Terms of Reference for Request for Proposals

First Fleming Fund Country Grant to Eswatini

1 Overview of this grant

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

This Fleming Fund Country Grant for Eswatini will focus on strengthening surveillance systems for antimicrobial resistance (AMR), antimicrobial use (AMU), and antimicrobial consumption (AMC) in both the human and animal health sectors. It will aim to facilitate a stronger One Health approach to surveillance, bringing together multi-sectoral stakeholders to share surveillance data and gain a better understanding of AMR, AMU and AMC. This grant will align with the national AMR policy framework and with the investments made by other donors and stakeholders in this area.

In the human health sector, the grant will seek to strengthen Mbabane General Hospital to be able to provide reference laboratory functions for AMR. This site will also be a sentinel surveillance site along with Raleigh Fitkin Memorial Hospital, Good Shephard Hospital and Hlatikhulu Regional Hospital. In the animal health sector, the grant will support the improvement of AMR surveillance and the monitoring of AMC/U, with the development of bacteriology including antimicrobial susceptibility testing (AST) at the Central Veterinary Laboratory and the Food Hygiene Laboratory.

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

The Grantee will need to work in close coordination with the National Antimicrobial Resistance Containment Committee (AMRCC) and other national stakeholders. 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 the Regional Grants Programme and the Fleming Fellowship Scheme. The Grantee should also aim to align with other development partners and the Government's Medium-Term Development Plan III 2018-2022.

This grant is expected to last until **September 2021**. Grant applications should be in the region of **£2.5million**, including all capital and recurrent costs, overheads and management costs.

2 Overview of the Fleming Fund

2.1 Introduction

The UK Government has established the Fleming Fund to respond to the global threat of increasing AMR. The Fleming Fund will be a critical support in achieving the resolution of the 68th World Health Assembly, 2015

(WHA A68/20), and in realising the Political Declaration of the High-Level Meeting of the United Nations General Assembly (UNGA) on Antimicrobial Resistance, 2016. These recognise that urgent cross-sectoral rationalisation of antimicrobial use in humans, animals, food, agriculture and aquaculture sectors are key to tackling AMR, and call for innovative research and development; affordable and accessible antimicrobial medicines and vaccines; improved surveillance and monitoring; increased governance on antimicrobial use; and increased international cooperation to control and prevent AMR.
The Fleming Fund aims to address critical gaps in the surveillance of antimicrobial-resistant bacteria in low- and middle-income countries (LMICs) in Asia and Sub-Saharan Africa. Countries in these areas are set to bear the highest burden of antimicrobial-resistant infections. A Global Action Plan on AMR has been developed by the World Health Organization which acts as the blueprint for a multi-stakeholder global response to averting a global health crisis caused by AMR.[1]

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

The Fleming Fund Grants Programme is the largest stream of financial support available through the wider Fleming Fund. The UK Department of Health and Social Care has appointed Mott MacDonald as the Fleming Fund Management Agent for the Fleming Fund Grants Programme. Mott MacDonald is a global company with expertise in multi-sectoral international development and fund management. On behalf of the UK Government, Mott MacDonald is responsible for funding allocation and oversight of all investments made across a wide portfolio of grants in different activities and in different countries.
Part of the aim of the Fleming Fund Grants Programme, particularly through Country Grants, is to improve the ability of recipient countries to diagnose drug-resistant infections, with an emphasis on bacterial infections, and to improve data and surveillance to inform policy and practice at national and international levels. The overall goal is to reduce the human and economic burden of AMR.

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

- Country Grants
- Fleming Fellowship Scheme Grants
- Regional Grants

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

[1] http://www.who.int/antimicrobial-resistance/global-action-plan/en/
[2] https://amr.lshtm.ac.uk/wp-content/uploads/sites/12/2016/11/AMR-Surveillance-Protocol.pdf

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

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

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

2.3 Fleming Fund investment areas and outputs

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

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

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

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

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

- Increase in quality and quantity of AMR data collected.
- AMR data shared in country to support evidence-based policy and practices.

- AMR data shared internationally to improve and inform the global response.

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

2.4 Core principles within the Fleming Fund Grants Programme

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

1. **Country Ownership:** The Fleming Fund Grants Programme will work closely with national governments to ensure that country plans and aspirations, as laid out in their National Action Plans, are implemented; Mott MacDonald as the Fleming Fund Management Agent will consult and work hand-in-hand with national governments to agree the approach and ensure sustainability. Grants and RFPs will conform to national priorities outlined in the National Action Plan and as articulated during Country Assessment visits. Unless there are good reasons not to do so, Fleming Fund grants will chiefly invest in public sector laboratories and surveillance systems, thereby supporting national public health systems.
2. **One Health:** The Fleming Fund recognises that the problem of AMR is a great danger to human health and cannot be controlled without a One Health approach. A specific set of One Health investment parameters has also been developed and is summarised below. This approach is aligned with key documents and guidelines from OIE[3] and FAO[4] as well as the Global Action Plan.
    a. ***Collaborative multi-sectoral governance of AMR*:** Leadership and resourcing of AMR surveillance and mitigation measures in all sectors that directly contribute to the emergence of AMR.
    b. ***Integrated AMR and antimicrobial use and consumption surveillance in all sectors*:** Surveillance, data collection and analysis in humans, livestock, aquaculture, crops, food and the environment to produce information that is interpreted by multi-sectoral teams to help understand factors associated with AMR emergence within and between sectors
    c. ***AMR mitigation policies and programmes prioritised across multiple sectors*:** Evidence-based policies and programmes for AMR mitigation measures that are prioritised across the relevant sectors, based on information generated through AMR and AMU/AMC surveillance in all sectors.
3. **Alignment of Approach:** The Fleming Fund Grants Programme will seek to invest in areas which complement and build on work done to date, rather than create new systems. Grant applicants will need to demonstrate that they understand other actors' work in the field of improved laboratory capacity (both within and outside the sphere of AMR surveillance), improved disease surveillance and the One Health approach. The Fleming Fund Grants Programme will assess grants for duplication of efforts and/or the development of parallel systems. To the extent possible, prospective Grantees will need to demonstrate how their proposals add value to existing and planned investments and systems.
4. **Sustainability:** The Fleming Fund Grants Programme will focus assistance on national systems with a view to long-term sustainability. Investment size and scope should, as far as possible, be aligned with national government spending so that systems created with Fleming Fund grants are sustainable within the public health system. We also recognise that the public good of conducting AMR surveillance means medium- to long-term support, and it is expected that countries that demonstrate good performance will have access to additional funds to provide ongoing support. The lead grantee will be expected to: take a strategic approach to sustainability; identify key challenges and critical factors relating to sustainability;

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

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

explain concrete strategies specifically designed to address these challenges and factors; and outline an exit strategy.

