AMU/AMC symposiums

Objective/Output
Output 1.2: AMR, AMU and AMC surveillance information is shared between NDoH, DAL and DEC
Objective 2: Strengthened AMR, AMU and AMC surveillance and monitoring systems in the human health sector
Output 2.1: CPHL is functioning as the national reference laboratory for AMR
Output 2.2: CPHL is functioning as AMR data centre
Output 2.3: AMR surveillance site laboratories are providing effective bacteriology services for GLASS priority pathogens
Output 2.4: AMR results and relevant clinical data at surveillance sites are captured, shared with clinical teams and submitted to CPHL
Output 2.5: Improved biosafety and biosecurity of CPHL and at all surveillance site laboratories
Output 2.6: Improved on-site specimen collection and transportation to CPHL for confirmatory testing
Output 2.7: AMU and AMC surveillance and monitoring systems are developed and piloted
Objective 3: Strengthened AMR, AMU and AMC surveillance and monitoring systems in the animal health sector
Output 3.1: NAHFTL is providing reliable culture, identification and AST results
Output 3.2: Improved biosafety and biosecurity at NAHFTL
Output 3.3: AMR surveillance in the animal health sector is developed with a formal sampling plan, sample collection and testing with the AMR results being analysed and reported by NAQIA
Output 3.4: AMC and AMU surveillance system is developed, and data is analysed and reported by NAQIA
Output 3.5: NAQIA is leading knowledge management and policy development for AMR, AMU and AMC in animals

4.2 Laboratories to be supported by the grant

In addition to CPHL, the following sites should be supported by the grant.

Table 1. List of human and animal surveillance sites identified for Fleming Fund support

No.	Site	Location	Sector
1	Port Moresby General Hospital (PMGH)	Port Moresby	Human
2	Angau Memorial Hospital	Lae	Human
3	Mount Hagen General Hospital	Mt. Hagen	Human
4	Nonga General Hospital	Rabaul	Human
5	Goroka Provincial Hospital	Goroka	Human
6	National Animal Health and Food Testing Laboratory (NAHFTL)	Kilakila	Animal
7	Lae animal sampling handling facility (NAQIA)	Lae	Animal

4.3 Duration of the grant

The grant is expected to last for 21 months.

4.4 Funding envelope

Grant applications should be in the region of £6-8 million, including all capital and recurrent costs, overheads and management costs.

The Fleming Fund wishes to see value for money (VfM), and all applicants will be expected to demonstrate their understanding of VfM. The Guidance Notes for the Grant Application Form describes the different dimensions that should be considered as part of a VfM approach – economy, efficiency and effectiveness – and an indication of how VfM will be assessed.

4.5 Procurement

Applicants should include a placeholder in their proposals to the value of GBP 2,800,000 to cover equipment, maintenance, supplies. An additional GBP 1,400,000 placeholder should be included to cover laboratory renovations.

Highly preferential rates have been secured by the Fleming Fund for the purchase of key laboratory instruments, namely blood culture analysers (BACTEC or BacT/Alert), automated antimicrobial susceptibility testing platforms (Vitek II or BD Phoenix), and MALDI-TOF mass spectrometers (Bruker or Vitek MS).

To take advantage of these rates, these instruments will be procured centrally by the Management Agent's procurement partner, International Procurement Agency (IPA), who will also co-ordinate delivery.

Where identified and appropriate, blood culture analysers will be supplied to laboratories providing a clinical service, with the final number determined by the laboratory assessments. Each automated AST platform will be supplied, bundled together, with a mass spectrometry instruments, with the necessary databases and

linkage software. A maximum of two of these bundles (i.e. two AST platforms linked with two mass spectrometers) will be supplied for use in the AMR reference laboratories (animal health and human health). If the reference laboratories do not have sufficient specimen throughput, or do not have the required infrastructure, the instruments may be deployed, with the approval of the Management Agent, to alternative sites.

These items will be paid for directly by the Fleming Fund via a grant to IPA. This will include the instruments, delivery, import duties (up to 15%), installation, basic training, software and first year service contracts.

Reagent costs and subsequent service contracts will come from the Country Grant budget and should be included with the proposal. All other laboratory equipment and costs will also come from the Country Grant budget and should also be included within the proposal.

Suppliers (Biomerieux or Beckton Dickinson) have been preselected for each country by the Management Agent. However, purchase and delivery will be co-ordinated by IPA, and the Grantee will need to work with IPA to confirm readiness for delivery. Purchase of additional instruments, if required, should also be done via IPA, with the approval of the Management Agent, to secure the highly preferential prices offered to the Fleming Fund.

4.4.1 Laboratory equipment and consumables

Laboratory assessments were completed for six of the seven identified laboratories and findings will be provided to the successful applicant. The Grantee is expected to finalise the specifications for equipment and consumables, and to develop a procurement plan and budget within the first three months of the Country Grant.

Following approval from Mott MacDonald, the Grantee is to undertake the procurement with the choice of procurement route being subject to review by IPA; the Grantee will be expected to work with IPA to optimise the procurement process.

