

Terms of Reference for Request for Proposals

First Fleming Fund Country Grant to Sri Lanka

1 Overview of this grant

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

This Fleming Fund Country Grant for Sri Lanka will focus on strengthening the Antimicrobial Resistance (AMR) and Antimicrobial Use (AMU) surveillance systems in both the human and animal health sectors. It will facilitate a stronger One Health (OH) approach to surveillance, bringing together multi-sectoral stakeholders to share surveillance data and gain a better understanding of AMR and AMU.

This grant will align with the national AMR policy framework and with the investments made by GoSL, other donors and stakeholders in this area. In both the human and animal health sectors, the grant will invest in the improvement of national AMR and AMU surveillance coordination and information management, as well as in the reinforcement of both the reference and surveillance site laboratories. In addition, the grant will contribute to further develop and support the coordination with ministries and between technical institutions involved in AMR/AMU surveillance.

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

The Grantee will need to work in close coordination with the GoSL's National Advisory Committee for Combatting AMR (NAC-AMR) on the prevention of AMR, as well as Mott MacDonald and other stakeholders, as needed. The Grantee will also be required to harmonise efforts on this Country Grant with other types of grants under the Fleming Fund Grants Programme, namely Regional Grants and the Fleming Fellowship Scheme.

This grant is expected to last 24 months. Grant applications should be in the region of £4 million, including all capital, procurement, recurrent costs, and 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 drug-resistant infections due to bacterial Antimicrobial Resistance, also known as AMR. The Fleming Fund will be a critical tool 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, and prevention and control of infections 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 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 drug resistant infections. A Global Action Plan on Antimicrobial Resistance (GAP-AMR) has been developed by the World Health Organization (WHO), 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 (see www.flemingfund.org for more information). 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 OH approach. Through funding to the Tripartite Alliance, the Fleming Fund has contributed to the development of National Action Plans (NAPs) in Sub-Saharan Africa, South and South East Asia, and to the building of the evidence base and guidance for AMR surveillance. This work will be critical for the overall success of the Fleming Fund Grant Programme and underpins the delivery of the portfolio of Country and Regional Grants and the Fleming Fellowship Scheme, as these will target capacity gaps identified in NAPs. The Fleming Fund also funds initiatives in academic institutions to develop guidance on the development of AMR surveillance systems.

The Fleming Fund Grants Programme is the largest stream of financial support available through the wider Fleming Fund. The DHSC 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 the whole portfolio of grants in different activities and in different countries.

The aim of the Fleming Fund Grants Programme 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 avert 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, including Sri Lanka. It can provide financial support up to 2021 to participating countries via three funding channels:

- Country Grants
- Fleming Fellowship Scheme Grants
- Regional Grants

The Fleming Fund will be independently evaluated and Itad, a specialist evaluation firm, has been appointed by the DHSC for this purpose.

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

2.2 Problem statement to be addressed by the Fleming Fund

The main issues to be addressed by Fleming Fund Country Grants are outlined below (*please note*: these are general issues in LMICs with regard to AMR, and may not all be relevant in the case of Sri Lanka):

- Non-availability of a policy level multi-sectoral National Steering Committee.
- The National Reference Laboratory is understaffed for its role as the referral centre for the surveillance system. There is a lack of advanced technology for AMR confirmation, no biorepository system for isolates storage and insufficient freezer capacity.
- Laboratories in animal health system are weaker than human health sector and require improvements in bench space and quality, water quality, lighting, climate control as well as the quality of chemicals and consumables used for susceptibility testing.
- There are few health facilities that meet the requirements for accreditation.
- There is little perceived use of surveillance data on any level including low demand for the data from policy makers.
- There is a lack of knowledge on the use and consumption of antimicrobial agents across human and animal health sectors.
- Inadequate epidemiology capacity in animal health sector for AMR, AMC and AMU data analysis.
- Logistical challenges are significant, e.g. transporting samples in a safe and secure manner under challenging transport conditions; ensuring a quality assured and sustained supply chain for reagents and consumables; and ensuring appropriate servicing of equipment; inadequate transport facilities to ensure safe and secure delivery of samples to the laboratories.
- Challenges in ensuring a quality assured and sustained supply of reagents and consumables; and ensuring appropriate servicing of equipment and calibration.
- Surveillance systems (national, regional and global) that do exist are often vertical in nature, are not linked, and are often unwilling to integrate.
- Insufficient institutionalization of One Health, despite the existence of numerous multi-sectoral Committees, to manage health issues that may have an impact on inter-sectoral collaboration.
- There are poorly defined and applied quality assurance standards in laboratory testing and animal health laboratories are not involved in any External Quality Assurance System.
- There is lack of understanding across all sectors, from basic surveillance of pathogens, to transmission patterns and drivers such as inappropriate use of antimicrobial drugs
- The National Coordinating Centre (NCC) lack infrastructure, human resources, and data analysis capacity.

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;
- Building foundations for AMR surveillance data use; and
- Promoting rational use of antimicrobial medicines.

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

- Improved laboratory skills for bacterial identification and Antimicrobial Susceptibility Testing (AST); and, therefore, improved data quality;
- Strengthened OH workforce with a range of relevant skills for AMR surveillance;
- Stronger AMR surveillance systems and processes at country and regional level;
- Stronger demand for AMR data at regional, country, subnational and facility levels; and

- Better knowledge of country level patterns of practice 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 and AMU data collected;
- AMR and AMU data shared in country to support evidence-based policy and practice; and
- AMR and AMU 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 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 GoSL to ensure that activities undertaken through this grant are in line with Sri Lanka's National Strategic Plan for combatting AMR (NSP). The Grantee is expected to plan and implement activities in close consultation with GoSL, keeping country priorities and needs in mind, but within limits of the scope as mentioned in this RFP.
- 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 OH approach. This approach is aligned with key documents and guidelines from OIE² and FAO³ as well as the GAP – AMR. A specific set of OH investment parameters has also been developed and are summarised below.
 - a. Collaborative multi-sectoral governance of AMR:** Leadership and resourcing of AMR surveillance and mitigation measures in all sectors that contribute to the emergence of AMR.
 - b. Integrated AMR and antimicrobial use and consumption surveillance in all sectors:** Surveillance in humans, livestock, aquaculture, crops, food and the environment to 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, AMU and AMC surveillance in all sectors.

The applicants should explicitly propose activities in the application to demonstrate how they will achieve the above.

- 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 GoSL investments and other actors' work in the field of improved laboratory capacity (both within and outside the sphere of AMR surveillance), improved

² OIE Standards, Guideline and Resolution on Antimicrobial resistance and the use of antimicrobial agents;

³ The FAO Action Plan on Antimicrobial Resistance, 2016-2020.

disease surveillance, and the OH approach. The Fleming Fund Grants Programme will assess grants for duplication of efforts and/or the development of parallel systems. To the extent possible, applicants 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, and it is expected that countries that demonstrate good performance will have access to additional funds to provide ongoing support. The applicants should propose activities in their application on how they would undertake actions to achieve sustainability on a long-term basis.

2.5 Fleming Fellowship Scheme

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 an 18-month programme of structured learning, mentoring and skills development for nine fellows in Sri Lanka (see annex 2). Rather than duplicate basic training, the Fellowships will focus on building advanced skills and leadership to promote the application of best practice in identified 'Beneficiary Institutions'. Beneficiary Institutions are organisations that add strategic value and complementarity to achieve the Fleming Fund's aims in the country, and who are likely to derive sustainable benefit from the Fellowship activities, such as AMR reference laboratories, national epidemiology units, hospitals and/or national drug administration agencies.

The initial focus will be on strengthening the quality of laboratory diagnostic data and the analysis and use of AMR and AMU surveillance data in Beneficiary Institutions. The scheme will support individuals and institutions to build the sustainability of programmes that seek to address AMR. The data they generate will be applied to deliver evidence-based approaches to tackling AMR, for example to improve antimicrobial stewardship.

In close discussions with GoSL, Mott MacDonald has identified priority areas to be supported through Fellowships and the Beneficiary Institutions under the Fellowship Scheme. Details are attached as annexure 2 to this RFP. Each Fellow will be matched with a 'Host Institution' from a list of institutions which have already been identified by Mott MacDonald.