2.5 The Fleming Fellowship Scheme

The Fleming Fellowship Scheme is part of the broader Fleming Fund Grants Programme and is managed by Mott MacDonald. Fellowships provide funding to support on-the-job training over an 18- to 24-month programme of structured learning, mentoring and skills development for four to eight Fellows in each investment country. The Fellowships do not duplicate basic training, rather they focus on building advanced skills and leadership to promote the application of best practice in identified 'Beneficiary Institutions', while promoting the One Health principle. Beneficiary Institutions are organisations such as AMR reference laboratories national epidemiology units in the human and animal health sectors, hospitals and/or national drug administration agencies that add strategic value and complementarity to achieve the Fleming Fund's aims in the country. They are also institutions most likely to derive sustainable benefit from the Fellowship activities.

The initial focus of the Professional Fellowship Scheme is on strengthening the quality of laboratory diagnostic data and the analysis and use of AMR and AMU surveillance data in Beneficiary Institutions. Fellows in each country are supported by mentors who provide the expertise required to support the needs of the Fellows as well as to help them to improve the sustainability of AMR programmes in their institution. The data they generate will be applied to deliver evidence-based approaches to tackling AMR, for example to improve antimicrobial stewardship.

Priority areas to be supported through the Fellowship Scheme are discussed by a Mott MacDonald scoping team together with the national AMR committee in each country and reviewed with the Beneficiary Institutions to which they are assigned. A template is provided for each Fellowship terms of reference which is adapted to the Beneficiary Institutional needs. One, or at most two, expert 'Host Institutions' are matched with all the Fellowships in a specific country. The Host Institution is drawn from a preselected pool, and after attending an initial workshop with the Fellows and Beneficiary Institution, the Host Institution develops a budgeted work plan. Once workplans and budgets have been agreed by Mott MacDonald, Fellows are formally accepted, and their Fellowship activities expensed through the Host Institution.

2.6 Fleming Fund activities in Eswatini to date

This is the first RFP for a Fleming Fund Country Grant to be released for Eswatini through the Fleming Fund Grants Programme. In preparation for this grant, Mott MacDonald carried out an early desk-based assessment, followed by an initial approach to the country by the Regional Coordinator in April 2019 to assess in the programme. Following a positive response to the mission, Scoping and Positioning activities were undertaken in May 2019 to determine the scope of the Country Grant.

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

3 The current AMR situation in Eswatini

3.1 Policy and strategy environment/National Action Plan for AMR

Eswatini has developed a multisectoral National AMR Containment Strategic Plan (NAP) for Antimicrobial Resistance 2017 to 2021. Development was supported by USAID and Systems for Improved Access to Pharmaceuticals and Services (SIAPS). The plan has been formally agreed and signed (in early June) by the Ministries of Health, Agriculture and Natural Resources, however it has not yet been launched due to changes in the political leadership at sector levels for all the ministries concerned. The NAP is expected to be launched before the start of the Country Grant.

The NAP includes a timeline with activities for the short, medium and long term. Activities have not been costed but this is an objective in the NAP itself. In keeping with the Global Action Plan on AMR, the NAP has five key strategic objectives (SOs):[4]

- SO1. Improve awareness and understanding of AMR through effective communication, education and training.
- SO2. Strengthen the knowledge and evidence base for AMR containment through surveillance and research.
- SO3. Reduce the incidence of infection across humans and animal communities, the environment, and healthcare through individual and environmental sanitation, hygiene, and infection prevention measures.
- SO4. Optimise the use of antimicrobial medicines in human and animal health through AMR stewardship.
- SO5. Enhance the leadership, governance, coordination, and investment in containing AMR

The MOH is charged with leading government efforts on the containment of AMR through coordination and collaboration with other relevant ministries, with support from the AMRCC for co-ordination of NAP activities. The AMRCC was appointed in 2016, and includes representatives from MOH, MOA, academia, SIAPS and other development / implementing partners. The AMRCC reports to the Chief Pharmacist of the MOH and terms of reference have been developed.

There are three technical sub committees:

- Surveillance and responsible use of antibiotics subcommittee
- AMR Surveillance and Infection Prevention Control (IPC) subcommittee
- AMR research and development subcommittee

However, there is limited support available to develop the roles of the subcommittees, and, due to the small size of the AMRCC, there is at present no intention to develop these into more formal technical working groups.

A Joint External Evaluation (JEE) for Eswatini was completed in 2018[5]. The report noted that three public health laboratories are performing susceptibility testing (although it does not comment on the volume or

[4] Shongwe, K., and S.-C. Wang. 2018. Development of Swaziland's National Antimicrobial Resistance Containment Strategic Plan. Submitted to the US Agency for International Development by the Systems for Improved Access to Pharmaceuticals and Services (SIAPS) Program. Arlington, VA: Management Sciences for Health.

[5] Joint external evaluation of IHR core capacities of the Kingdom of Eswatini. Geneva: World Health Organization; 2018 (WHO/WHE/CPI/2018.27).

quality of testing), as well as two private laboratories and the CVL. The JEE makes several recommendations. For AMR surveillance, these include:

- Development of an implementation plan describing short-, mid- and long-term interventions, M&E framework, and budget
- Adoption and implementation of international tools for AMR surveillance
- Established systems must allow for the integration of AMR detection and surveillance in both the public health and animal health sectors.

The Government is also developing the National Health Security Policy framework and aims to consolidate all relevant policies in a new Health Sector Strategic Plan. The Government considers tackling AMR as a critical issue to improve health outcomes and, in the animal health sectors, as important for facilitating its beef exports to neighbouring markets

3.2 One Health

Surveillance for several notifiable zoonotic diseases such as rabies, brucellosis and avian influenza is in place, under the responsibility of the Division of Veterinary Services (DVS). However, there is no system for collecting AMR data, although the DVS as a representative of OIE routinely collects data on AMC in animals.

Eswatini recognises that the control of AMR will require close cooperation between the sectors and has adopted a 'One Health' approach as a guiding principle for working together to address AMR issues. The AMRCC includes members from three ministries (Agriculture, Health and Environment) and representation from FAO, OIE and WHO. However, the FAO country office is not currently capacitated to support AMR-related activities carried out by the Ministry of Agriculture and most of the support in that area is provided by the regional FAO office in Harare, Zimbabwe. Efforts are underway to strengthen AMR/AMU related capacities at the FAO Country Office.

3.3 AMR Surveillance and laboratory capacity in human health

Although the NAP is ready for publication, and Strategic Objective 2 focuses on surveillance, there is no accompanying Surveillance Plan and Eswatini has not yet enrolled in GLASS.

Four laboratories in Eswatini are performing bacterial culture and antimicrobial susceptibility testing: two government hospitals, Mbabane Government Hospital (MGH) and Raleigh Fitkin Memorial Hospital (RFM), and two private laboratories. The cost of private laboratory tests is beyond the means of most people in Eswatini, however laboratory tests in government laboratories are charged at a nominal rate of 4 Emalangeni, about £0.22.

MGH laboratory has been designated as the national microbiology laboratory and currently provides testing services for other government hospitals. It is a WHO surveillance site for paediatric bacterial meningitis, and will be the designated AMR reference laboratory, as well as a sentinel site. Three proposed additional sentinel sites are the Raleigh Fitkin Memorial Hospital, Hlatikhulu Provincial Hospital (HPH) and Good Shephard Hospital (GSH) at Siteki. The latter two do not currently offer a bacteriology service. The sites have been chosen to give geographical and demographic representation of the country: MGH and RFM are based in urban settings, while Hlatikhulu and Good Shephard serve rural populations.