The Grantee will be expected to:

- Assist with the import and delivery of any equipment procured by IPA or themselves, where relevant.
- Work closely with suppliers to ensure that delivery of items is appropriately sequenced.
- Maintain an asset register of all items that are defined as assets by the programme.
- Monitor items provided by the Fleming Fund Grants Programme to ensure they are being used as intended and being maintained appropriately.
- Report any misuse or misappropriation of assets to Mott MacDonald.

4.4.2 Renovation of laboratories

Laboratories require varying degrees of renovation which can be supported by the Fleming Fund Grants Programme. The Grantee will need to oversee/undertake the renovation and procurement required by the laboratories. The Grantee should undertake detailed site assessments in the early stages of the grant.

Grantees should indicate how they will manage the renovation of laboratories and provide details of their experience undertaking such work. For all items procured for laboratory renovations, the Grantee will be expected to:

- Maintain an asset register of all items that are defined as assets by the programme.
- Monitor items procured by Fleming Fund Grants Programme to ensure they are being used as intended and being maintained appropriately.

- Report any misuse or misappropriation of assets to Mott MacDonald.

As with the laboratory equipment and consumables, the detailed procurement plan and budget will need to be reviewed and agreed by Mott MacDonald, and the choice of procurement route will be subject to assessment by the IPA.

5 Key partnerships, alignment and coordination

The Country Grant should be delivered in a way which supports the national AMR-related effort as stated in the NAP and which takes account of current capacity levels, absorptive capacity, alignment with other development partners, and national strategies and priorities/policies. This should include WHO, FAO, DFAT (both through the health team in-country and the Centre for Health Security in Canberra), and other implementing partners who are working with laboratories, surveillance, or AMR.

Allocation of grant resources should support the national effort in a transparent way by specifying resource allocation in a workplan and budget that has been jointly developed by government officials and the Grantee, where possible.

Much of the success of this grant, in particular Objective 1, depends upon the ability of the Grantee to bring cross-sectoral stakeholders together and facilitate joint working.

The Grantee should be mindful of, and contribute to, the achievement of the Key Result Areas (KRAs) stated in Papua New Guinea's Medium-Term Development Plan (MTDP) volume III – in particular KRA 1: Increased revenue and wealth creation; KRA 2: Quality infrastructure and utilities; KRA 5: Improved service delivery; KRA 6: Improved governance; and KRA 7: Responsible sustainable development.

6 Complementing other grants from the Fleming Fund Grants Programme

The Country Grant is expected to work effectively and synergistically with other grants under the Fleming Fund Grants Programme at the regional level. This relates to both the Regional Grants and the Fleming Fellowship Scheme.

Regional Grants will focus on strengthening networking and data sharing on AMR at the regional level. The Grantee is expected to liaise, through Mott MacDonald, with the Regional Grants Programme to maximise the sharing of AMR data and learning at the regional and global levels.

The Fleming Fellowship Scheme is part of the broader Fleming Fund Grants Programme and is also managed by Mott MacDonald. Fellowships will provide grants to fund a 1-2-year programme of structured learning, mentoring and skills development for 4-8 Fellows in each investment country. The Fellowships will primarily provide basic trainings addressing priority needs. When possible, it will also focus on building advanced skills and leadership to promote the application of best practice in identified 'Beneficiary Institutions.'

According to current plans, eight Fleming Fellowships – to comprise five for the human health sector and three for the animal health sector – are proposed for Papua New Guinea. Successful applicants will receive

specialised training in AMR epidemiology, AMU and AMC data management and analysis, laboratory quality management, advanced laboratory technical skills and in coordination and policy development.

Fellows are expected to become technical leaders in AMR and AMU surveillance in Papua New Guinea, and to play a role as mentors and trainers in capacity building activities that will be implemented through this Country Grant. Therefore, once established, the Grantee is expected to align and collaborate with Fleming Fellows, their Beneficiary Institution (where they are usually based) and their Host Institutions (who provide mentorship to the Fleming Fellows).

Summary terms of reference for all the Fellowships, currently being finalised, are attached in Annex 2. It is expected that, by the time the Grantee can begin implementing the Country Grant, the Fellowships will be established.

7 Detailed Objectives and Outputs

7.1 Objective 1: Strengthened One Health approaches to information sharing

Output 1.1: Functional NAMRSC established with regular coordination meetings and annual national AMR/AMU/AMC symposiums

The NAMRSC and its Secretariat (PSSB of NDoH) will be supported to become fully operational. NAMRSC meetings will include participants as outlined in the NAP and/or as considered relevant to AMR. The wider membership of NAMRSC should include NGOs and the private sector, as outlined in the NAP. The NAMRSC should also include observers from key development partners.

By the end of the grant, it is expected that the following will have been achieved:

- Regular meetings of NAMRSC being held at least every 3 months to provide coordination in the development of information sharing between the sectors, to address organisational issues, and to develop policies on AMR as appropriate
- The TWGs should be established in the first 6 months of the project, with appropriate membership and work plans to support human laboratory and AMR surveillance, animal laboratory and AMR surveillance, human AMU stewardship and surveillance, animal AMU stewardship and surveillance, and improved biosafety and biosecurity of the laboratories. The TWGs should meet monthly or as required and provide meeting and activity reports to the NAMRSC. Annual national symposiums (likely two over the lifetime of the grant) are held to share and review AMR, AMU and AMC information with active participation by representatives from NDoH, DAL, NAQIA, and DEC, and development partners from the human and animal health sectors.

