Terms of Reference for Request for Proposals

First Fleming Fund Country Grant to Senegal

1 Overview of this grant

This is a Request for Proposals (RFP) for the first Country Grant to address critical gaps in surveillance of antimicrobial-resistant bacteria in Senegal. It has been created in response to a Request for Support from the Senegalese High Council for Global Health Security [Haut Conseil de la Sécurité Sanitaire Mondial] on behalf of the Government of Senegal. 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 first Fleming Fund Country Grant for Senegal will focus on putting in place the foundations for antimicrobial resistance (AMR) and antimicrobial use (AMU) surveillance in the human and animal health sectors, as well as some aspects of AMR surveillance in the environment. It will facilitate a stronger One Health approach to surveillance, bringing together multi-sectoral stakeholders to share surveillance data and gain a better understanding of AMR and AMU.

This grant will align with the National Action Plan for antimicrobial resistance (NAP) [Plan d'action national multisectoriel de surveillance et de lutte contre les résistances aux antimicrobiens] and with the investments made by other donors and stakeholders in this area. In both the human and animal health sectors, the grant will invest in the improvement of AMR and AMU data collection, management, analysis and use in multi-sectoral decision making, as well as in the reinforcement of both reference and surveillance site laboratories. In addition, the grant will further develop and support the coordination with ministries as well as between technical institutions involved in AMR/AMU surveillance.

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 expected to sign the Grant Agreement and will be expected to enter into sub-granting arrangements with partners, if any, on the same back-to-back terms.

The grantee will need to work in close coordination with the Permanent Secretariat of the High Council for Global Health Security "One Health" [Secrétariat Permanent du Haut Conseil Sécurité Sanitaire Mondiale "One Health"], as well as Mott MacDonald 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 Regional Grants and the Fleming Fellowship Scheme.

This grant is expected to last 24 months[1]. Grant applications should be in the region of £3-5 million, including all capital and recurrent costs, overheads and management costs.

[1] The current FF programme funding ceases in 2021.

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 (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.[2] 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. 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 by Itad, a specialist evaluation firm appointed by DHSC for this purpose.

[2] 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:

- 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; still fewer facilities that meet the requirements for accreditation, or which do routine antimicrobial susceptibility testing.
- There is no culture of surveillance for AMR in healthcare delivery and there are barriers to developing it.
- There is little perceived use of surveillance data 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 One Health sectors.
- There is a lack of antimicrobial stewardship.
- Logistical challenges are significant: 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 are a few examples.
- Surveillance systems (national, regional and global) that do exist are often vertical in nature, are not linked, and are not integrated.
- There are weak One Health structures and there is poor inter-sectoral collaboration.
- There is a heterogeneous 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 lack of understanding 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.
- Building foundations for AMR surveillance data use.
- Promoting rational use of antimicrobial medicines.

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

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

- Better knowledge of country level patterns of prescribing 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
- AMR and AMU data shared internationally to improve and inform the global response, in particular via the WHO Global Antimicrobial Resistance Surveillance System (GLASS) for human health AMR data.

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 be implemented in line with national plans and aspirations, as laid out in the National Action Plan. 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 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 and AMU/C 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.

[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.

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.

2.5 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 Senegal to date

This is the first Fleming Fund Country Grant to be released in Senegal. In preparation for this grant Mott MacDonald carried out a Scoping Visit in October 2018, which was followed by Positioning Activities in November 2018 to review existing surveillance system capacity, conduct laboratory assessments, and to better understand the priority areas to be supported through this first Country Grant.

These activities culminated in the identification of major gaps and needs for strengthening AMR and AMU surveillance in humans and animals in Senegal, and informed agreement with the High Council for Global Health Security [Haut Conseil de la Sécurité Sanitaire Mondial] about grant objectives and outputs.

3 Current situation of AMR in Senegal

3.1 National Action Plan for AMR

A National Multisectoral Antimicrobial Resistance Surveillance and Control Action Plan (2018-2022) was prepared by the Ministry of Health and Social Action (Laboratories Directorate) with technical and financial support from WHO and FAO. This national AMR action plan was published and presented to the representative sectors concerned as well as AMR stakeholders in December 2017. However, to date the AMR action plan has not yet been officially approved or implemented.

The overall objective of the aforementioned national action plan for AMR (NAP) is to provide an effective response, through an integrated approach (One Health), to the growing threat of antimicrobial resistance in Senegal. It includes five specific objectives: (i) strengthen the capacity of laboratories in all sectors for the detection and reporting of all priority antimicrobial resistant pathogens; (ii) monitor infections caused by all priority pathogens; (iii) fight against healthcare-associated infections; (iv) ensure the management and rational use of antimicrobials; and (v) inform and raise awareness about the issue of antimicrobial resistance.

The achievement of these objectives will be based on interventions in the following four priority areas:

- 1: Laboratory capacity development
- 2: Hygiene, prevention and control of infections
- 3: Rational use of antimicrobials in human and animal health
- 4: Coordination, communication and research

The activities within the NAP are costed and a budget is provided, but there is limited confirmation of availability of funding for these activities.