Mott MacDonald will select Fellows through a separate process. Following selection, each Fellow, together with their Beneficiary and Host Institutions, will develop a budgeted work plan which will be agreed and funded by the Fleming Fund through the Host Institution. Activities will include mentoring, secondments, participation in collaborative projects and specialised training that will support the Fellows within their workplace. These institutions will also support Fellows' workplaces to allow Fellows to implement what they have learned.

We expect this process to run in parallel with the selection of the Grantee for the Country Grant, which will enable the Grantee and the Host Institutions to align their work programmes.

2.6 Fleming Fund activities in Sri Lanka to date

In Sri Lanka, through the support of Fleming Fund grant, the WHO Country Office has supported the country to develop the NSP. In addition, some technical capacity building activities have been undertaken in the country through Fleming Fund support.

To develop the Country Grant for Sri Lanka under the Fleming Fund Grants Programme, Mott MacDonald carried out visits to the country in August and October 2018 to undertake discussions with GoSL and other stakeholders. During these visits, Mott MacDonald met senior government officials, external development partners, technical experts, and undertook visits to select AMR surveillance sites and laboratories in both human and animal health sectors, to understand the current AMR and AMU situation in the country, the programmes that are being implemented, and the current human and animal health laboratory infrastructure and capacities for supporting AMR surveillance. The discussions identified major gaps and needs for strengthening AMR and AMU surveillance in humans and animals which will be supported by the Fleming Fund Country Grant for Sri Lanka.

3 The current AMR situation in Sri Lanka

3.1 National Strategic Plan for AMR

Sri Lanka has established a OH, multisectoral collaboration to combat AMR, and has developed a National Strategic Plan (NSP 2017-2022) to provide a country roadmap, which has been endorsed by multiple ministries. The NSP includes five key strategies, aligned with the strategic objectives of the GAP-AMR and covering human, animal, agriculture, aquaculture and environment sectors. These are:

1. Improve awareness and understanding of antimicrobial resistance through effective communication.
2. Strengthen the knowledge and evidence base through surveillance and research.
3. Reduce the incidence of infection through effective sanitation, hygiene and infection prevention measures.
4. Optimise the use of antimicrobial medicines in human and animal health.
5. Prepare the economic case for sustainable investment and increase investment in new medicines, diagnostic tools, vaccines and other interventions.

The five strategies include further specific objectives and have short and long term (2 year and 5 year) milestones for implementation. For support NSP, a budget has been allocated for AMR, however, there is a strong need of funding to further strengthen the surveillance system, especially in the animal health sector. The country has formed 3 multisectoral, national-level committees to support AMR surveillance (a steering committee, a quality assurance committee, and an infection control and prevention committee). The National Advisory Committee (or the Steering Committee) is chaired by DG/Health, with DG/Department of Animal Production and Health and DG/Department of Agriculture as co-chairs.

3.2 One Health

While there is a history of a OH collaboration between the human, animal and environment sectors that developed from work on zoonoses such as rabies and highly pathogenic avian influenza, the multi-sectoral collaboration has further expanded to the areas of Food Safety, International Health Regulations (IHR) and finally into combatting AMR in humans and animals. Sri Lanka was actively engaged in the One Health Hub South Asia Network activities that provided an opportunity for human resource development in both

human and animal health sectors as well as to establish collaborative surveillance activities in zoonotic disease control. In addition, the country has recently engaged in the South Asia One Health Disease Surveillance Network, which is an online collaboration platform which brings together OH experts from government institutions, academic institutions, private sector, and NGOs.

The IHR Joint External Evaluation (IHR-JEE) conducted in 2017 made a recommendation to establish a national level platform for OH so that the relevant activities could be institutionalised from the sustainability point of view. This has been strengthened by the establishment of the Sri Lanka Wildlife Human Health Net programme, which brings together the Faculty of Veterinary Medicine and Animal Science, the Ministry of Health, the Department of Wildlife Conservation, and the Department of Animal Production and Health (DAPH), through a Memorandum of Understanding (MoU) to handle wildlife zoonotic diseases as a multi-sectoral issue, however, more work is needed to widen this approach for AMR.

3.3 AMR Surveillance – human health

Sri Lanka has identified AMR as an important area for public health action. Sri Lanka has an extensive and well-established healthcare system, including more than 60 microbiology laboratories across the country. These laboratories can conduct AMR surveillance (with varying levels of capability) for WHO (GLASS) priority pathogens. Additional support is provided by a national reference laboratory based at the Medical Research Institute (MRI). Sri Lanka has demonstrated progress on AMR since 2009 when AMR surveillance was first implemented by Sri Lanka College of Microbiologists with the support of the Ministry of Health.

Over the next few years, the country plans to increase the number of laboratories that submit AMR data, to expand their healthcare acquired infection surveillance programme beyond Methicillin Resistant *Staphylococcus aureus* (MRSA) bacteraemia, and to develop robust hospital-based AMR stewardship programmes

AMR surveillance is currently being conducted routinely at 25 laboratories, which report data to an AMR focal person at MoH (the Deputy Director General of Laboratory Services). In addition, the country participates in the WHO Gonococcal Antimicrobial Resistance Surveillance Programme (GASP). The health system has established a National Advisory Committee on Infection Prevention and Control, and all hospitals have an infection control unit and an infection control committee. In addition, infection control has been included in some curricula for healthcare workers such as postgraduate training. Importantly, all infection control doctors and nurses undergo in-service training on infection control after being appointed to the infection control unit. However, MRSA bacteraemia surveillance is conducted only at select hospitals.

Sri Lanka has adopted national guidelines on empirical antibiotic therapy for select clinical conditions (such as leptospirosis and dengue) and accordingly 'Red Light' antibiotics require approval of a Clinical Microbiologist prior to prescription. Local antibiotic stewardship programmes are available in some hospitals and the National Medicines Regulatory Authority (NMRA) aims to ensure that all medicines and medical devices available in Sri Lanka are efficacious, safe, and of acceptable quality, and to ensure uninterrupted supply and rational use.

The Medical Research Institute (MRI) is well integrated with the Ministry of Health and works closely with the hospital laboratories to provide diagnostic and quality management support. MRI provides a valuable role as the national AMR reference laboratory and supports AMR surveillance by providing confirmatory culture, identification and antibiotic susceptibility testing of isolates, microbiology laboratory technologist training and National External Quality Assurance System (NEQAS) for the laboratories. Aiming for further improvements in AMR prevention activities, the IHR JEE has recommended the following:

- Encourage participation of all hospitals (at base hospital-level A or higher) in AMR surveillance activities.
- Start to collect AMR data on *Shigella spp.* infections.
- Develop national-level infection control policies.
- Establish a comprehensive healthcare acquired infection surveillance system and incorporate it into the national notifiable diseases system.
- Establish negative-pressure isolation rooms in all tertiary-care level hospitals, according to international standards.
- Continue to develop AMR awareness programmes in all relevant sectors, including for the public.
- Develop legislation to ensure strict oversight and enforcement of unauthorized, over-the counter sale of antibiotics in both human and animal health sectors.
- Strengthen the existing mechanism for monitoring prescription policies.

Academia and some research institutions in Sri Lanka are implementing studies on AMR and have already produced information that contributes to the understanding of priority AMR patterns and possible risk factors. However, there are opportunities to improve the sharing of findings by these institutions within and between sectors, in order to improve the integration of research outputs into overall knowledge and understanding of the epidemiology of AMR in Sri Lanka. Furthermore, improving the flow of this knowledge to the key government departments responsible for recommending policy – as evidence to underpin policies for effective management of AMR in humans, animals and the environment – would improve Sri Lanka’s approach to addressing AMR overall.

3.4 AMR Surveillance – animal health

Conducting AMR surveillance in animals (including aquatic species) and food of animal origin is the responsibility of the DAPH. Within DAPH, the Veterinary Drug Control Authority (VDCA) has the mandate to collate and review all the information generated on AMU and AMC to understand the contribution of this information to the epidemiology of AMR in animals, and make recommendations for policy development to the NAC-AMR and to the Ministry of Fisheries, Aquatic Resource Development and Rural Economy (MoFARD&RE) relating to AMU in animals. The VDCA is responsible for registering drugs imported and manufactured for veterinary use according to the provisions of the Animal Diseases Act No 59 of 1992, for managing data on imports and manufacture of antimicrobials.

AMR surveillance in the animal health sector is at a very early stage in Sri Lanka. However, some surveillance studies have been done in poultry using *E. coli* as the indicator organism and the published findings reveal resistance to multiple drugs in the indicator organism.