Output 1.2: AMR, AMU and AMC surveillance information is shared between NDoH, DAL and DEC

The NAMRSC and its Secretariat will develop mechanisms and implement ongoing sharing of information on AMR, AMU and AMC between the sectors to improve the understanding of AMR issues in Papua New Guinea.

By the end of the grant, it is expected that the following will have been achieved:

- information is being shared between the sectors with improved cross-sectoral understanding of AMR issues.
- NAMRSC with the TWGs have established a cooperative and collaborative relationship that facilitates sharing of information on AMR, AMU and AMC between the human and animal sectors.

- NDoH, DAL, DEC with NAQIA and CEPA produce sector-based reports on AMR, AMU and AMC surveillance that includes a section cross-referencing and analysing the surveillance data from other sectors and potential impacts on their sectors.
- Policy initiatives are being developed by NAMRSC to mitigate the risks of AMR in Papua New Guinea

7.2 Objective 2: Strengthened AMR, AMU and AMC surveillance and monitoring systems in the human health sector

Output 2.1: CPHL is functioning as the national reference laboratory for AMR

The Grantee is expected to finalise the laboratory requirements for CPHL, including infrastructure, equipment, diagnostic capability, and AMR data management. The Grantee is then expected to deliver the grant so that these requirements are fulfilled.

In particular, the Grantee should address:

- Utilities, including mains electricity, back-up power, and UPS systems for critical instruments, including ensuring systems can support the anticipated load
- Laboratory renovations and equipment required for high-quality reliable bacterial isolation, identification and AST
- Laboratory biosafety and biosecurity systems
- Information technology (hardware and software) requirements for AMR surveillance data

CPHL should take on the function of the national reference laboratory for AMR, with the necessary key functions (e.g. confirmation of unusual resistance patterns, advanced organism identification and AST) as outlined in the LSHTM Roadmap.⁵

Areas for support by the Grantee should include:

- **External quality assurance (EQA).** CPHL should participate in at least one international bacteriology EQA scheme including a proficiency testing scheme for AST, recognised or operated by an international reference laboratory. The Grantee should support and monitor the implementation of EQA.
- **Maintenance.** There are challenges in maintenance of laboratory equipment in Papua New Guinea, in part due to a lack of technical maintenance professionals in-country. The Grantee should review the status of key specialist equipment relevant for bacterial culture, identification and AST, and support provision of the necessary service and maintenance contracts, and, where necessary, the training of in-country biomedical engineers, to ensure satisfactory performance of the instruments.
- **Provision of advanced testing services.** The Grantee should support CPHL to develop advanced services for bacterial identification and AST as expected of a national reference laboratory. This should include confirmatory methods for e.g. ESBL and carbapenemase production, and MIC methods for isolates with borderline resistance or species which should be tested by an MIC method. Purchase of automated ID/AST systems and MALDI-TOF for CPHL can be supported by the grant, subject to discussions and agreement between Mott MacDonald and the instrument supplier.
- **Biorepository.** A secure repository of isolates is important to allow future investigation of the isolated pathogens, for example tracing origin and transmission of outbreaks, or confirming the genetic basis of resistance. The grantee is expected to develop a biorepository system (e.g. ultra-low freezers, or a

⁵ <https://amr.lshtm.ac.uk/wp-content/uploads/sites/12/2016/11/AMR-Surveillance-Protocol.pdf>

lyophilisation system) with consideration of the power supply and back-up sources. Development of the repository should include Standard Operating Procedures (SOPs) for determining which isolates get selected for banking, for how long they are retained, and how access is granted for their use. Isolates should be inventoried using an appropriate system and be linked to relevant epidemiological data such as source demographics and available clinical data.

By the end of the grant, it is expected that the following will have been achieved:

- CPHL is performing as the national reference laboratory for Papua New Guinea, including providing support to the NAHFTL for the animal health sector. The following outputs should be completed.
 - Microbiology technicians at CPHL are trained and able to conduct bacterial culture, identification and AST using conventional methods and more advanced techniques.
 - Quality Management Systems (QMS) are developed for the laboratory, and it is participating in an international proficiency testing or other EQA scheme
 - CPHL is providing national support for AMR surveillance, for example, providing national guidelines and SOPs, developing bench guides/flow charts, developing internal QC processes for instruments, reagents and methods
 - A stable supply of blood (sheep or horse) for the preparation of blood agar is established, potentially in conjunction with NAQIA.
 - Training and mentoring are provided on QMS for surveillance site laboratories, providing an EQA validating service for surveillance site laboratories, providing re-testing and feedback on a subset of isolates, and developing a proficiency testing scheme for the GLASS pathogens as part of the QA process for surveillance site laboratories.
 - A secure, inventoried, biorepository system is in place as outlined above
 - A Laboratory Information Management System (LIMS) is in use that allows collection of laboratory data in an electronic format; this can be WHONET or an alternative LIMS with WHONET compatibility to avoid unnecessary repeat data entry at the laboratory. The database should use appropriate data backup systems.