The Fleming Fund team assessed all four human health laboratories outlined for support in the Request for Proposal. MGH laboratory possesses a Bactec 9050 automated blood culture machine and a Vitek II automated AST analyser. The laboratory is enrolled in a general bacteriology proficiency testing scheme from the National Institute of Communicable Diseases in South Africa and the annual UK National External Quality Assessment Services Meningitis panel. With only three staff currently available to perform bacteriology, who

also perform general on-call laboratory duties, the capacity of the laboratory to accept new activities is limited, and expansion of its role as a reference laboratory will need to be done in a stepwise manner with monitoring of the workload imposed. The RFMH laboratory also possesses a Bactec 9050 instrument, and both sites have adequate laboratory space.

The other two sites, HPH and GSH, do not provide a bacteriology space and expansion of the current laboratory space will be required for both. Good Shepherd Hospital has a basic container laboratory, initially provided by ICAP for TB testing but currently unused, that may provide sufficient space but will need to be refitted to make it suitable for bacterial culture work. Hlatikhulu hospital has a small room available in the laboratory that may be sufficient for limited culture work. Both hospitals will need considerable support to start performing culture work and the Grantee will need to consider options for achieving this.

The government laboratory service in Eswatini is organised centrally, with laboratory budgets being held nationally, separately to the general hospital budget. Laboratory services receive a significant amount of external support, especially in HIV and TB treatment, with ICAP (icap.columbia.edu) being the major partner. The number of staff available in all laboratories is very limited, with a significant proportion of the staff contracted by ICAP on PEPFAR and Global Fund financing.

Reagents and consumables are procured by the Central Medical Stores but due to the low level of use of specialist microbiology items, stock outs of these are common. Budgets are available to procure reagents, but the process is unnecessarily bureaucratic and often microbiology is not given priority. Many consumables are supported by donor funded projects such as the Global Fund, ICAP, and Medecins Sans Frontiers. The American Society of Blood Banks has also partnered with the Laboratory systems to strengthen capacity in Quality Management Systems. Servicing and maintenance of equipment is centrally organised by donors for larger items and is generally reliable. However, less specialised equipment such as incubators and fridges are not included in these arrangements.

Biosafety is covered by the national 2012 Biosafety Act and 2017 Biosafety Regulations, however, the Act is principally concerned with agricultural rather than laboratory biosafety as reflected by the fact that the Eswatini Environment Authority is the National Focal Point for biosafety. Biosafety and Biosecurity will need strengthening in all the laboratories.

The DISA*LAB (disalab.com) Laboratory Information Management System (LIMS) is used for all samples in all surveillance site laboratories and is centrally backed up for all sites at MGH. ICAP is assisting Eswatini with implementation of this system. Currently patients are given per episode identifiers on DISA so tracking patients is a challenge, however, a potential solution being considered by the MoH is the use of national identity card numbers to provide a consistent and traceable identity.

The Strategic Information Department of the Ministry of Health is trialling a Client Management Information System designed in-house for patient registration and management, HIV care management, drug and prescription management, and referral services. If this system is expanded to full operation it may be possible to use it for collection of clinical data to enhance AMR surveillance.

A national clinical sample transport system is operational. It does not currently include microbiology samples but with some investment could allow movement of isolates for confirmation from surveillance site hospitals.

The epidemiology service of the Ministry of Health has three members of staff (all are epidemiologists), and produces weekly, and monthly bulletins and quarterly reports for the Ministry of Health and its hospitals. Bulletins and reports cover a wide range of healthcare issues including notifiable diseases, outbreaks, HIV treatment statistics, etc. but information on AMR/AMU is not currently included. Although there is a

government freeze on recruitment, the epidemiology service is hoping to be able to gain four field staff, one for each region from existing environmental health officers and nursing personnel.

3.4 AMR Surveillance and laboratory capacity – animal

The Ministry of Agriculture is composed of four departments including the Department of Veterinary and Livestock Services. This department consists of the Division of Livestock Services and the Division of Veterinary Services (DVS). The DVS consists of three units: two of these (the Veterinary Field Services Unit, and the Veterinary Public Health Unit) have a laboratory and both are located in the same compound in Manzini.

The Central Veterinary Laboratory (CVL) is under the Veterinary Field Services Unit. Among other activities, this laboratory is responsible for active surveillance of diseases in poultry and livestock (e.g. Newcastle Disease, Avian Influenza, Foot and Mouth Disease, Transmissible Spongiform Encephalopathy (TSE)). This system is well structured for livestock due to a nation-wide network of dip tanks, managed by veterinary assistants, at which livestock are registered. As animals are treated at the dip tanks, a calculated number (determined according to specific disease surveillance objectives) of animals are sampled. The CVL also receives samples submitted for diagnostic testing by farmers and veterinarians. Therefore, there is an active and a passive surveillance for livestock diseases but none for AMR. The newly commissioned Food and Hygiene Laboratory (FHL) is under the Veterinary Public Health Unit. This laboratory carries out meat inspection in slaughterhouses where it collects beef, poultry, water and environmental samples. There are two major slaughterhouses for beef and animals are slaughtered there two to three times a week. Poultry, on the other hand, are slaughtered daily, and their slaughtering is managed by a few large companies which produce the large majority of poultry produced commercially in Eswatini.

The Epidemiology Unit at the DVS in Manzini currently consists of three epidemiologists who do the collation, analysis and interpretation of data generated by both aforementioned laboratories. Quarterly reports are submitted to the Ministry of Agriculture and stakeholders as per the objective of the surveillance. If a disease is present, the Unit reports on its prevalence, spatial, and temporal distributions. If a disease was not detected, the Unit reports confirmation of absence. Other pertinent information not related to disease but related to surveillance procedures are also included in the reports.

CVL staff include a veterinarian, two senior laboratory technologists, and a laboratory technician. Two more staff are currently under recruitment. CVL carries out routine diagnosis on samples submitted by veterinarians and farmers and active surveillance of livestock diseases by taking samples at dip tanks (Foot and Mouth Disease, TSE, trypanosomiasis, brucellosis, babesiosis, anaplasmosis), slaughterhouses (tuberculosis, cysticercosis and hydatidosis) and poultry farms (Avian Influenza and Newcastle Disease). CVL does AST on samples submitted for diagnostic testing (example: mastitis samples).

The FHL staff include a veterinarian, two technologists and a technician. The FHL currently performs culture and identification of *E. coli* and *Salmonella spp.* on food samples. So far, they have not performed ASTs on the samples submitted to them.

At the moment, there is no national AMR surveillance system in place, and no national bacteriology laboratory protocols or SOPs. The laboratories have no LIMS in place and submit data in the form of paper reports or transfer of spread sheets through email to the epidemiology unit.

The laboratories are relatively new structures; however, restrictive access and some biosecurity measures are lacking. Both laboratories will require support for equipment and reagents, quality management systems, data management systems, biosafety and biosecurity improvement, and human resources strengthening.