AST is done at the Bacteriology Division (Animal Health Reference Lab), Central Veterinary Investigation Centre, as well as at 24 Veterinary Investigation Centres (VICs) scattered throughout the island on a district basis. The laboratories handle clinical samples as a part of disease investigation and diagnosis services provided to Divisional Veterinary Officers. In addition to DAPH, the Faculty of Veterinary Medicine and Animal Science also conducts research studies on AMR and antibiotic residues, and provides a support service to the food industry, particularly to shrimp production. In relation to aquatic animal health sector, National Aquatic Resources Research and Development Agency (NARA) also conducts limited AMR surveillance activities and is now engaged in the WHO Tricycle Programme, investigating extended-spectrum beta-lactamase producing (ESBL) *E coli* in environmental water samples associated with aquaculture farms.

DAPH has planned an AMR surveillance programme with the technical assistance of the University of Saskatchewan, Canada. DAPH is also engaged in the WHO Tricycle Programme. However, systematic AMR data generation and evaluation have not yet been conducted in the AH sector, although WHONET training has been provided to the key staff responsible for AMR surveillance at the AH Reference laboratory and the VIC network. The IHR JEE recommended expanding the capability for AMR surveillance at veterinary laboratories as well as broadening surveillance for AMR infections by including other sectors such as animal health and agriculture.

3.5 Laboratory capacity – human health

The hospital network of Sri Lanka consists of hospitals at multiple levels, namely, the National Hospital of Sri Lanka; Teaching Hospitals; Provincial General Hospitals; District General Hospitals, Base Hospital A, Base Hospital B, Divisional Hospitals A, B, C, and six Special Hospitals for cancer, chest diseases, eye, rheumatology and rehabilitation and children. Microbiology and histopathology labs are available at the hospitals above the level of base hospitals including specialist hospitals. There are about 40 institutes that have Clinical Microbiologists and 25 institutions have already started reporting AMR data. The surveillance sites are selected based on the availability of a Clinical Microbiologist, the availability of facilities to perform AST (based on Clinical & Laboratory Standards Institute (CLSI) method) and participation in EQAS. However, any state or non-state health care institution that has a diagnostic microbiology laboratory which fulfil the criteria are eligible to enrol in the AMR surveillance programme.

Across the laboratory network, identification of pathogens to species level is not universal or uniform. At most of the laboratories, significant isolates from blood, cerebrospinal fluid (CSF) and sterile fluid cultures are identified to species level, however, most laboratories do not identify urinary pathogens to species level other than by the use of chromogenic agar. Currently the laboratories enter results into WHONET and send the data via email to the AMR focal point.

3.6 Laboratory capacity – animal health

DAPH is responsible for managing the veterinary laboratory network in Sri Lanka. However, the highest number of laboratories working on aquatic animals are under the NARA and National Aquaculture Development Authority (NAQDA), although some laboratories operating under DAPH also handle aquatic animal diagnostic activities. The Veterinary Research Institute (VRI), comprising 10 sub-laboratories, is the main veterinary laboratory in the country and has been identified as the AMR reference laboratory for animals and aquaculture species. In addition, there are 25 regional laboratories (24 VICs and a Poultry Disease Investigation Centre in Wariyapola) operating under the Animal Health Division of the DAPH. Most VICs have limited capability and only perform basic parasitology and bacteriology tests. The Poultry Investigation Laboratory in Wariyapola has strong diagnostic capability and conducts serology in addition to parasitology and bacteriology, and also performs AST on clinical poultry cases.

The bacteriology laboratory at VRI has the capability to conduct AST on clinical samples and for research projects. The laboratory is able to isolate and identify aerobic and anaerobic bacterial species and perform AST using the disk diffusion test. It also has the capacity to perform agar dilution and macro broth dilution testing. However, it lacks appropriate reference isolates, a working nephelometer, facilities for molecular confirmation of species and resistance genes, -80C storage capacity, and appropriate autoclaving facilities.

Some improvements will be needed to strengthen diagnostic capabilities for AMR surveillance within the animal health laboratory network. In addition to laboratory renovations and equipment, capacity building

of its staff including Veterinary Research Officers (VROs), Veterinary Surgeons (VSs) and laboratory technicians is required. Additional strengthening is required for: data management; data reporting; Biosafety and Biosecurity; and reagent / consumable supply chains.

3.7 Rational use of drugs

In the human health sector, the NMRA was established under Parliamentary Act No 05 of 2015 to administer the manufacture, importation, storage and sales, transportation, recall and destruction, and advertising of medicines in Sri Lanka. According to the legislation, all antimicrobials are registered under the NMRA and antimicrobials must be prescribed by a registered medical officer under Sri Lanka Medical Council (SLMC), however many pharmacies still provide antimicrobials without prescription. National guidelines on empirical and prophylactic uses of antimicrobials were prepared in 2016 and Drug and Therapeutic Committees have initiated antimicrobial stewardship programmes in many hospitals in the country. As per the guidelines, “Red-Light” antimicrobials can only be prescribed on advice of a Clinical Microbiologist.

In the animal health sector, VDCA administers permits for the importation of pharmaceuticals and biologicals that include antimicrobials for animal and aquaculture use as per the Animal Diseases Act No 59 of 1992. Growth promoter use in animal feeds are governed by the Animal Feeds Act No 15 of 1986. However, there are some gaps in the system, such as antimicrobials in pre-mixes - these are registered under the Animal Feed Advisory Committee. Considering the public health importance and AMR, DAPH has already banned antimicrobial use for animal production for the purpose of prophylaxis and growth promotion.

Approximately 90% of antimicrobials used in Sri Lanka are imported from foreign manufacturers. Good Manufacturing Practice (GMP) inspection is mandatory for local manufactures with special GMP requirements to prevent cross contamination between different classes of antimicrobials and special air-handling systems to prevent exposure of antimicrobials to the environment. Regulation for managing effluent from manufacturers is a requirement but is not effectively enforced. The regulatory system for quality assurance is in place and pre-marketing quality assurance is fully functional with bio equivalence studies for antimicrobials intended for human health, though not implemented in the case of animal health sector due to lack of capacity. However, there is inadequate laboratory capacity for quality control of some antimicrobials.

The Medical Supplies Division (MSD) within MoH manages the supply of antimicrobials to government hospitals. The MSD has an online information system that acts as an inventory of antimicrobials held in central stores and supplied to each hospital. The pharmacist in each hospital is responsible for maintaining records of antimicrobial use by recording details from prescriptions and maintaining a daily balance of the antimicrobial supplies in the hospital. However, there is no system for linking prescription data with clinical indication for which antibiotics were prescribed. At present, 20-30 hospitals maintain an online antimicrobial use database, while the remaining hospitals maintain paper-based records. By 2019, MoH plans to extend the online system to 300 hospitals. Each hospital has a Drug Therapeutic Committee comprising consultants, pharmacists and microbiologists.

NMRA is in the process of developing an automated system to produce reports from the antimicrobial importation data with government support. In addition, the MRI is conducting a prospective study of antimicrobial prescriptions in the large government hospitals and a private hospital in Kandy to improve knowledge on AMU / AMC.

In contrast, the state animal health sector does not operate a system of supplying antimicrobials to the veterinary service. Antimicrobial supply is managed by private sector suppliers and stocks are purchased

depending on the requirement, using different mechanisms according to the provincial veterinary services. To regulate the use of antimicrobials, the Veterinary Drug Registration Office has a system in place for import invoice approval and re-registration. In the process of invoice approval and re-registration, importers are required to provide details of the people/organisations to whom they supplied antimicrobials from the previous consignment as a pre-requisite to approve the import invoices and re-registrations. Importers therefore, must provide details of the name of the antimicrobial, concentration and number of units provided, and to whom they were provided. This data is maintained in an access database and is a valuable source of understanding AMU for veterinary purposes. According to the current law, antimicrobials must be prescribed by a veterinarian, however, in practice many farmers purchase antimicrobials over the counter from farm shops without a veterinarian's prescription. In the poultry sector, veterinarians prescribe antimicrobials for most well-managed farms. However, the sector 3 farms (semi-commercial farms with low biosecurity) tend not to use veterinarians and purchase their drugs directly from pharmacies.