Output 2.2: CPHL is functioning as the AMR data centre

At present, no entity is responsible for collecting, storing, analysing and reporting laboratory AMR data to the NAMRSC. The Grantee should undertake activities to enable CPHL to perform this function, including the set-up of systems and processes to allow data storing and analysis, including the use of software as appropriate.

By the end of the grant, it is expected that the following will have been achieved:

- An AMR data centre is established at CPHL, with CPHL staff appropriately trained to manage it.
- CPHL is effectively leading laboratory AMR surveillance data collection, storage, and analysis.
- CPHL provides SOPs on clinical, epidemiological, and laboratory data collection to surveillance sites.
- CPHL is sending nationally collated resistance data on priority pathogens to the surveillance sites.
- CPHL produces a quarterly report showing the results from analyses of the AMR surveillance data and shares the results with the NAMRSC
- Data on GLASS priority pathogens is available in a format that allows it to contribute to GLASS.

Output 2.3: AMR surveillance site laboratories are providing effective bacteriology services for GLASS priority pathogens

The focus of this Country Grant is to develop systems that allow passive surveillance for bacterial drug-resistant infection. This is primarily through the provision of blood culture services which can provide reliable results within a clinically relevant timeframe (to ensure clinical engagement and direct use of data for patient care) as well as contributing to country level surveillance data.

However, developing sustainable bacteriology laboratory services in Papua New Guinea presents several challenges, including limited human resources, increased expense in importing instruments, reagents and consumables, and costly transportation networks.

Applicants should formulate their workplans with a view to strengthening the laboratories, as identified in Table 1, with each laboratory conducting blood culture testing, and utilising CPHL for confirmatory testing. The proposal should include costs for staff training and transportation of samples. Please refer to Section 4.5 for additional details on how to include proposed costs for equipment, consumables, supplies, and refurbishment.

Within the first three months, the Grantee will be expected to undertake a costed options appraisal for developing clinical bacteriology for the sites identified in Table 1, to include the following (and others, as appropriate):

- standard development of bacteriology services at each site for ID/AST, sending isolates to CPHL only for confirmation
- stepwise laboratory improvement, with Gram stain +/- basic biochemical testing performed at site but formal ID and AST done centrally
- development of a hub and spoke model, with positive bottles sent directly to CPHL and efforts focused on developing transport and rapid reporting systems
- use of container laboratories

For each option, consideration should be given to feasibility, timescale, cost, sustainability, human resources, expected sample throughput and turnaround/reporting times. At least one mass spectrometry (MALDI-TOF) instrument and automated AST platform will be purchased for the country, likely located at CPHL. Additional options, e.g. local provision of urine cultures, will also be considered if appropriate.

The options appraisal should either confirm the approach that has been proposed or offer an improved modality for achieving the goals of the Country Grant. This will require discussion and any changes to the proposal will require approval from Mott MacDonald.

By the end of the first three months, it is expected that the following will have been achieved:

- A costed options appraisal that has been discussed with Mott MacDonald and a more refined understanding of expected costs going forwards.

By the end of the grant, it is expected that the following will have been achieved:

- All sites in Table 1 are providing a clinical diagnostic blood culture service, are able to provide results to clinicians within a clinically useful timeframe, and are contributing data to the national surveillance system
- Relevant SOPs are in place to support the production of reliable data for both clinical and national surveillance
- A stock management system is being used to ensure availability of laboratory consumables and reagents

- A Quality Management System is implemented at each site (relevant to the functions performed by that site) to support production of reliable, timely bacteriology results for clinical use and AMR surveillance
- QC systems are developed and operating for relevant equipment, with training, monitoring and logging of corrective actions
- Key equipment is maintained and under the required service contract
- Ongoing professional development programme for laboratory staff to include the functions performed at each site
- Data management systems in place at each site to allow reporting of results centrally as well as local analysis of sample throughput and resistance profiles
- If appropriate and feasible, in conjunction with NAQIA, a stable supply of blood (sheep or horse) is established for the preparation of blood agar for sites performing in-house culture

Output 2.4: AMR results and relevant clinical data at surveillance sites are captured, shared with clinical teams and submitted to CPHL

Available clinical data should be integrated into the surveillance system and linked to the laboratory results to contribute to a better analysis, understanding and use of the AMR data. Communications between the laboratories and clinicians should be supported to improve sample throughput and quality, and facilitate the sharing of clinical data and AMR.

Data is to be shared with the NAMRSC, who have responsibility for informing policy, as well as the surveillance unit at the NDoH, to maximise the use of the data at the national level. The data sharing and feedback systems between the surveillance sites, CPHL, NAMRSC and the surveillance unit at NDoH are to be developed.

By the end of the grant, it is expected that the following will have been achieved:

- Available clinical data is incorporated into the LIMS of the surveillance sites.
- An analytical framework which includes appropriate indicators and denominators, and incorporates available clinical and AMR data is developed to ensure that data is used and interpreted.
- AMR data, with relevant clinical details, are being shared between clinicians and the microbiology laboratory managers at the surveillance sites and with NAMRSC and the surveillance unit at NDoH
- A sustainable AMR data sharing and feedback system is operational between the surveillance sites, CPHL, NAMRSC, and the surveillance unit at NDoH.