3.5 Rational use of drugs

Registration of medicines for human use is controlled by the newly formed Medicines Regulator. This is still in early development, with two members of staff sitting within the Central Medical Stores. The Regulator has embarked on national registration of medicines imports following an Act of Parliament passed last year. The Regulator works in close collaboration with the Revenue Authority for registration and assessment of imports – most of these come from South African manufacturers.

The Pharmacy Department at the Ministry of Health is headed by a director and has developed clinical guidelines in collaboration with stakeholders. At the hospital level, limited antimicrobial consumption information and use is available through logbooks for pharmacy requisitions to central medical stores, but dispensed medicines are only recorded in individual patient charts and therefore data on antimicrobial use is extremely limited.

There are no current plans for routine AMU/C surveillance in human health. A pharmacist at RFM is planning to perform a Point Prevalence Survey of use of antibiotics this year as part of her PhD studies.

The DVS has AMC regulatory and monitoring strategies in place and keeps a compendium of registered Veterinary Drugs and Medicinal Substances at importation and validates them for distribution within the country. They also register and authorise retail establishments and further monitor and supervise the distribution of the drugs (i.e. distributer quantities to retailer and retailer sources and quantities). This data is currently being submitted to the OIE (Option 1). The DVS registers, monitors and supervises importation of Veterinary Drugs and Medicinal Substances including antimicrobials and is governed by the Animal Diseases Act (Regulation and control of Veterinary Drugs and Medicinal Substances) Regulation, 2012.

4 Scope of this Country Grant

4.1 Grant Objective and Outputs

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

For human health, the Country Grant is intended to support / improve implementation of the WHO GLASS programme and Grantees should refer to the roadmap for GLASS participation produced by the London School of Hygiene and Tropical Medicine:
(https://amr.lshtm.ac.uk/wp-content/uploads/sites/12/2016/11/AMR-Surveillance-Protocol.pdf)

Table 1: Eswatini Country Grant Objectives and Outputs.

Objective 1: The AMRCC is strengthened to oversee and monitor AMR, AMU and AMC surveillance across sectors
Output 1.1: The AMRCC is supported to develop a functioning surveillance system

Output 1.2: The AMRCC share knowledge and data nationally and internationally
Output 1.3: A Surveillance Strategy for AMR has been developed
Output 1.4: A cost evaluation is completed to analyse the cost drivers for establishing AMR surveillance in Eswatini and identify lessons for future programmes.
Objective 2: Improved country capacity for AMR and AMU / AMC surveillance in the human health sector
Output 2.1: MGH is functioning as the National Reference Laboratory for AMR
Output 2.2: The MOH Epidemiology Unit is functioning as the AMR data centre
Output 2.3: Priority AMR surveillance site laboratories are providing basic bacteriology services for GLASS priority pathogens
Output 2.4: Clinicians are engaged in the laboratory improvement programme at all sites
Output 2.5: Improved biosafety and biosecurity at MGH and surveillance site laboratories
Output 2.6: AMU and AMC surveillance and monitoring systems are developed and piloted
Objective 3: Improved country capacity for AMR and AMU / AMC surveillance in the animal health sector
Output 3.1: The Central Veterinary Laboratory and the Food and Hygiene Laboratory are strengthened for AMR surveillance
Output 3.2: Improved biosafety and biosecurity at CVL and FHL
Output 3.3: An AMR surveillance protocol is developed and piloted in live chickens and poultry meat
Output 3.4: Current AMU and AMC surveillance systems are strengthened
Output 3.5: Data collected through AMR, AMU and AMC surveillance is managed and analysed at the DVS and results are regularly shared with the relevant stakeholders, including the AMRCC.

4.2 Laboratories to be supported by the grant

The sites identified for Fleming Fund support are listed in Table 2, below.

Table 2. List of human and animal surveillance sites

No.	Site	Location	Sector
1	Mbabane Government Hospital	Mbabane	Human*
2	Raleigh Fitkin Memorial Hospital	Manzini	Human*
3	Good Shephard Hospital	Siteki	Human
4	Hlatikhulu Regional Hospital	Hlatikhulu	Human
5	Central Veterinary Laboratory	Manzini	Animal
6	Food Hygiene Laboratory	Manzini	Animal

*Priority human health sites

4.3 Duration of the grant

This Country Grant to Eswatini is expected to last for 20 months, until September 2021.

4.4 Funding envelope

Grant applications should be in the region of £2.5 million, including all capital and recurrent costs, overheads and management costs. Applicants should include a placeholder budget within this funding envelope to the value of **£600,000** for renovating and equipping the laboratories (human and animal health).

Mott MacDonald is responsible for driving Value for Money (VfM) on behalf of the UK Department of Health throughout the Grant programme and will carefully consider how the proposal addresses efficiency, effectiveness, economy and equity in delivering the Request for Proposal (RFP) outputs in relation to the proposed costs. The Guidance Notes for the Grant Application Form provide more information on different dimensions to be considered as part of a VfM approach.

4.5 Procurement

4.5.1 Central procurement

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

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

Where identified and appropriate, blood culture analysers will be supplied to laboratories providing a clinical service, with the final number determined by the laboratory assessments. Each automated AST platform will be supplied together with a mass spectrometry instrument, with the necessary databases and linkage software. A maximum of two of these bundles (i.e. two AST platforms linked with two mass spectrometers) will be supplied for use in the AMR reference laboratories (animal health and human health). If the reference laboratories do not have sufficient specimen throughput, or do not have the required infrastructure, the instruments may be deployed, with the approval of the Management Agent, to alternative sites or countries.

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

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

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

The grantee will work in consultation with the Management Agent, the Management Agent's procurement supplier (International Procurement Agency) and the UK Department of Health and Social Care, to determine the most suitable method of procurement for all other laboratory equipment, and to develop reliable stock management and supply systems for consumable and reagents.

The lead grantee will also be expected to:

1. assist with the importation and delivery of equipment and consumables to recipient sites;
2. work closely with the procurement partner (whether IPA or an alternative organisation) to ensure the appropriate delivery sequence of items;
3. maintain an asset register of all items defined as assets by the programme;
4. regularly monitor the items that have been procured by Fleming Fund Grants Programme to ensure:
    (i) items are being used for intended purpose;
    (ii) items are being maintained appropriately; and
    (iii) to report any misuse or misappropriation of assets to the Management Agent.

4.5.2 Laboratory equipment and consumables

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

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

The Grantee will be expected to:

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

4.5.3 Renovation of laboratories

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

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

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

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

5 Key partnerships, alignment and coordination

The Country Grant should be delivered in a way which supports the national AMR-related effort as stated in the NAP and which takes account of current capacity levels, absorptive capacity, alignment with other development partners, and national strategies and priorities/policies. This should include OIE, WHO, FAO, and other implementing partners who are working with laboratories, surveillance, or AMR.

It is important that the AMR programme works closely with other vertical CDC programmes especially the HIV and TB programmes. The successful bidder must show how this would work and how they will ensure alignment and value for money over the course of the grant.