4 Scope of this Country Grant

4.1 Grant Objectives and Outputs

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

Objective/Output	Inception (Initial six months)	Remaining Period (18 months)
Activities related to project set up, Kick off/inception meeting during the inception phase	X	
Objective 1: Strengthened Multisectoral AMR and AMU surveillance		
Output 1.1 A multisectoral policy-level decision making body (steering committee) is in place	X	X
Output 1.2 NAC-AMR is making recommendations to the policy-level body on AMR programmes and policy, and on priorities for future surveillance and research based on reviews of multi-sectoral surveillance data on AMR, AMU and AMC		X
Output 1.3 Strengthened implementation of the Tricycle integrated surveillance project (see http://resistancecontrol.info/wp-content/uploads/2017/08/55-58-Andremont.pdf)		X
Output 1.4 Strengthened information sharing across sectors to support programme and policy recommendations		X
Objective 2: Strengthened AMR and AMU surveillance in humans		
Output 2.1 Strengthened National Coordinating Centre within MoH to manage and share AMR/AMU surveillance data (collect, analyse, report and utilize) nationally/internationally	X	X
Output 2.2 Strengthened human health sector technical working group	X	X

Objective/Output	Inception (Initial six months)	Remaining Period (18 months)
Output 2.3 Assessment of priorities and needs for AMR surveillance in human health laboratories completed	X	
Output 2.4 Bacteriology Division of MRI functions as a National AMR Reference Laboratory		X
Output 2.5 National Reference Laboratory for Sexually Transmitted Infections & HIV functions as the National Reference Centre for <i>Neisseria gonorrhoea</i> resistance surveillance		X
Output 2.6 Sentinel surveillance site laboratories can generate and send reliable quality AMR surveillance data		X
Output 2.7 Biomedical Engineering Division of MoH is strengthened to provide maintenance / calibration for key laboratory equipment		X
Objective 3: Established AMR and AMU surveillance systems in poultry and shrimp		
Output 3.1 Assessment of priorities and needs of laboratories for AMR/AMU surveillance completed and documented for strengthening the animal health laboratories	X	
Output 3.2. DAPH AMR and AMU Surveillance Technical Working Group (TWG) functioning on TOR agreed with NAC-AMR	X	X
Output 3.3 Strengthened capacity of the Bacteriology Division of VRI to function as the AH AMR reference laboratory to generate, collect, analyse, report data in various forum & WHONET		X
Output 3.4 Diagnostic and Technical Capacities of AH surveillance site laboratories strengthened to generate and share quality AMR data to the AMR reference lab		X
Output 3.5 Development and implementation of AMR / AMU surveillance in poultry		X
Output 3.6 Development and implementation of AMR / AMU surveillance in shrimp		X
Output 3.7 Quarterly and annual reports of AMR surveillance results shared with the AH AMR and AMU Surveillance TWG, surveillance laboratories, MoFARD&RE, and NAC-AMR		X

4.2 Duration and phasing of the grant

The grant is expected to start mid-2019, and will last for approximately 24 months, ending by August 2021. The activities in of the grant will be divided into two phases, an inception phase, expected to last up to six months, followed by an implementation phase which will cover the remainder of the grant. The table in Section 4.1 illustrates which outputs are expected to be delivered in which phase.

Proposals for the grant require a detailed budget and workplan for the inception phase. On the same budget and workplan template (which will be shared separately as a part of the Application Pack) proposals for the grant should also include an indicative budget and workplan for the implementation phase and should be detailed to the extent possible.

During the inception phase, the Grantee will:

- Complete or begin work on the outputs, as outlined above in the table 5.
- Collaborate with the Fleming Fellows and their Host Institutions to understand the Fellowship workplans.
- Agree an MOU with the Government of Sri Lanka.

At the end of the inception phase, the Grantee will be expected to revise and update their workplan and budget (including procurement) for the implementation phase and will propose standard indicators to be used to measure success (see Section 9). These will be subject to review and subsequent sign-off by the Mott MacDonald team.

The remainder of the outputs should be completed during the implementation phase, as outlined above.

4.3 Funding envelope

Grant applications are expected to be in the region of GBP 3-5 million for the full grant period, including all capital, procurement, overhead 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 provides further information on the different dimensions that should be considered as part of a VfM approach, and an indication of how we may assess VfM.

4.4 Procurement

4.4.1 Laboratory equipment and consumables

An indicative procurement list for laboratory equipment and consumables for the grant was compiled following visits to five public-sector laboratories by Mott MacDonald team in October 2018 (Scoping Mission). The procurement list will be included as part of the Application Pack for information purposes.

The Grantee will need to work with further selected laboratories to finalise detailed specifications for equipment and consumables, and a procurement plan and budget should be developed by the end of the inception phase. Pending approval from Mott MacDonald, the Grantee will be expected to undertake the procurement of laboratory equipment and consumables. The choice of procurement route will be subject to assessment by the International Procurement Agency (IPA), a partner of Mott MacDonald in the Fleming Fund Grants Programme providing advisory services, and the Grantee will be expected to work with IPA if necessary to optimise the procurement process. Some items (e.g. automated blood culture analysers, antimicrobial susceptibility testing platforms, and mass spectrometry instruments) may be procured centrally by IPA.

The Grantee will also be expected to:

- assist with the import and delivery of equipment procured by IPA;
- work closely with suppliers to ensure that delivery of items is sequenced appropriately;
- maintain an asset register of all items that are defined as assets by the programme;
- regularly monitor the items that have been procured by Fleming Fund Grants Programme throughout the course of the grant to ensure: i) items are being used as intended; and ii) items are being maintained appropriately; and
- report any misuse or misappropriation of assets to Mott MacDonald.

4.4.2 Renovation of laboratories

Laboratories will require varying degrees of refurbishment under this Fleming Fund Country Grant. The Grantee will need to undertake the renovation works and procurement of necessary goods that are required for the renovation of the laboratories (e.g. benches, air-conditioning units, flooring, generators etc.).

The Grantee should undertake relevant detailed site assessments for refurbishment in the inception phase and should include the costs in the budget and proposal for the implementation phase, which will subsequently be agreed with Mott MacDonald. All applicants should make sure that sufficient personnel costs are included both for sites assessments and subsequently for the design work required for renovation and management of renovation of laboratories, both of which would need to be coordinated very closely with the government. Grantees should also explain how they will manage the renovation of laboratories and provide detail of any experience undertaking renovation work.

For all items procured under renovations, the Grantee will be responsible for:

- maintaining an asset register of all items that are defined as assets by the programme;
- regularly monitoring the items that have been procured by Fleming Fund Grants Programme throughout the course of the grant to ensure: i) items are being used for intended use; and ii) items are being maintained appropriately; and
- reporting any misuse or misappropriation of assets to the Management Agent.

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 International Procurement Agency.

For this grant all applicants should insert a budget of GBP £1,500,000, which will serve as a placeholder until detailed assessments can be undertaken by the Grantee in the inception phase to ascertain a more detailed budget for procurement of laboratory equipment, consumables, and renovation of the laboratories.

5 Key partnerships, alignment and coordination

The Country Grant must be delivered in a way which supports the national effort, and which takes account of current capacity levels, absorptive capacity, and alignment with other stakeholders working in Sri Lanka. The Grantee must also ensure that activities complement and build on work done to date and avoid duplication and development of parallel systems.

In the human health sector, the delivery approach and inputs must be closely aligned with national priorities, as stated in the NSP and other related policy and strategy documents. There must also be close alignment with inputs being provided by other development partners supporting AMR/AMU-related activities. This means that the Grantee, in addition to working closely with national stakeholders, must work closely with the development partners involved in AMR during both the inception and implementation phases. 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.

In the animal health sector, the delivery approach and inputs must be aligned with the NSP. Building a relationship with the One Health Partnership would also be useful to contribute to AMR information sharing in this forum.

Much of the success of this grant, in particular Objective 1, depends upon the ability of the Grantee to bring stakeholders from multiple sectors together and facilitate joint working. Close collaboration with a wide range of stakeholders at different levels in the GoSL is central to the success of this grant. The Grantee will also need to build and leverage partnerships with several AMR stakeholders beyond those in Government, to include academic, training and research institutions, the private sector, and other development partner-supported programmes.

The Grantee must particularly bear in mind the need to enable sustainability of AMR surveillance beyond the life of the grant. Applicants are expected to describe concrete strategies to promote sustainability of outputs in their proposals.

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 Fleming Fellowship Scheme (see Section 2.5) and Regional Grants.