Output 2.5: Improved biosafety and biosecurity of CPHL and at all surveillance site laboratories

The Grantee is expected to provide/enhance infrastructure, to develop systems and to provide training and technical assistance to ensure a high level of biosafety and biosecurity.

By the end of the grant, it is expected that the following will have been achieved:

- A Biosafety Officer is in place at CPHL to oversee implementation of a biosafety and biosecurity programme at CPHL and also to provide support to the other laboratories.
- CPHL and the surveillance sites are equipped with appropriate safety equipment, and staff are wearing the necessary personal protective equipment while conducting testing.
- All biosafety cabinets are regularly maintained and calibrated, and staff have been trained in their use.
- All waste is disposed of in a biosafe manner.
- Appropriate training and monitoring systems for biosafety and biosecurity have been established.

Output 2.6: Improved on-site specimen collection and transportation to CPHL for confirmatory testing

The appropriate and timely collection and transport of specimens for microbiology, including AST, is important to support clinical treatment and to develop an understanding of AMR in the country. Delays can reduce specimen quality and the reliability of the result, which may result in unnecessary or inappropriate use of antibiotic treatment and unnecessary costs of repeat investigations.

By the end of the grant, it is expected that the following will have been achieved:

- Engagement undertaken with clinical teams to ensure appropriate sampling, timely feedback of results at the individual patient level of bacteriology and AMR data.
- An increased number of bacteriology samples are being collected at each site.
- Clinical teams are collecting samples appropriately and minimising contamination.
- A reliable, timely, and safe specimen transport system (adhering to international regulations) is operating between the surveillance site laboratories and the CPHL for samples/isolates sent for processing or confirmatory testing.

Output 2.7: AMU and AMC surveillance and monitoring systems are developed and piloted

The Grantee is to engage with the PSSB and the MSPDB to better understand, evaluate and analyse the current data on AMU/AMC, and to develop a system to more effectively capture and analyse AMU/AMC data.

By the end of the grant, it is expected that the following will have been achieved:

- AMU/AMC surveillance and monitoring implementation plan finalised, costed and approved by NDoH.

Activities expected to ensure achievement of this output will include:

- Development of a system for AMU/AMC data capture, considering the information available to PSSB and MSPDB.
- SOPs for the capture of the AMU/AMC surveillance and monitoring data.
- Piloting of the AMU/AMC surveillance system at key surveillance sites (e.g. PMGH and one other surveillance site)

7.3 Objective 3: Strengthened AMR, AMU and AMC surveillance and monitoring systems in the animal health sector

Output 3.1: NAHFTL is providing reliable culture, identification and AST results

NAHFTL is to be developed as the national animal health reference laboratory for AMR and to provide veterinary bacteriology services for the country. NAHFTL will coordinate with CPHL, who can provide more specialist testing.

The Grantee is expected to follow-up on the provisional assessment undertaken of NAHFTL, re-assess its needs and to upgrade/refurbish the facility as necessary. This will include consideration of the laboratory

infrastructure, equipment, their bacteriology diagnostic capability, quality management systems, and AMR data management.

The Grantee is also expected to assess the NAQIA office in Lae for the proposed development of infrastructure, equipment and systems to enable sample collection and preparation, and an onward shipping facility.

The Grantee is expected to provide training and other inputs, as required, to develop staff capacity at NAHFTL and in Lae.

An AMR database is required to collect and manage AMR data such as: sampling date, location, species, type of sample, production system, farm of origin, culture parameters (e.g. date, time, plate type, etc.), bacterial species/characterisation, AST, etc.

By the end of the grant, it is expected that the following will have been achieved:

- NAHFTL has the capability and capacity to undertake routine bacteriology with AST including NAHFTL staff have been trained in bacterial culture, identification and AST.
- SOPs for culture, identification and AST are developed for all pathogens relevant to the animal health AMR surveillance strategy.
- NAQIA staff and, if relevant, private sector stakeholders have been trained in sample collection and submission.
- NAHFTL has undertaken (for all pathogens relevant to the animal health AMR surveillance strategy) proficiency testing on bacterial culture, identification and AST, and has achieved satisfactory results in an EQA system, with support from the CPHL as required.
- A national biorepository of animal bacterial isolates, with inventory, is maintained at NAHFTL.
- A laboratory management system is in place, data is regularly recorded and backed-up.

Output 3.2: Improved biosafety and biosecurity at NAHFTL

The Grantee is expected to provide training and other inputs to ensure a high level of biosafety and biosecurity at NAHFTL and in the collection and handling of samples.

By the end of the grant, it is expected that the following will have been achieved:

- The laboratory has appropriate infrastructure and equipment to provide high levels of biosafety and biosecurity
- A Biosafety Officer has been appointed to supervise and implement biosafety and biosecurity procedures at NAHFTL.
- Appropriate training and monitoring systems for biosafety and biosecurity have been established including staff wearing personal protective equipment while conducting testing.
- All biosafety cabinets being regularly maintained and calibrated, and staff trained in their use.
- All waste is disposed of in a biosafe manner.