Allocation of grant resources should support the national effort in a transparent way by specifying resource allocation in a workplan and budget that has been jointly developed by government officials and the Grantee, where possible. Much of the success of this grant depends upon the ability of the Grantee to bring cross-sectoral stakeholders together and facilitate joint working.

The Grantee should be mindful of and attempt to complement where appropriate other laboratory strengthening programs in Eswatini, for example those related to the HIV and TB programs.

6 Complementing other grants from the Fleming Fund Grants Programme

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

The Fleming Fund Regional Grant programme, also managed by Mott MacDonald, will focus on strengthening networking and data sharing on AMR at the regional level. The grantee is expected to liaise, through Mott MacDonald, with this programme where relevant, to maximise the sharing of AMR data and learning at the regional and global levels.

7 Detailed Objectives and Outputs

7.1 Objective 1: The AMRCC is strengthened to oversee and monitor AMR, AMU and AMC surveillance related activities in all sectors.

Output 1.1: The AMRCC is supported to develop a functioning surveillance system.

The AMRCC is a multisectoral committee which acts as an operational platform for co-ordination of AMR and AMU/C activities among the different sectors. The AMRCC needs support to understand and respond to the outputs from surveillance activities so that it can function effectively.

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

- Development of a costed implementation plan for the NAP, including monitoring and evaluation arrangements that demonstrably contributed to improved policies and program improvement over time
- Quarterly meetings of AMRCC are being held that demonstrably contribute to improved coordination in the development of information sharing between the sectors, to address organisational issues, and to develop policies on AMR, AMU/C as appropriate

Output 1.2. The AMRCC shares knowledge and data nationally and internationally

The Grantee should support the AMRCC to ensure intersectoral sharing of knowledge and results, ensuring alignment with international surveillance systems (e.g. GLASS, OIE).

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

- Improved quantity and quality of AMR and AMU information, to a standard that could be shared nationally and internationally with evidence that such information is contributing to improved policies and practices.
- Annual national symposiums (likely two over the lifetime of the grant) are held to share and review AMR and AMU information including with private sector stakeholders involved in animal production and health as well as human health, with evidence that such national symposiums are building greater awareness and action-oriented plans to better prevent and treat AMR over time.

Output 1.3: A Surveillance Strategy for AMR has been developed

The Grantee should support the AMRCC to develop a national AMR surveillance strategy. Surveillance should be aligned with WHO Global Antimicrobial Resistance Surveillance System (GLASS). The Fleming Fund supported, LSHTM-GLASS roadmap[6] document provides further information. The strategy should also take into account emerging AMR surveillance strategies published by internationally recognised bodies such as FAO and OIE, and existing surveillance structures to promote alignment and sustainability. An indication of the capacity and timeframe of Eswatini to contribute to GLASS should be included within the Surveillance Strategy.

The Grantee should provide technical assistance, training and other support as appropriate, aligned with the needs of Government and recognising the limited absorptive capacity.

By the end of the first 6 months of the grant we expect that the following will have been achieved:

- A situational analysis of existing surveillance capacity, national systems should be conducted to understand how the AMR Surveillance Strategy will align to ensure sustainability.
- A five-year National AMR Surveillance Strategy drafted that focus Eswatini financial, human, and other resources on the most strategically important gaps and bottlenecks that currently limit AMR prevention and control.
- A detailed costed operational plan for the short-term component, achievable within the life of the grant.
- The roles and responsibilities of all organisations contributing to the surveillance system are clearly outlined.

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

- Completion of the short-term component of the National AMR Surveillance Strategy.
- Evidenced uptake of the longer-term surveillance strategy by the NMCG.
- Demonstration of data use at a national level.
- Clear indication of progress towards GLASS reporting.

[6] https://amr.lshtm.ac.uk/wp-content/uploads/sites/12/2016/11/AMR-Surveillance-Protocol.pdf

- A sustainability plan put in place to continue the implementation of the surveillance strategy beyond the life of the grant.

Output 1.4: A cost evaluation is completed to analyse the cost drivers for establishing AMR surveillance in Eswatini and identify lessons for future programmes.

The Fleming Fund Country Grant investment is intended to provide the initial stimulus to generate data to support Eswatini's response to AMR. Long term sustainability, both for laboratory systems and for the surveillance programme, will depend on the success of the programme, and on demonstration of the value to the country of the investment. The Grantee should therefore undertake a basic cost appraisal to add value to future policy and programming. This should address: actual costs of laboratory improvements (including building human capacity) compared with estimates, identifying examples of good practice, identifying efficiencies and cost savings, and estimating potential impact on other expenditures e.g. hospital drug budgets. Additional factors which could be examined include the cost benefit of preventative maintenance of equipment to preserve long term function. The evaluation should be shared with the relevant TWG and with the AMRCC to advocate for better use of scarce financial resources, through gains in efficiency that can be invested back into AMR prevention and control.

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

- A cost evaluation has been completed and shared with the relevant TWGs and the AMRCC, which includes lessons learned / examples of good practice which can inform further rollout of the surveillance programme.

7.2 Objective 2: Improved country capacity for AMR and AMU / AMC surveillance in the human health sector

Output 2.1: MGH is functioning as the National Reference Laboratory for AMR

The Grantee is expected to finalise the laboratory requirements for MGH, including infrastructure, equipment, diagnostic capability, and AMR data management, and implement the improvements identified.

MGH should take on the function of the national reference laboratory for AMR, with the necessary key functions (e.g. confirmation of unusual resistance patterns, advanced organism identification and AST) as outlined in the LSHTM Roadmap.[7]

In particular, the Grantee should address:

- Utilities, including mains electricity, back-up power, and UPS systems for critical instruments, including ensuring systems can support the anticipated load
- Laboratory renovations and equipment required for reliable bacterial isolation, identification and AST
- Laboratory biosafety and biosecurity systems

Areas for support by the Grantee should include:

- **Maintenance,** The Grantee should review the status of key specialist equipment relevant for bacterial culture, identification and AST, and support provision of the necessary service and maintenance contracts, and, where necessary, the training of in-country biomedical engineers, to ensure satisfactory performance of the instruments. This should be considered jointly with the needs of the animal health sector.
- **Provision of advanced testing services.** The Grantee should support MGH to develop some advanced services for bacterial identification and AST as expected of a national reference laboratory. This should

[7] https://amr.lshtm.ac.uk/wp-content/uploads/sites/12/2016/11/AMR-Surveillance-Protocol.pdf

include confirmatory methods for e.g. ESBL and carbapenemase production, and MIC methods for isolates with borderline resistance or species which should be tested by an MIC method.

- **Biorepository.** A secure repository of isolates is important to allow future investigation of the isolated pathogens, for example tracing origin and transmission of outbreaks, or confirming the genetic basis of resistance. The grantee is expected to develop a biorepository system (e.g. ultra-low freezers, or a lyophilisation system) with consideration of the power supply and back-up sources. Development of the repository should include Standard Operating Procedures (SOPs) for sample selection and duration of storage, and for how access is granted for their use. Isolates should be inventoried using an appropriate, sustainable system and be linked to relevant epidemiological data such as source demographics and available clinical data.