The 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 such grants to maximise the sharing of AMR data and learning at the regional and global levels.

It is expected that nine Fleming Fellowships (four in the human health sector and five in the animal health sector) will be appointed in Sri Lanka. Successful applicants will receive specialised training in AMR epidemiology, AMR and AMU data management and analysis, laboratory quality management, and advanced laboratory technical skills.

Fellows are expected to become technical leaders in AMR and AMU surveillance in Sri Lanka, and it is hoped that they may play a role as mentors and active trainers in capacity building activities that will be implemented through this Country Grant. The Grantee is therefore expected to work, wherever possible, in collaboration with the Fleming Fellows.

Summary terms of reference for all the Fellowships, currently being finalised, are attached in Annex 2.

7 Detailed Objectives and Outputs

By the end of the grant we expect that the following indicators will have been achieved:

- All surveillance sites received revised national AMR standards and protocols.
- AMR and AMU surveillance results are regularly fed back to the surveillance sites.
- Outputs and key AMR and AMU surveillance documents discussed are stored (with back-ups) at the OH secretariat.
- Sri Lanka is sharing AMR data with GLASS annually.

This would be achieved through following objectives and outputs as mentioned in this section

7.1 Objective 1: Strengthened Multisectoral AMR and AMU surveillance

Output 1.1 A multi-sectoral policy-level decision making body (steering committee) is in place

The Grantee will undertake activities to advocate to the Government of Sri Lanka to set up a high level multi-sectoral committee which can make policy level decisions on AMR/AMU related issues. Currently, although there are two multi-sectoral committees already functional in the country (NAC-AMR and NAPIST), these committees are technical in nature and lack policy level decision-making authority.

By the end of the grant, we expect a policy level decision making body, with the appropriate authority is in place.

Output 1.2 NAC-AMR is making recommendations to the policy-level body on AMR programmes and policy, and on priorities for future surveillance and research based on reviews of multi-sectoral surveillance data on AMR, AMU and AMC

During the grant period we expect that the Grantee is expected to support the already established NAC-AMR and NAPIST in the form of technical assistance and administrative support (such as organising meetings etc).

By the end of the grant, we expect that NAC-AMR has made recommendations to the policy-level body on AMR programmes and policy, and on priorities for future surveillance and research. These recommendations will be based on reviews of multi-sectoral surveillance data on AMR, AMU and AMC, possibly including assistance to NAC-AMR to develop an economic case for sustainable investment on activities related to AMR containment.

Output 1.3 Strengthened implementation of the Tricycle integrated surveillance project

WHO has designed the Tricycle project to pilot more tightly integrated surveillance that involves sampling in epidemiologically connected human and animal populations and their environment, currently focusing on testing for ESBL producing *E coli*. WHO is providing technical support to a number of countries to pilot the Tricycle project, including Sri Lanka.

By the end of this grant, we expect that the Grantee has supported activities (such as sample collection, transport and analysing at surveillance labs) to strengthen collaborative surveillance involving the human, animal and aquaculture sectors. For further information, (see <http://resistancecontrol.info/wp-content/uploads/2017/08/55-58-Andremont.pdf>)

Output 1.4 Strengthened information sharing across sectors to support programme and policy recommendations

The Grantee is expected to support information/data sharing between multiple sectors and with NAC-AMR, NAPIST and NCC.

By the end of the grant, we expect that through the support provided by the grantee, the following is achieved in ways that are specifically designed to support improved and more effective programme and policy recommendation:

- Strengthened IT capacities with networking support,
- Administrative support provided such as by organising meetings,
- technical assistance provided on Information sharing across sectors.

7.2 Objective 2: Strengthened AMR and AMU surveillance in humans

NAC-AMR has assigned MRI to assist the surveillance sites in the collection of quality assured AMR and AMU data following international biosafety and biosecurity standards and have identified sentinel sites for AMR surveillance (Table 1). A list of priority specimens and priority pathogens following WHO's GLASS recommendations and incorporating national priorities has also been developed (Table 2). The surveillance site laboratories should be supported to enable them to isolate and identify these organisms from blood, urine, stool and genital samples as appropriate, perform AST, and report results to clinicians and the Focal Point in a timely manner.

Table 1: List of reference centre and surveillance sites to be strengthened through the first Fleming Fund Country Grant

Name	Type	Location
1. Medical Research Institute (MRI)	AMR Reference Centre	Western Province
2. National Reference Laboratory for STI & HIV	STI/HIV National Reference Centre	Western Province
3. National Hospital of Sri Lanka	Surveillance site	Western Province
4. North Colombo Teaching Hospital	Surveillance site	Western Province
5. Colombo South Teaching Hospital	Surveillance site	Western Province
6. Lady Ridgway Hospital for Children	Surveillance site	Western Province
7. National Cancer Institute of Sri Lanka	Surveillance site	Western Province
8. Sri Jayawadenepura General Hospital	Surveillance site	Western Province
9. Teaching Hospital, Karapitiya	Surveillance site	Southern Province
10. Teaching Hospital, Jaffna	Surveillance site	Northern Province
11. Teaching Hospital, Anuradhapura	Surveillance site	North Central Province
12. Teaching Hospital, Kandy	Surveillance site	Central Province
13. Provincial General Hospital, Kurunegala	Surveillance site	North Western Province
14. Teaching Hospital, Batticaloa	Surveillance site	Eastern Province
15. Provincial General Hospital, Badulla	Surveillance site	Uva Province
16. Provincial General Hospital, Ratnapura	Surveillance site	Sabaragamuwa Province

Table 2: Priority pathogens for surveillance in Human Health

Pathogens	Sample	Collection sites	Primary Referral Centre	
GLASS priority pathogens	<i>Escherichia coli</i>	Blood, urine	MRI	
	<i>Klebsiella pneumoniae</i>	Blood, urine	MRI	
	<i>Acinetobacter baumannii</i>	Blood	All sites	MRI
	<i>Salmonella spp</i>	Blood, stool	All sites	MRI
	<i>Shigella spp.</i>	Stool	All sites	MRI
	<i>Staphylococcus aureus</i>	Blood	All sites	MRI
	<i>Streptococcus pneumoniae</i>	Blood, CSF	All sites	MRI
	<i>Neisseria gonorrhoeae</i>	Urethral swab / cervical swab	STD/HIV Laboratory network	National Reference laboratory for STI & HIV

Output 2.1 Strengthened National Coordinating Centre within MoH to manage and share AMR/AMU surveillance data (collect, analyse, report and utilize) nationally/internationally

At present, AMR data is collected at 25 surveillance sites and sent to the National Focal Point for AMR, however, the data is not regularly analysed due to lack of resources and capacity. The Grantee should undertake activities to strengthen the NCC in terms of infrastructure, human resources, data analysing and data storing equipment and software to increase its technical capacity to operate as the overall coordinating body for AMR surveillance.

By the end of the grant following indicators should be achieved:

- AMR Data Centre established at NCC facility with human resources supported by MoH.
- NCC is effectively leading and coordinating AMR and AMU surveillance data storage with formal analysis, including of risk factors.
- Epidemiologists at NCC and designated staff at surveillance sites are trained to analyse AMR data collected from surveillance sites and MRI.
- NCC is sending nationally collated resistance data on priority pathogens to the surveillance sites.
- NCC produces a report showing the results from analyses of the AMR surveillance data every 4 months and shares the results with NAC-AMR and NAPIST.
- NCC provides guidance and information on clinical, epidemiological, and laboratory data collection and reporting.

Output 2.2 Strengthened human health sector technical working group

At present, the human health sector has developed a group of technical officers including Clinical Microbiologists and Epidemiologists to analyse AMR surveillance data receiving from 25 laboratories.

By the end of the grant, we expect following to be achieved through the technical assistance, logistics support regular meetings, and documentation support provided by the grantee to HHTWG:

- Functional HHTWG in place, with an agreed TOR, conducting quarterly meetings
- Prescription based study AMU survey is done within a selected hospital cluster and MSD is supported to do an AMC study
- AMR, AMC and AMU surveillance results regularly analysed and discussed.
- Priorities for further surveillance/research identified and costed.
- Results shared and discussed with other relevant technical working groups leading to improved AMR policies and practice
- protocols and data collection tools developed, data analysed, and policy level recommendations generated on AMC and AMU.