Output 3.3: AMR surveillance in the animal health sector is developed with a formal sampling plan, sample collection and testing with the AMR results being analysed and reported by NAQIA

The Grantee is to support NAQIA in conducting AMR surveillance to establish baseline information on the AMR situation in food-producing animals and then to monitor changes over time using further rounds of surveillance. Initially, AMR surveillance in animals will target the larger commercial poultry and pig producers. It will be necessary to negotiate with the industry commercial producers on methodology and issues of

confidentiality. It is proposed that at least 200 samples are tested by the end of the grant; some samples will have to be flown to the NAHFTL for testing.

Applicants should include provision to plan and conduct the sampling using funds from the Country Grant. Some international guidelines are available, as well as a guide produced by the Fleming Fund which will be shared with the successful applicant.

By the end of the grant, it is expected that the following will have been achieved:

- AMR surveillance in the animal health sector is developed with a formal sampling plan, which is then conducted, with samples being tested at the NAHFTL.
- NAQIA captures and analyses data on AMR surveillance and reports findings to NAMRSC and to other relevant stakeholders.
- AMR reports and documents are stored on data management systems with regular secure off-site backups.

Output 3.4: AMC and AMU surveillance system is developed, and data is analysed and reported by NAQIA

AMC surveillance is to be supported by working with NAQIA to improve data management and analysis of imported antimicrobial agents and their distribution in Papua New Guinea. This is to be achieved by working with the current NAQIA import licencing system and developing a database for improved data management and analysis.

AMU surveillance is to be supported by working with NAQIA to improve data management and analysis of the distribution and use of antimicrobial agents. This includes antimicrobials that are distributed to the DAL provincial/district offices and NAQIA regional offices, as well as those that are used on larger commercial farms, particularly the poultry and pig producers. This will require the development of an information management system with operating protocols and staff training. Applicants should also consider the relevant infrastructure constraints and the need for sustainability.

Any AMU/AMC surveillance strategy should take account of any major, relevant, and country-specific sectors, such as cattle, shrimp, crocodiles, as appropriate.

By the end of the grant, it is expected that the following will have been achieved:

- Development of information management systems, operating protocols and staff training on data capture and analysis for AMU and AMC.
- NAQIA has the capability and tools to calculate the volume of imported antimicrobials used in animal health and production, summarising consumption and usage by antibiotic category, formulation, and end-use/species/multispecies and to produce reports in a format that enable OIE reporting.
- Information on AMU and AMC is being regularly reported to the NAMRSC, in a format that would allow reporting to OIE.

Output 3.5: NAQIA is leading knowledge management and policy development for AMR, AMU and AMC in animals

NAQIA will have the capability to interpret the results of AMR surveillance with reference to AMU, AMC and other risk factors, and so develop an understanding of the epidemiology of AMR in animals and any possible links with AMR in humans.

The Grantee will support team meetings at least quarterly to review progress on AMR, AMU and AMC surveillance in animals and so promote understanding of the results to date and revise the surveillance programme as necessary.

By the end of the grant, it is expected that the following will have been achieved:

- NAQIA is leading and coordinating AMR and AMU surveillance activities and AMC data capture, with formal analysis and reporting.
- A yearly report of the current knowledge of AMR/AMU epidemiology in animals is prepared and the information shared with relevant AMR stakeholders, including the NAMRSC and relevant TWGs.
- These results and findings are used to inform policy and practice including the development of guidelines and/or policy recommendations for the mitigation of risk factors for AMR. Future priorities are being reviewed for further rounds of AMR and AMU surveillance in animals to address gaps in epidemiological knowledge.

8 Grantee Roles and Responsibilities

The main role of the Grantee(s) will be to plan and implement the activities required to achieve the objectives and outputs outlined above. The Grantee is responsible for providing – either alone or through a partnership or consortium – the technical, financial, and operational expertise required to deliver the grant.

The Lead Grantee is also responsible for monitoring and reporting to Mott MacDonald. Reporting of financial expenditure against budgeted activities is a requirement of the grant and Grantee(s) will need to show evidence of sufficient capabilities to undertake these responsibilities.

9 Measuring success

Country Grants are ultimately expected to generate results that can be tracked using a standard set of indicators that will monitor progress and achievements within and across Country Grants. A copy of the full list of indicators will be shared in the Application Pack. Applicants are to select only the ones they find applicable or appropriate for their implementation plan.

In summary, while the completion and level of attainment for all activities requires monitoring, the type/level of activity will determine the monitoring method. When developing the application, applicants should:

- Select from the proposed indicators for activities, where appropriate, or,
- Identify targets and timeframe completion for 'process' type activities (i.e. where indicators provided are not applicable / too advanced).

A mix of these options is also appropriate depending on application content.

The Grantee will be expected to revisit/confirm the monitoring plan, which will then be agreed with Mott MacDonald after the grant is awarded.

In addition to measuring grant performance against the objectives and outputs stated above, the grant will also be monitored on the implementation of, and adherence to, the Fleming Fund core principles described

in Section 2.4, and practical implications for this will be discussed with the successful applicant. No further action is required at this stage.