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

- Microbiology technicians at MGH are trained and able to conduct bacterial culture, identification and AST using conventional methods and some more advanced techniques
- Quality Management Systems (QMS) are developed for the laboratory
- The laboratory is participating in an international proficiency testing scheme or other EQA scheme
- MGH is providing national support for AMR surveillance, for example, providing national guidelines and SOPs, developing bench guides/flow charts, developing internal QC processes for instruments, reagents and methods
- A stable supply of blood (sheep or horse) for the preparation of blood agar, possibly with aid of CVL, is established for MGH and the surveillance sites.
- The reference laboratory is providing training and mentoring on QMS for surveillance site laboratories, providing an EQA validating service for surveillance site laboratories, providing re-testing and feedback on a subset of isolates, and developing a proficiency testing scheme for the GLASS pathogens as part of the QA process for surveillance site laboratories.
- A secure, inventoried, biorepository system for bacteria relevant for AMR surveillance is in place
- A stock management system is in place to ensure reliable supply of reagents and consumables for surveillance activities. This includes a plan for sustainability beyond the end of the Fleming Fund grant.

Output 2.2: The MoH Epidemiology Unit is functioning as the AMR data centre

The Grantee should undertake activities to strengthen the Epidemiology Unit of the Ministry of Health (MoH-EU), including the set-up of systems and processes to allow data storing and analysis.

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

- An AMR data centre is established at MoH-EU, with appropriate training of staff.
- A server, together with appropriate power protection, backup systems and software for data handling and analysis is in place and operating.
- MoH-EU produces a quarterly report showing the results from analyses of the AMR surveillance data and shares the results with the AMRCC. These are discussed with other relevant parties such as the Strategic Information Department of the Ministry of Health
- Data on GLASS priority pathogens is available in a format that allows it to be submitted to GLASS
- MoH-EU is providing feedback on nationally collated resistance data for priority pathogens to the surveillance sites.

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

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

However, developing sustainable bacteriology laboratory services in Eswatini presents several challenges, including limited human resources and sustainability of supplies.

Applicants should formulate their workplans with a view to strengthening MGH and RFM in the first instance, with each laboratory conducting blood culture testing, and MGH performing confirmatory testing. The proposal should include costs for staff training and transportation of samples. Please refer to Section 4.5 for additional details on how to include proposed costs for equipment, consumables, supplies, and refurbishment.

All the sites have a small complement of staff in the laboratories. These staff are all generalists and need support to improve their knowledge and skills in bacteriology. For bacteriology services to be sustainable in Eswatini, a community of practice will need to be developed both within and between laboratories including in animal health and other sectors. The Grantee should therefore consider options for supporting the development of bacteriology skills at all sites. The use of short course, on-site mentoring, online and video-conferencing based training should be considered. Other mechanisms of creating a national community of practice in bacteriology could be suggested by the grantee.

Two sites are not currently performing any bacteriology. Within the first three months, the Grantee will be expected to undertake a costed options appraisal for developing clinical bacteriology services at Good Shepard and Hlatikhulu hospitals. The Grantee should consider the following options (and any others that they think may be feasible):

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

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

The appraisal should be discussed with the Management Agent and the AMRCC, and a decision will be taken regarding incorporation into the workplan for the Country Grant. The laboratory placeholder budget includes the estimated amount for development of these two sites.

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

- A costed options appraisal is presented to Mott MacDonald and the AMRCC, and discussions held regarding incorporation into the Country Grant.

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

- Priority sites in Table 1 are providing a clinical diagnostic blood culture service, are able to provide results to clinicians within a clinically useful timeframe, and are contributing data to the national surveillance system
- Relevant SOPs are in place to support the production of reliable data for both clinical and national surveillance
- A stock management system is being used to ensure availability of laboratory consumables and reagents. Co-ordinated procurement with the animal health sector laboratories should be explored as an option.
- A Quality Management System is implemented at each site (relevant to the functions performed by that site) to support production of reliable, timely bacteriology results for clinical use and AMR surveillance.
- QC systems are developed and operating for relevant equipment, with training, monitoring and logging of corrective actions
- Key equipment is maintained and under the required service contract
- Ongoing professional development programme for laboratory staff to include the functions performed at each site
- Basic data management systems (e.g. WHONET) in place at each site to allow reporting of results centrally as well as local analysis of sample throughput and resistance profiles

Output 2.4: Clinicians are engaged in the laboratory improvement programme at surveillance sites

Due to the existing limited laboratory capacity, there is little utilisation of bacteriology services as there is limited value to the clinicians if tests are too expensive, turnaround times are too slow, or results too unreliable to impact on patient care. Conversely, unless there is demand for services, and a reasonable throughput of samples, there is no motivation for laboratories to improve or maintain capacity.

To address this, Grantees should ensure that clinicians and laboratory staff work together to develop bacteriology services at each site, with laboratory staff understanding the need for reliable results and rapid turnaround times, and clinical staff aware of the constraints and the limitations in the laboratory, particularly as the service is being developed.

Areas to address could include: joint planning and engagement meetings between laboratory services and clinicians; timely reporting of results – e.g. using LIMS, WhatsApp, phoning of critical results; training of clinical staff in blood culture taking, with monitoring of contamination rates and provision of feedback; engagement with stewardship / AMR committees; improved collection of clinical data on submission forms to enhance the value of the AMR data; local use of data to improve prescribing of antimicrobials

Use of the clinical microbiology laboratories should be integrated into standard good clinical care of patients: as guidance, patients being treated for sepsis (i.e. receiving intravenous antimicrobials) should have at least one set of blood cultures taken, plus additional samples as per presenting syndrome, and specimen forms should have basic data regarding clinical presentation and antimicrobial treatment.

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

- Increased number of good quality blood culture samples sent to the laboratory, with acceptable contamination rates and relevant clinical data recorded on the request form.
- Results are communicated to clinicians in a timely manner
- Clinical staff and pharmacists at the surveillance sites demonstrate an improved understanding of how to incorporate bacteriology results into their practice.
- Data generated at the site is analysed locally and being used to inform hospital level decisions on training, stewardship and drug policies. This may be via Medicines and Therapeutic Committees, Antimicrobial Stewardship Committees or similar entities.

- Data is shared at the national level via the AMRCC

Output 2.5: Improved biosafety and biosecurity of MGH and at all surveillance site laboratories
The Grantee is expected to provide/enhance infrastructure, to develop systems and to provide training and technical assistance to ensure a high level of biosafety and biosecurity.

By the end of the grant, it is expected that the following will have been achieved:
- A Biosafety Officer is in place and trained at all laboratories to oversee implementation of a biosafety and biosecurity programme.
- All laboratories are equipped with appropriate safety equipment, and staff are wearing the necessary personal protective equipment while conducting testing.
- All biosafety cabinets are regularly maintained and calibrated, and staff have been trained in their use.
- All waste is disposed of in a biosafe manner.
- Appropriate training and monitoring systems for biosafety and biosecurity have been established.