Output 2.3 Assessment of priorities and needs for AMR surveillance in human health laboratories completed

The grantee will undertake detailed assessment of the above mentioned 16 surveillance sites during the inception phase using needs assessment tools which will be provided by Mott MacDonald, under technical guidance and supervision from Mott MacDonald.

As the sites vary in capability, the level and type of support offered is expected to vary between them. The Grantee will draw up a plan of support for the laboratories including renovation, procurement, biosafety & biosecurity, to be agreed with Mott MacDonald before initiation of the implementation phase.

By the end of the inception period, the Grantee should also identify, in close collaboration with NAC-AMR or NAPIST, how the project activities will contribute to the further development of the national AMR surveillance strategy. These inputs will align with those from Government, other stakeholders and donors supporting this area.

Output 2.4 Bacteriology Division of MRI functions as a National AMR Reference Laboratory

MRI has been identified as the AMR reference laboratory for the priority pathogens listed in see Table 2 and has been mandated to provide leadership and technical support for the laboratories in the AMR surveillance network. The primary function of MRI is to promote good microbiological laboratory practice within the surveillance network, and to serve as a resource and coordination point to harmonise laboratory testing and to collaborate with animal health sector.

By the end of the grant, we expect:

- Relevant laboratory guidelines and quality documents updated, and grantee aided in their dissemination. This can include assistance in development of SOPs and bench aids suitable for use by surveillance site laboratories This should be in collaboration with the Sri Lanka College of Microbiologists.
- Assistance provided to MRI to undertake supportive supervision and quality assurance of the surveillance sites.
- Technical support provided, and training conducted for the laboratory workforce to generate quality-assured AMR data at surveillance sites (pathogen isolation, identification, AST and data entry using WHONET).
- Technical assistance provided for confirmatory testing of organism and susceptibility, plus additional phenotypic characterisation of the mechanisms of AMR for unusual resistance patterns for isolates referred by surveillance sites
- Referral and transport pathways established for transport of isolates to and from the reference laboratory. The Grantee should work with the MRI to implement a sustainable and bio-secure means of transporting QC and EQA strains from the reference laboratories to surveillance sites, and for referred isolates from the surveillance sites to the reference laboratory. The Grantee should also work with the laboratory to develop criteria for sample referral and ensure appropriate feedback to the surveillance sites.
- A secure biorepository of isolates established at MRI, to include procurement of necessary equipment, developing protocols for sample storage (including SOPs for determining which isolates are stored), establishing an inventory system, and developing protocols for accessing and using archived materials.
- Collection of routine and extended⁴ QC ATCC reference strains is maintained.
- Improved maintenance of laboratory equipment.
- Improved Biosafety and Biosecurity (procurement of equipment, training, controlling laboratory access etc)
- Labs are equipped to reach Biosafety Level 2 (refer to CDC BMBL 5th edition⁵).

Output 2.5 National Reference Laboratory for Sexually Transmitted Infections & HIV functions as the National Reference Centre for *Neisseria gonorrhoea* resistance surveillance

The National Reference Laboratory for STI and HIV (NRLSTI/HIV) provides support to all laboratories in the STD/HIV laboratory network. The centre has the facilities to culture *Neisseria gonorrhoea* and is connected

⁴ Following EUCAST or CLSI international standard

⁵ Biosafety in Microbiological and Biomedical Laboratories 5th Edition – HHS Publication No. (CDC) 21-1112 – Revised December 2009

to the WHO Collaborating Centre for STD, Sydney. However, the centre needs to be further strengthened to support *N. gonorrhoea* surveillance as per GLASS.

By the end of the grant, we expect following through support provided by the Grantee:

- Guidelines and SOPs updated, as required. Job-aids developed for use by surveillance site laboratories.
- Enhanced capacity of the STI/HIV NRL to undertake supportive supervision and mentorship of other laboratories in the STI/HIV network on quality assurance through EQA and IQC
- Technical support and materials provided, and training organised for the laboratory workforce to generate Quality Assured AMR data for *N. gonorrhoea*
- Support provided for confirmatory testing and phenotypic characterisation of resistance mechanism on unusual resistance patterns
- Strengthened transport system of isolates
- Support provided to establish an inventoried, secured biorepository system.
- Improved maintenance of laboratory equipment.
- Improved biosafety and biosecurity

Output 2.6 Sentinel surveillance site laboratories can generate and send reliable quality AMR surveillance data

Assessment of the laboratories during the inception phase will inform the details of the actions required to make the surveillance site laboratories fully functional. The Grantee, in discussion with the NAC-AMR and MRI, will be expected to support renovation, information technology, equipment procurement and training at the laboratories as needed. The Grantee will need to develop and support the implementation of equipment maintenance contracts in each laboratory.

By the end of the grant we expect that the following results will be achieved:

- Surveillance site laboratories are equipped to a standard level (Biosafety level 2).
- Surveillance site laboratories are producing high quality bacteriology results, which are reported to the referring clinicians in a timely manner
- Clinicians are using the laboratory appropriately and providing adequate clinical details
- Laboratories have appropriate Quality Management Systems in place, including
 - Certification and maintenance of equipment
 - IQC and EQA materials provided at each site
 - Laboratories are participating in the national EQA programme established by MRI and achieving satisfactory results
- All laboratories have appropriate Biosafety and Biosecurity systems in place
- AST is performed using a validated international method (EUCAST or CLSI, including use of approved reagents / antibiotic disks) at all surveillance sites
- Blood culture contamination rates are monitored, with corrective interventions (e.g. clinical staff training) for sites with a contamination rate >5%.
- Basic clinical and demographic data is collected and linked with laboratory data, with due regard to patient anonymity / confidentiality
- Surveillance sites are sending regular (minimum monthly) epidemiological and laboratory AMR data to NCC

Output 2.7 Biomedical Engineering Division of MoH is strengthened to provide maintenance / calibration for key laboratory equipment

The Biomedical Engineering Division, MoH performs laboratory equipment maintenance and calibration for standard items of equipment (biosafety cabinets etc). However, there are some capacity issues, and by the end of the grant, we expect following to be achieved:

- Biomedical Equipment Calibration Centre established and certified biomedical engineers able to provide calibration services for the microbiology laboratories in Human and animal AMR surveillance.
- The Grantee provided technical assistance to Division of Biomedical Engineering for budgeting and planning for Biomedical Equipment Calibration Centre through end of grant life.

7.3 Objective 3: Established AMR and AMU surveillance systems in poultry and shrimp

For Sri Lanka, the poultry and shrimp production sectors have been identified as major foci of antimicrobial use. Although poultry sector has not yet started AMR surveillance on routine basis, VRI has conducted few pilot studies to understand the presence of resistance bacteria in the poultry sector. In one of such studies, the antimicrobial resistant pattern of *E. coli* isolated from septicaemic clinical cases in broiler, layer and backyard chickens submitted to Central Veterinary Investigation Center of Veterinary was studied as a pilot.

On the other hand, aquaculture sector has started conducting AMR surveillance at NARA. Samples taken for AMR surveillance are shrimp culture environment, raw shrimps, water and sediment from shrimp culture ponds that are about to harvest. AMR surveillance is done for *Salmonella* and *Vibrio spp*. Methods adopted for salmonella isolation in water is ISO 19250:2010(E), *Salmonella* in shrimps and water is ISO 6579:2002 while method for *Vibrio spp* is ISO/TS 21872-1:2007(E). Following the isolation and identification, AST is done for isolated organisms by disk diffusion method.

While some surveillance is in place in these sectors, it is focused on disease-causing species-specific pathogens and does not include a formal AMR component. The Grantee should aim to build on these systems to develop a more comprehensive, One Health AMR surveillance system which, as well as species-specific pathogens, also focuses on the following AMR priorities:

- Resistant bacteria which frequently cause disease in humans (based on the GLASS priority pathogens for surveillance)
- Resistant bacteria which frequently cause disease in the species under surveillance, which may result in widespread use of antimicrobials or where resistance will have significant economic consequences
- Indicator bacteria: bacterial species where resistance may indicate high levels of antimicrobial use, or where there is a possibility that resistance genes could be passed to more virulent species

Table 3 gives an indicative list of bacteria which should be priorities for AMR surveillance for poultry and shrimp, however, this is for initial guidance only and should be expanded in line with any relevant guidelines from FAO as integrated One Health systems are developed.