10 Application requirements

10.1 Grant Eligibility Criteria

Potential grant applicants must satisfy the following eligibility criteria before applications will be assessed in detail. Applicants:

- Must demonstrate that they are competent organisations responding to this call for proposals.
- Must have an appropriate track-record in supporting laboratory capacity development, surveillance, capacity building, and One Health.
- Must have experience of programme implementation in countries similar to Papua New Guinea.
- Must demonstrate that they are registered to work within the country, including the provision of essential documents such as articles of incorporation.
- Must demonstrate an understanding of the MoU process with the Government of Papua New Guinea.
- Must be prepared to accept the Grant Agreement terms.
- Must be able to provide the same information and assurances for all sub-grantees, where the application is from a consortium.
- Should be able to provide all information required for due diligence checks, including clear evidence of financial standing and systems of financial management and control.
- Should be able to provide evidence of suitability in the form of references from clients and donors for previous work undertaken within the last three years.
- Can be a single organisation or consortium, though the latter must clearly identify a Lead Grantee with the appropriate governance and coordination mechanisms to manage sub-grantees.
- Can be:
 - National institutes – such as a university or research institutes;
 - Non-governmental organisations (NGOs);
 - UN Agencies;
 - Private companies;
 - Government-owned enterprises or institutions, provided they can establish that they are (i) legally and financially autonomous, (ii) operate under commercial law, and (iii) are not dependent agencies of national governments

10.2 How to apply

Prospective grantees must register interest to receive the **Application Pack** by emailing flemingfundSEA@mottmac.com by the dates outlined in the 'Key dates' section below (Section 10.5). Please include the organisations name, the name, phone number and email address of the main focal point.

Soon after publication of the RFP, there will be an **Applicant Information Session (AIS)** in Port Moresby for prospective applicants. The details of the venue will be shared with applicants who have registered their interest.

Ahead of the event, the **Application Pack** will be shared and will include the application form, budget and monitoring template, Guidance Notes, and the grant agreement template.

To apply, please complete the **application form and budget and monitoring template** that will be provided, in line with the Guidance Notes, by the deadline outlined in Section 10.5.

Note the key requirements set out at the beginning of the Country Grant application form:

- Your submission should be returned by the deadline indicated in the RFP.
- When submitting the application document, press "Reply All" from the Application Pack automated email that you will receive with the application documents attached. Do not send it to us from a new email, and do not modify the Subject-line. Only "Reply All" emails will register the documents in our system.
- Keep file sizes as low as possible - there is a 9MB size limit to each individual email that can be received by the grant submission software. You can submit documents by sending multiple emails attaching submission documents to each one. Please follow the instruction (above) using "Reply All" to the original email.
- Applicants should observe the word limit indicated for each question. Additional words outside the limit will be disregarded.
- All documents included as part of the proposal must be submitted in Word, Excel, and PDF format (body font: Calibri 11pt). Do not send through as zipped files.
- You should include a covering letter, signed by the person authorised to represent your organisation for the submission of this proposal.

Proposals that do not satisfy these criteria may not be accepted and may be returned.

10.3 Evaluation criteria

The application form will indicate the scoring and weighting for each section of the application. The Application Pack will also contain Guidance Notes explaining what we are looking for in terms of a good quality response for each question, including approach to Value for Money (VfM).

In particular we are looking for a Grantee / Grantees who can demonstrate its:

- technical capacity to address the different aspects of AMR covered by this Country Grant.
- ability and preparedness to bring stakeholders together in an effective and productive working arrangement, promoting a One Health approach.
- ability to operate effectively in Papua New Guinea.

10.4 Restrictions/limitations

Any conflict of interest, or potential conflict of interest, should be declared to Mott MacDonald when applicants are registering their interest to apply for the grant. If a conflict of interest, or potential conflict of interest, arises after that point the prospective Grantee must clearly declare this in their proposal.

10.5 Key dates

- Publication of RFP: **20 May 2019**.
- Deadline for registering interest to attend the Applicant Information Session: **1700 Bangkok-time (GMT+7) on 3 June 2019**.
- Applicant Information Session in Port Moresby: **1400-1630 (PNG local time), 5 June 2019** (the venue will be emailed to those who have registered interest).
- Deadline for registering to apply for the grant is **1700 Bangkok-time (GMT+7) on 7 June 2019**.
- Application submission deadline: **1700 Bangkok-time (GMT+7) on 31 July 2019**.
- Anticipated start of grant: **December 2019**.

10.6 Contact details and support information

Any questions on the Request for Proposals should be sent to flemingfundSEA@mottmac.com. Mott MacDonald will endeavour to respond to queries within three working days.

Annex 1: Eligible funding items

Laboratory Infrastructure Enhancement

- Infrastructure: renovation, redecoration, electricity and water supply, environmental controls, waste and waste disposal.
- Equipment: appropriate equipment for the level of capability; biosafety and biosecurity equipment; automated culture and identification platforms; IT equipment.
- Reagents, durables & consumables: appropriate media, reagents, culture plates, etc; glassware; sample collection consumables.
- Transport and logistics: vehicles or contracted services for transport of goods, and people; safe and secure transport of specimens and samples; logistical support for surveys.