Output 2.6: AMU and AMC surveillance and monitoring systems are developed and piloted
The Grantee should engage with the AMRCC to better understand, evaluate and analyse the current data on AMC, and to develop a system to capture and analyse AMC data. Options to be considered include the WHO Point Prevalence Survey methodology, and analysis of consumption data using data from the national regulator and other sources such as wholesalers. The grantee should support the development and implementation of a national strategy and plan for AMC and AMU surveillance.

By the end of the grant, it is expected that the following will have been achieved:
- AMU/AMC surveillance and monitoring implementation plan finalised, costed and presented to MOH.
- AMC surveillance has been conducted at a national level
- AMU data has been obtained from the surveillance sites
- Data has been disseminated to care providers, policy makers and programme managers at country and national level
- A sustainable plan is in place for continuing AMC and AMU surveillance beyond the end of the grant

7.3 Objective 3: Improved country capacity for AMR and AMU / AMC surveillance in the animal health sector

Eswatini has a surveillance strategy for a number of animal diseases and syndromes which are currently organised and carried out by CVL and the epidemiology unit of the DVS. However, this surveillance strategy does not yet include AMR activities (hence its design is included under Objective 1). AMR surveillance, in the animal health sector, will be active, and should target resistance to specified antimicrobials in selected zoonotic enteric bacteria in healthy broilers and layer hens as this sector is a potential source of zoonoses and a high user of antimicrobials. It will also serve as a foundation for developing services which can be expanded. The AMR surveillance protocol will be developed by the Grantee using internationally available guidelines. CVL will conduct AST on samples collected as part of active AMR surveillance and will additionally contribute passive surveillance data from ASTs conducted on samples from clinically ill animals.

Eswatini has a surveillance system (including protocol and strategy) that aims at controlling safety of food products of animal origin, which is currently managed by the FHL. However, as for surveillance in live animals, this surveillance does not, currently, include AMR. Therefore, the AMR surveillance strategy (under Objective

1) should include surveillance in food. Additionally, a protocol for AMR surveillance in food from animal origin will have to be developed during this Country Grant, and FHL will be responsible for conducting it, in partnership with the epidemiology unit. Under this country grant, AMR surveillance in food should start by sampling chicken meat at abattoirs. Current surveillance is aimed at controlling food safety and could likely be reviewed and adapted to include AMR surveillance.
In the initial stages, surveillance in live animals and food should focus on the following 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
- Indictor 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.

Output 3.1: The Central Veterinary Laboratory and the Food and Hygiene Laboratory are strengthened for AMR surveillance

CVL and FHL are on the same campus at the Department of Veterinary Services in Manzini. Both infrastructures are relatively new (FHL was set up in 2016); however, they will both require some minor renovations, including demarcations to create changing rooms, tiled floors, marble benchtops and increased shelf space, equipment installation such as biosafety cabinets. To be noted, some equipment or facilities (such as the -80°C freezer, storage space) could be shared between laboratories; opportunities for collaboration between the laboratories should be thoroughly investigated by the Grantee.

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

- Necessary renovations completed to allow safe, efficient functioning of the laboratories including restrictive access and repair of the generator, so it becomes automatic. The Grantee should support such works in consultation with the laboratories' management.
- Staff from both laboratories are adequately trained in bacterial identification, ASTs (disc diffusion), and advanced confirmatory tests, as adequate.
- Designated room at the CVL for media preparation to supply both laboratories.
- Establishment of a shared biorepository, including a management system, at the CVL for bacterial isolates. ToRs will be developed to determine which isolates will be selected for storage, how the biorepository will be accessed and used by partners. Relevant SOPs (and subsequent training) for use and access will be developed and shared with relevant stakeholders and staff. This also includes procurement of necessary equipment for storage and inventory.
- Establishment of a LIMS (hardware and software, e.g. WHONET) at both laboratories with a database and backup systems. The data from the LIMS should be easily accessible to the team of epidemiologists to facilitate data extraction and management. IT support in form of software, hardware, internet, etc. will be required to implement the LIMS and train staff in its use.
- A coordinated and sustainable supply and procurement system: the Grantee should facilitate the setting up of a common procurement and stock management system for the two laboratories and also ensure provision of necessary reagents and materials. The possibility of co-ordinated procurement with the human health sector should also be explored.
- Maintenance contracts, that can be sustained beyond the lifetime of the grant, are needed for all equipment. Consideration should be given to training a national biomedical engineer who could service equipment present in veterinary, food and human laboratories.

- If CVL and FHL decide to acquire sheep to provide a reliable supply of blood for their own media and to generate revenue by selling it to all laboratories in the country, the Grantee will support, for example, the construction of a shed and development of good husbandry practices to ensure sheep are kept at high health and welfare standards .
- A quality management system is established, covering equipment, supply chain, data management, training and standard operating procedures.
- Support the participation of both laboratories in EQA, including proficiency testing (PT). Implementation of EQAs and quality management should enable the laboratories to show progress towards accreditation.

Output 3.2: Improved biosafety and biosecurity at CVL and FHL

The laboratories do not have restrictive access measures in place, nor designated changing rooms. Additionally, there is a need to assess the biosafety and biosecurity of the current waste management system which uses a pit for biological waste and the municipal incinerator for other waste. The Grantee should establish sound Biosafety and Biosecurity measures at both CVL and FHL to ensure the protection of staff and the public.

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

- Laboratory staff have designated changing areas.
- The waste management system ensures biosafe and biosecure waste transport and management.
- All samples and isolates are collected, processed, packaged and transported in a safe manner.
- A designated biosafety officer, or biosafety team, is in place.
- The laboratories are equipped with appropriate safety equipment, and staff are wearing staff are wearing the necessary personal protective equipment while conducting testing. Biosafety cabinets are installed, maintained and being used by staff appropriately.
- There is a plan for maintaining the biosafety and biosecurity system beyond the life of the grant.

Output 3.3: An AMR surveillance protocol is developed and carried out in live chickens and poultry meat

The CVL is undertaking only a limited number of bacterial identifications and ASTs due to low demand for bacterial diagnostics.

The FHL performs culture and identification of *E. coli* and *Salmonella*, as part of its food quality and safety role.

The Grantee should assist in the assessment, design, and implementation of AMR surveillance and data analysis of AMR surveillance data, in live poultry and chicken meat.

At present, a large proportion of poultry slaughterhouses are managed by a few companies, with reportedly good traceability. Additionally, a significant proportion of chickens produced in the country are slaughtered at slaughterhouses, at which FHL samples meat daily. This system could be built on to include sampling of entire caeca for AMR surveillance in live chickens and of meat for AMR surveillance in chicken meat. There should be agreement about who, among CVL staff, FHL staff and field animal health staff, will be responsible for the timely collection of samples from live poultry and meat. A transport system, that respects biosafety and biosecurity requirements, should also be planned and budgeted for. ASTs should also be conducted on samples submitted by farmers and veterinarians for routine diagnostic tests of sick animals.

The Grantee will need to support the creation of SOPs, training of staff to collect and transport samples. Costs of sample collection, transportation and processing (including purchase of all consumables) will be covered under the Grant.