Table 3: Priority pathogens to consider for surveillance in Animal Health

	Pathogens	Surveillance Laboratories
Bacteria for AST in poultry*	<i>Escherichia coli</i>	CVIC, Wariyapola VIC and Chilaw VIC
	<i>Salmonella spp</i>	
	<i>Enterococcus spp</i>	

	<i>Campylobacter spp</i>	
Bacteria for AST in shrimps*	<i>Escherichia coli</i>	Chilaw VIC
	<i>Salmonella spp</i>	
	<i>Vibrio parahaemolyticus</i>	

*AH Sector Reference centre will have the capacity to culture, isolate and identify all the above organisms.

AMR and AMU surveillance in the animal health sector should focus on strengthening an AMR reference centre and three surveillance sites plus the VDCA under the overall guidance of NACAMR and AHTWG. The identified sites are listed in table 4 below.

Table 4: List of reference centre and surveillance sites to be strengthened through the first Fleming Fund Country Grant

Name	Type	Location
1- Veterinary Research Institute (VRI)	AMR Reference Centre	Central Province
2- Central Veterinary Investigation Centre (CVIC)	Surveillance site - poultry	Central Province
3- Veterinary Investigation Centre - Wariyapola	Surveillance site - poultry	North-Western Province
4- Veterinary Investigation Centre - Chilaw	Surveillance site – poultry and shrimp	North-Western Province
5- Veterinary Drug Control Authority (VDCA)	AMC surveillance site	DAPH, Peradeniya

Currently, all laboratories have capacity for processing bacterial isolates. At present, environmental samples for aquaculture are processed at the National Aquatic Resources Research and Development Agency (NARA). The Chilaw VIC has been identified by the DAPH to be developed for AMR testing in aquatic species as it is already under the process of development as the Regional Specialised VIC for food fish disease diagnosis.

To develop the surveillance system, the Grantee should support the laboratories above to develop / improve capacity for bacterial culture and susceptibility testing, data management, reporting and analysis. The Grantee should support the development of the relevant technical working group, and then work with the TWG to develop and implement surveillance strategies in the poultry and shrimp sectors for AMR and AMU as the foundation of an integrated, One Health surveillance system.

Output 3.1 Assessment of priorities and needs of laboratories for AMR/AMU surveillance completed and documented for strengthening the animal health laboratories

In the inception phase, the Grantee should undertake detailed needs assessment sites listed above, (1 AH AMR reference centre and 4 surveillance sites) using the tool provided by the management agent, to draw up a plan of support for the laboratories including renovation, procurement and capacity building plan. This should align with support provided from Government, and other stakeholders and donors.

By the end of the inception phase, we expect that:

- Detailed assessment of laboratories is completed using the tool provided by the management agent
- Assessments are used to produce a costed list of renovations, equipment and consumables for agreement with GoSL and Mott MacDonald.
- Plan for procurement and renovation agreed with GoSL and Mott MacDonald

Output 3.2. DAPH AMR and AMU Surveillance Technical Working Group (TWG) functioning on TOR agreed with NAC-AMR

The Animal Health Technical Working Group (AH-TWG) for AMR is in its infancy and the Terms of Reference have not been finalised.

By the end of the inception period, to implement a sustainable AMR surveillance programme and achieve the objectives, the following should be completed:

- Expert committee formed for AMR and AMU surveillance in animals, with appropriate expertise e.g. microbiologists, epidemiologists, veterinarians. The committee should also include representation from VRI and AHD.
- Quarterly meetings of AHTWG held.
- Animal AMR, AMC and AMU surveillance results are compared with the results from other sectors in the Joint TWG on AMR & AMU surveillance
- Recommendations regarding AMR/AMU/AMC made and communicated to NAC-AMR and MoFARD&RE.
- Priorities for further surveillance/research Identified

Output 3.3 Strengthened capacity of the Bacteriology Division of VRI to function as the AH AMR reference laboratory to generate, collect, analyse, report data in various forum & WHONET

The Bacteriology Division of the VRI has been identified as the AMR reference laboratory for the animal health sector to provide leadership and technical support for the laboratories in the animal health AMR surveillance network. In addition to its role as the AH reference laboratory, the laboratory should promote good microbiological laboratory practices within the surveillance network, and to serve as a resource and coordination point to harmonise laboratory testing.

By the end of the grant, we expect the following:

- Development / maintenance of formal Quality Management System, including maintenance of ATCC strains, participation in EQAS, training and development
- Development of standardised SOPs for bacterial identification and AST
- AMR reference service provided, including SOPs for sample referral, transport and reporting
- Establishment of a formal biorepository for resistant bacterial strains
 - Inventory software and training
 - SOPs for transport, storage, access and use of isolates
- Advanced phenotypic testing e.g. ESBL confirmation, MIC testing, Salmonella serotyping is in place
- Improved Biosafety & Biosecurity ((including equipment support and capacity building/training)
- Provision of supervision, training and diagnostic expertise to support sentinel surveillance laboratories (CVIC, Wariyapola, Chilaw)

Output 3.4 Diagnostic and Technical Capacities of AH surveillance site laboratories strengthened to generate and share quality AMR data to the AMR reference lab

The Grantee should use the laboratory assessments completed in output 3.1. to develop and implement improvement plans for the laboratories at CVIC, VIC-Wariyapola and VIC-Chilaw to improve their capacity in basic bacterial culture, identification and AST for AMR surveillance.

By the end of the grant we expect that the following will be achieved:

- Renovations and refurbishment completed
- Necessary equipment installed, with monitoring and maintenance schedules
- Functional Laboratory Management Information System (LMIS) with relevant staff training
- Reliable stock management / procurement systems for good quality media, reagents, consumables and antibiotic disks

- Laboratory producing reliable culture, identification and AST results for the relevant organisms listed in table 3
- Quality Management Systems in place
- Formal Biosafety and Biosecurity programme
- Development of relevant SOPs including for sample referral and transport
- Staff trained to appropriate levels
- Laboratories participated in an inter-laboratory comparison programme (lead by MRI).

Output 3.5 Development and implementation of AMR / AMU surveillance in poultry

By the end of the grant, under this objective, we expect following to be achieved:

- A surveillance strategy for AMR in the poultry sector is developed in close coordination with the TWG and NAC-AMR. This should initially focus on 1-4 high density poultry production areas including broilers and layers, following guidelines produced by Massey University, New Zealand, in conjunction with the management agent. These guidelines will be provided to the Grantee by the management agent. Grantees should plan to sample a minimum of 400 samples for broilers and 400 samples for layers and should include the organisms listed in table 3. The sampling strategy should be drafted during inception, for agreement with GoSL and the management agent.
- Training provided to the relevant staff of the beneficiary organisations to develop surveillance plans by adopting the Massey University Protocols to fit to the local situation. Consideration should also be given to sample transport, to ensure that samples and / or isolates are transported from sampling site to laboratories, and between laboratories, in line with international biosafety and biosecurity standards.
- Support provided to DAPH to conduct a field survey on antimicrobial usage (AMU). The grantee will provide technical assistance to develop data collection protocol and template to obtain standardised and harmonised information/data on sales of veterinary antimicrobials. Grantee will provide technical assistance to DAPH to analyse and report data on antimicrobial consumption based on the animal species. The grantee will provide technical assistance to analyse survey results to recognise how and why antimicrobials are being used or misused by poultry farmers and veterinary practitioners for any policy level recommendation.

Output 3.6 Development and implementation of AMR / AMU surveillance in shrimp

The Grantee should work with the TWG and NAC-AMR to develop a surveillance strategy for AMR in the aquaculture sector. This should initially focus on shrimp and should include the organisms listed in table 3. While the Chilaw laboratory has been identified as the focal aquaculture AMR laboratory, the Grantee should also liaise with the National Aquatic Resources Research and Development Agency (NARA). NARA currently perform environmental sampling as part of the Tricycle Project and have drafted a sampling protocol for aquaculture which should, if appropriate, be incorporated into the sampling strategy.

By the end of the grant we expect grantee to achieve following in close coordination with the TWG, the NAC-AMR and NARA:

- The sampling strategy is drafted
- Training provided to process samples at the surveillance sites. Consideration should also be given to sample transport, to ensure that samples and / or isolates are transported from sampling site to laboratories, and between laboratories, in line with international biosafety and biosecurity standards.
- Support provided to NARA to conduct a field survey on antimicrobial usage in shrimp production sector. The grantee will provide technical assistance to develop data collection protocol and template to obtain standardised and harmonised information/data in shrimp production sector

recognising how and why antimicrobials are being used and misused by shrimp producers and prescribers for any policy level recommendation.