Human Resource Strengthening and Workforce Reforms

- Training: clinical, veterinary, agricultural and One Health surveillance protocols; biosafety and biosecurity; microbiology, laboratory science and laboratory management; epidemiology and surveillance; genomics; IT training.
- Long-term support: ongoing and refresher training according to the competency and capabilities framework; Fleming Fellowship Scheme.

Surveillance System Strengthening

- Governance: support for AMR Coordination Committees & working groups; operational planning; cross-sectorial meetings and strategy reviews; evaluation(s).
- Quality assurance and control: site visits and audits, laboratory twinning / mentoring.
- Data: transfer and storage; safety and security; analysis software and training.
- Recurrent costs: utilities, maintenance of equipment, upkeep of laboratory space, small maintenance, personnel costs.

Building Foundations for Surveillance Data Use

- Support to build demand for AMR data: general awareness among prescribers, dispensers and agricultural consumers (i.e. farm workers, agribusiness); publication charges; workforce training.
- Evidence based strategy, policy and practice change: data / information sharing conferences, meetings and initiatives; conference attendance; IT platforms for data sharing and awareness / transparency.

Rational use of Antimicrobial Medicines

- AMU/C surveillance: development of strategies for AMU/C surveillance; use of AMU data for appropriate prescribing / informing stewardship programmes.

Annex 2: Possible Fleming Fellowships in Papua New Guinea

Sector	Fellowship	Beneficiary Institution	Understanding AMR	Surveillance expertise	Diagnostic training	Lab quality management systems	Data collection, analysis and use	OH information sharing	Collaborative project
Human	AMR Surveillance	Central Public Health Laboratory (NDoH)		Strengthen competency in AMR surveillance system design and evaluation Support AMR information sharing nationally & internationally Deliver training programmes			Collate and analyse AMR surveillance data Understand the need for data quality and any biases. Interpret AMR results in consultation with lab fellowship and AMU data Maintain a national human AMR database Make recommendations on AMR by working with the policy fellowship	Discuss AMR results from humans and animals with laboratory fellowship and NAMRSC/the TWGs Provide AMR information and data to the NAMRSC	To be discussed at the time of agreeing on the Fellowship workplans
Human	AMU/AMC Surveillance and monitoring	Medical Supplies, Procurement and Distribution Branch (NDoH)		Review of the information available to PSSB and MSPDB and develop an enhanced system for AMC/AMU data capture. Develop SOPs for the capture of the AMC/AMU surveillance and monitoring data.			Work with key surveillance sites to conduct a pilot programme on AMU Capture, analyse and interpret available AMC data Develop protocols and templates for ongoing AMU and AMC data analysis and reporting Assess antimicrobial prescribing practices and make recommendations	Provide key recommendations and lessons learnt, including sharing of data findings with the TWGs/NAMRSC and other stakeholders.	To be discussed at the time of agreeing on the Fellowship workplans
Human	Laboratory LQMS (x2)	Central Public Health Laboratory and Port Moresby General Hospital (NDoH)			Reliable bacteriology testing and advanced AMR diagnostic methods	Develop LQMS Design and deliver LQMS staff training programmes Develop a system for managing laboratory reagents to ensure their availability and reliability	Develop and maintain AMR database and inventoried biorepository of isolates from CPHL	Discuss AMR results from humans and animals (with NAMRSC and Surveillance Fellows)	To be discussed at the time of agreeing on the Fellowship workplans

Sector	Fellowship	Beneficiary Institution	Understanding AMR	Surveillance expertise	Diagnostic training	Lab quality management systems	Data collection, analysis and use	OH information sharing	Collaborative project
Human	Policy	National AMR Steering Committee (NDoH)	Review evidence and advise on policies and programmes on AMR, AMU and AMC Develop guidelines for improved antibacterial stewardship in human and animal health					Provide sound evidence-based advice on AMR policy development in the human and animal health sectors, within a One Health framework	To be discussed at the time of agreeing on the Fellowship workplans
Animal	AMR Surveillance	Import Permit Section, National Agriculture Quarantine and Inspection Authority (NAQIA)		Strengthen AMR, monitoring for animal health and production			Data capture and analysis of animal AMR, with interpretation and reporting of the results to DAL, the TWGs and NAMRSC Develop epidemiological expertise and implement training programmes with animal health staff on AMR and how to reduce the risk of AMR	Facilitate the sharing of AMR information between the animal and human health sectors	To be discussed at the time of agreeing on the Fellowship workplans
Animal	AMU/AMC Surveillance	Veterinary Field Services (NAQIA)		Design and implement AMU data collection at local office and farm level Design and capture AMC data imported by government and private sectors			Assess antimicrobial prescribing practices and AMU and make recommendations on restricting priority medicines and improved antimicrobial stewardship	Capture and analyse AMU & AMC data and report findings to the NAMRSC Report AMC data to OIE	To be discussed at the time of agreeing on the Fellowship workplans
Animal	Laboratory	National Animal Health and Food Testing Laboratory (NAQIA)			Establish reliable bacterial culture, identification and basic AST Provide training and support to NAHFTL staff	Support a Quality Assurance leader at NAHFTL	Maintain a biorepository of isolates	Facilitate isolate and data/information sharing between human and veterinary laboratories	To be discussed at the time of agreeing on the Fellowship workplans