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

- The Grantee should, in partnership with the DVS epidemiology unit and FHL, support the design and implementation of an AMR surveillance protocol in live chickens and chicken meat. Surveillance should have a clearly outlined objective to ensure findings can inform policy. The protocol should build upon the current surveillance strategies and protocols in place to avoid duplication. The surveillance protocol should be budgeted, including sample collection and processing, and implemented during the lifetime of the grant.
- A transport system that ensures samples are collected and transported to the laboratory, respecting biosafety and biosecurity requirements has been planned and budgeted for, and set up.
- Samples are labelled appropriately, transported in a safe manner, and are accompanied by epidemiological and demographic information.
- Staff are trained in sample collection, transport and processing, including biosafety and biosecurity, appropriate SOPs have been developed, and due consideration has been given to ethical issues such as sampling procedures and data protection
- The required number of samples have been sent to the laboratories for culture, bacteria identification, and AST.
- The Grantee should support the epidemiology unit from DVS to carry out a value chain analysis of food products of animal origin and those of importance to Eswatini. This analysis should enable national staff to prioritise and design future AMR surveillance activities. The analysis should be carefully designed to specifically address the question or AMR surveillance prioritisation, and be carried out in collaboration with the epidemiology unit and the laboratory managers.

Output 3.4: Current AMU and AMC surveillance are strengthened

AMC surveillance is currently in place, managed at the DVS and achieves “Option 1” reporting to OIE.

The grantee should support the development of databases to manage AMU and AMC data. The grantee should provide technical expertise to train DVS staff in data collection and analysis and promote collaboration between entities responsible for AMU and AMC surveillance in human and veterinary sectors.

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

- A situation analysis of antimicrobial usage in animal sector has been performed. This will identify ways to develop AMU surveillance, improve AMC reporting and identify critical points where legislative changes would make an impact on antimicrobial usage in the country.
- Assessment of the current AMC surveillance system, including data collection methods and data management systems is carried out in order to identify areas that could be strengthened to improve the quality of the data collected as part of AMC surveillance.
- Improved quality of the data reported to OIE.
- AMU and AMC surveillance strategy (including protocols) and data analysis plan developed and costed.
- AMU surveillance piloted in poultry.
- Data management system in place. Hardware and software support have been provided to enhance AMU and AMC capacity. Staff are trained in their use.

- AMU and AMC surveillance data are analysed and interpreted in the light of findings from AMR surveillance, and results are presented to policy makers to inform policy.

Output 3.5: Data collected through AMR, AMU and AMC surveillance is managed and analysed at the DVS and results are regularly shared with the relevant stakeholders, including the AMRCC.

At present, the epidemiology unit at DVS does not have a central database, and information from the CVL and FHL are in form of paper reports or transfer of spread sheets. The epidemiology unit collects, analyses and interprets data (generated by both laboratories) and creates quarterly reports for submission to the Ministry of Agriculture. However, these reports do not yet include information on AMR. As AMR surveillance is implemented, the epidemiology unit will be responsible for epidemiological analysis of the data collected, in both food and live animals.

AMR results should be interpreted in the context of results from AMU and AMC data analysis (output 3.4). The epidemiology unit currently has limited capacity to handle large volumes of data, such as the amount that will be generated through planned AMR surveillance activities. Once it is in place, they will require data management systems, a central database, internet connectivity with faster bandwidth, training, as well as IT support. Data entered in the LIMS installed (output 3.1) should be easy to access and download by the epidemiology unit. Assessment of the software and methods currently used for statistical analysis will have to be carried out to provide adequate upgrading and training to enable further epidemiological analysis of AMR data.

The Grantee should support quarterly meetings with all contributors of AMR, AMU and AMC surveillance data collection and analysis in the animal health sector in Eswatini to share and discuss results and issues related to data supply, quality, etc. The epidemiology unit should be supported to conduct AMR, AMU and AMC data analysis, regardless of the origin of samples (food, clinical cases, active surveillance…).

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

- The grantee should provide necessary technical expertise to train laboratory and DVS staff, as required by their role, in AMR, AMU and AMC data collection, quality management, and analysis.
- Data is regularly and securely backed up.
- Data entered by CVL and FHL (identification and AST results) are matched with relevant epidemiological and demographic information within a national database managed at the epidemiology unit.
- The epidemiology unit is supported in its analysis and interpretation of AMR data. Reports thus written are shared with relevant stakeholders, such as AMRCC, CVL, FHL and industry.
- AMC and AMU data is analysed and interpreted by DVS and shared with the AMRCC, with input from the epidemiology unit. A common report that interprets results in parallel is presented to stakeholders such as the AMRCC.
- Quarterly meetings are held between all stakeholders involved in data collection, analysis, sample collection and processing to discuss issues and ways of improving the surveillance system.

8 Grantee Roles and Responsibilities

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

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

9 Measuring success

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

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

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

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

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

In addition to measuring grant performance against the objectives and outputs stated above, the grant will also be monitored on the implementation of, and adherence to, the Fleming Fund core principles described in Section 2.4, and practical implications for this will be discussed with the successful applicant. No further action is required at this stage.

10 Application requirements

10.1 Grant Eligibility Criteria

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

- Must demonstrate that they are competent organisations responding to this call for proposals.
- Must have an appropriate track-record in supporting laboratory capacity development, surveillance, capacity building, and One Health.
- Must have experience of programme implementation in countries similar to Eswatini.
- 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 Eswatini.
- Must be prepared to accept the Grant Agreement terms.
- Must be able to provide the same information and assurances for all sub-grantees, where the application is from a consortium.
- Should be able to provide all information required for due diligence checks, including clear evidence of financial standing and systems of financial management and control.
- Should be able to provide evidence of suitability in the form of references from clients and donors for previous work undertaken within the last three years.
- Can be a single organisation or consortium, though the latter must clearly identify a Lead Grantee with the appropriate governance and coordination mechanisms to manage sub-grantees.
- Can be:

- National institutes – such as a university or research institutes;
- Non-governmental organisations (NGOs);
- UN Agencies;
- Private companies;
- Government-owned enterprises or institutions provided they can establish that they are (i) legally and financially autonomous, (ii) operate under commercial law, and (iii) are not dependent agencies of national governments.
- In line with UK Government financial transparency requirements any for-profit organisations will be asked to declare profit levels

10.2 How to apply

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

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

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

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

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

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

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

10.3 Evaluation criteria

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

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

- technical capacity to address the different aspects of AMR covered by this Country Grant.

- ability and preparedness to bring stakeholders together in an effective and productive working arrangement, promoting a One Health approach.
- ability to operate effectively in Eswatini.

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: **16 August 2019.**
- Deadline for registering interest to attend the Applicant Information Session: **23 August 2019**
- Applicant Information Session in Mbabane: **28 August 2019.**
- Deadline for registering interest to receive the official Application Pack: **29 August 2019 17:00 SAST (GMT+2)**.
- Application submission deadline: **27 September 2019.**
- Anticipated start of grant: **05 February 2020**

10.6 Contact details and support information

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

The Fleming Fund

RFP/CG1/Eswatini

11 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 contacted 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.