Output 3.7 Quarterly and annual reports of AMR surveillance results shared with the AH AMR and AMU Surveillance TWG, surveillance laboratories, MoFARD&RE, and NAC-AMR

At present, data generated through laboratory testing on AST are recorded on paper-based registers or in Excel database held at the site. There is no sharing of data between laboratories in the animal health sector, or between sectors at the level of NAC-AMR. The Grantee should therefore support the laboratories to develop data management strategies to ensure safe storage of data, and regular analysis and reporting to the AHTWG, Ministry and the NAC-AMR so that the information is used at national, regional and global levels.

By the end of the grant, we expect the following to have been achieved

Therefore, at the end of the intervention, the following should be achieved

- AMR Data management system (e.g. WHONET) installed at the reference and surveillance laboratories, with necessary hardware and internet connections
- Agreed reporting system in place
- Training of a central data manager at the Bacteriology Division to collate and verify data for surveillance sites
- Training on AMR, AMU and AMC data analysis and interpretation conducted.
- Epidemiological analysis of AMR and AMU data conducted.
- Quarterly meetings with sentinel labs supported.

The Grantee should provide the necessary technical assistance to develop data management and reporting protocols, so that good quality, reliable data is reported centrally for analysis and to generate policy level recommendations on AMC and AMU.

8 Grantee Roles and Responsibilities

The main role of the Grantee – or Lead Grantee if the successful applicant is to be a consortium – will be to plan and implement the 18 outputs and deliver the three objectives listed in Section 7. The Grantee is responsible for providing, either through in-house resources alone, or through a partnership or consortium, the expert technical assistance and high-quality support needed to achieve agreed results.

The Lead Grantee is also responsible for financial management and controls for the grant as a whole (including the contributions of sub-grantees if applicable), and 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. However, Mott MacDonald recognises that the suggested indicators may not all be applicable. Therefore, applicants are expected to select from the standard indicator set only where appropriate.

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. In the revised and updated workplan to be submitted to Mott MacDonald at the end of the inception phase, prior to implementation, the Grantee will be expected to revisit/confirm the monitoring plan which will then be agreed with Mott MacDonald.

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.

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 OH.
- Must have experience of programme implementation in Sri Lanka.
- 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 Sri Lanka.
- 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; or
 - 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 applicants must express their interest to receive the official Application Pack as per the timelines mentioned below in section 10.5. This is done by writing to flemingfundSA@mottmac.com, and should include the organisation's name, the name, phone number and email address of the main focal point.

In addition, there will be an **Applicant Information Session (AIS) in Colombo**. Please see section 10.5 for the date of AIS. The details of the venue will be shared with applicants who have registered their interest in writing. Dial-in details will also be available for those who have registered interest after this point.

Ahead of the AIS, an example Application Pack will be shared with prospective applicants and will include an application form, budget and monitoring template, and Guidance Notes in order to orientate applicants to the process. Following the AIS, the official Application Pack will be sent out to prospective Grantees who have registered.

To apply, please complete the application form and the budget and monitoring template, in line with the Guidance Notes.

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 Pack will include the application form, indicating 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).

We emphasise that the ultimate purpose of these investments is to help to further strengthen and transform Sri Lanka's approach to AMR prevention and control in line with its own Strategic Plan. We will therefore be giving preference to those applications that have:

- A clear, well-articulated, practical and feasible approach to addressing the most important strategic bottlenecks and gaps in Sri Lanka's existing system.
- Drawing upon past lessons from Sri Lanka's own experience with AMR control and therefore contributing to the sustainable strengthening and transformation of Sri Lanka's already relatively

good system of AMR control Technical capacity to address the different aspects of AMR covered by this Country Grant.

- Key team members proposed by the grantee and partners- with required management and/or technical experience and skills to deliver the project activities.
- Sound project management plan, consortium management plan (if proposed) and clear operational plan.
- Ability and preparedness to bring stakeholders together in an effective and productive working arrangement, promoting a OH approach.
- Demonstrate value for money which includes concepts such as total overall costs over the life of an activity and is not simply lowest cost.
- Ability to work effectively across multiple sectors.
- Ability to operate in Sri Lanka.

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: **Friday, 11 January 2019.**
- Deadline for registering interest to attend the Applicant Information Session: **1700 SLST (GMT+5.5) on Tuesday, 22 January 2019.**
- Applicant Information Session (AIS): **Thursday, 24 January 2019, Colombo.**
- Deadline for registering to apply for the grant: **1700 SLST (GMT+5.5) on Friday, 25 January 2018.**
- Application submission deadline: **1700 SLST (GMT +5.5) on Thursday, 28 February 2019.**
- Anticipated start of grant: **June 2019.**

10.6 Contact details and support information

Any questions on the Request for Proposals should be sent to flemingfundSA@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 Sri Lanka

Sector	Fellowship	Beneficiary Institution	Understanding AMR	Surveillance expertise	Diagnostic training	Lab quality management systems	Data collection, analysis and use	OH information sharing	Collaborative project
1.Human	AMR Health informatics	MoH		Contribute to designing future AMR surveillance			Design AMR data collection and storage system Collate, validate and analyse AMR surveillance data	Discuss AMR and AMU surveillance results and understanding of AMR epidemiology in humans with counterparts DAPH	To be discussed at the time of agreeing on the Fellowship workplans
2. Human	AMR surveillance	MoH	Integrate results from AMR surveillance with research results to understand the priority AMR patterns and their epidemiology Keep up to date with all the available information on AMR and AMU in Sri Lanka	Contribute to designing future AMR surveillance			Analyse AMR data Understand data biases Interpret AMR results in consultation with microbiologist and AMU data	Discuss AMR and AMU surveillance results and understanding of AMR epidemiology in humans with counterparts DAPH	To be discussed at the time of agreeing on the Fellowship workplans
3. Human	AMU Surveillance	MSA		Contribute to designing future targeted AMU surveillance			Understanding prescribing practices for analysis and interpretation for AMU surveillance results Work with clinicians to modify prescribing practices to reduce potential for AMR	Discuss AMR and AMU surveillance results and understanding of AMR epidemiology in humans with counterparts in DAPH	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
4. Human	Laboratory	Bacteriology Division, MRI			Advanced phenotypic and molecular testing for AMR	Benchtop guidelines SOPs Quality control External quality assurance ISO accreditation – preparatory activities		Discuss AMR and AMU surveillance results and understanding of AMR epidemiology in humans with counterparts DAPH	To be discussed at the time of agreeing on the Fellowship workplans
5. Animal	Laboratory	VRI			Advanced phenotypic and molecular testing for resistance	Benchtop guidelines Quality control ATCC strains External quality assurance-preparatory activities ISO accreditation		Discuss AMR and AMU surveillance results and understanding of AMR epidemiology in humans with counterparts in MoH, SCM, MSA	To be discussed at the time of agreeing on the Fellowship workplans
6. Animal	AMR Surveillance	VRI	Integrate results from AMR surveillance with research results to understand the priority AMR patterns and their epidemiology Keep up to date with all the available information on AMR and AMU in Sri Lanka	Contribute to designing future targeted AMR surveillance			Analyse AMR surveillance data Understand data biases Interpret AMR results in consultation with microbiologist and AMU data	Discuss AMR and AMU surveillance results and understanding of AMR epidemiology in humans with counterparts in MoH, SCM, MSA	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
7. Animal	AMC Surveillance	VDCA		Contribute to designing future AMC surveillance			Analyse and interpret AMC surveillance for example : analysis of data from veterinary drug importers	Discuss AMR and AMU surveillance results and understanding of AMR epidemiology in humans with counterparts in MoH, SCM, MSA	
8. Animal	AMU Surveillance	DAPH		Contribute to designing future targeted AMU surveillance			Analyse and interpret AMU surveillance results	Discuss AMR and AMU surveillance results and understanding of AMR epidemiology in humans with counterparts in MoH, SCM, MSA	To be discussed at the time of agreeing on the Fellowship workplans
9. Aquaculture	AMU surveillance	NARA		Contribute to designing future targeted AMU surveillance			Analyse and interpret AMU surveillance results	Discuss AMR and AMU surveillance results and understanding of AMR epidemiology in humans with counterparts in MoH, SCM, MSA	To be discussed at the time of agreeing on the Fellowship workplans