3.2 One Health

Senegal does not have a formal 'One Health' National Strategy document. The One Health approach is however included in the NAP. The area of One Health is managed through the Office of the Prime Minister [la Primature] through the following structures:

- The High Council for Global Sanitary Security chaired by the Prime Minister and comprising the Ministers of the sectors concerned (Health, Livestock, Agriculture, Environment, Fisheries, Army, etc.). This High Council has a permanent Secretariat.
- A Steering Committee chaired by the Minister who is in charge of the General Secretariat of the Government and is comprised of the General Secretaries of those ministries concerned.
- A Global Sanitary Security Task Force led by the Permanent Secretariat of the High Council and made up of technical representatives of the different sectors.

In addition, thematic multidisciplinary groups have been set up which correspond to the International Health Regulations (IHR) areas, providing an AMR thematic group, as well as a thematic group focusing on laboratories.

3.3 AMR Surveillance and Laboratory Capacity in Human Health

In Senegal, the Ministry of Health and Social Action (MSAS) [Ministère de la Santé et de l'Action Sociale] Laboratories Directorate (DL) manages the AMR surveillance system for human health. This system, which is in the process of being set up, plans to rely on a network of 165 laboratories (public and private) distributed nationally, of which only 47 currently have the capacity to carry out antimicrobial susceptibility testing (AST). The National Public Health Laboratory of Thiès has been identified as the National Reference Laboratory (NRL) for AMR surveillance.

AMR monitoring is in an early stage, with reports of 10 laboratories currently transmitting incomplete data to the DL. The collection of AMR data was initially done using Excel files, but through the support of PATH is now been reported in the LAB Book information system (developed by Fondation Mérieux), which is connected to DHIS2. This surveillance is limited to the isolation and identification of pathogens, although some results through AST are not yet consolidated. The AMR monitoring data collected by the DL has not been uploaded into GLASS as of yet.

It should be noted that health information and surveillance systems (including AMR) are extremely fragmented in Senegal. Each National Programme has its own system and these multiple systems are not fully integrated into the health information system placed under the responsibility of the General Directorate of Health (DGS) of the MSAS.

Laboratories in Senegal - including the 15 level 1 (national) laboratories - have very unequal capacities in terms of infrastructure, equipment, human resources and effective implementation of good practice. Most of the laboratories do not have sufficient maintenance and waste management capacity.

There is also a need to strengthen the biosafety and biosecurity capacity in Senegal. Of the sites visited, there were no laboratories with biosecurity documents (manuals, standard operating procedures or protocols). There was also no evidence of an emergency response plan at sites visited. At the best, there were some instructions posted on the doors to limit access to the laboratory staff. The NRL requires support to draft a biosafety manual that can be used by the all laboratories within the network. The capacity of the network must be supported to conserve biological strains to be used for the surveillance of AMR. Some laboratories have low-temperature freezers (-70 °C, -80 °C) for preserving bacterial strains, but with frequent power cuts and lack of maintenance there is cause for temperature fluctuations and equipment malfunction, and more reliable storage methods should be utilised. Support is needed for a centralised biorepository at the NRL to ensure safe storage of important strains, along with protocols for selection, transport and use of isolates.

3.4 AMR Surveillance and Laboratory Capacity in Animal Health

There is not yet a functioning system for surveillance of AMR in animal health. The National Laboratory for Livestock and Veterinary Research (LNERV) [Laboratoire National d'Elevage et de Recherches Vétérinaires] has been identified as the National Reference Lab (NRL) for AMR in animal health for Senegal. LNERV works under the Senegalese Institute of Agricultural Research (ISRA) [Institut Sénégalais de Recherches Agricoles] within the Ministry of Agriculture and Rural Equipment (MAER) [Ministère de l'Agriculture et de l'Équipement rural]. LENRV is relatively well equipped and will receive support in 2019 from the Defense Threat Reduction Agency (DTRA) within the US Department of Defense to upgrade its existing infrastructure and improve biosafety and biosecurity. LNERV regularly conducts antimicrobial susceptibility testing, particularly on poultry but also on other animal species. They also provide analysis regarding manure of animal origin

In addition, the Inter-State School of Veterinary Sciences and Medicine of Dakar (EISMV) [l'Ecole Inter-Etats des Sciences et Médecine Vétérinaires] has a laboratory for microbiology and immunology. This laboratory is installed with very limited space and few possibilities for an extension. The equipment installed is both basic and aging. There are currently only 2 dedicated staff to this laboratory. However, the EISMV laboratory is conducting studies on the phenotypic detection of AMR in poultry (*Escherichia coli* and *Salmonella spp*) as well as the molecular characterization of resistance genes in collaboration with the Institut Pasteur in Dakar.

At regional level, there are six laboratories attached to the Directorate of Veterinary Services (DSV) within the Ministry of Livestock and Animal Production (MEPA) [Ministère de l'Elevage et des Productions] These laboratories are not currently functional. At the end of 2016, the OIE carried out a performance evaluation of Senegal's veterinary services. Following this evaluation, the FAO (Dione 2017 report) and the REDISSE project decided to support the rehabilitation of three of these laboratories. The other three laboratories, located in Linguère, Kaolack and Tambacounda, do not currently benefit from any support.

Given Senegal's commitment to the fight against animal diseases (a commitment expressed in particular through the national rabies control program, contagious bovine pleuropneumonia agreements and the support of the global strategy for the eradication of plaque in small ruminants), the establishment of the capacity to collect samples country-wide is necessary. As a result, setting up a system that allows these laboratories to collect, package and deliver samples to central laboratories is a priority.

3.5 AMR Surveillance and Laboratory Capacity in Environment and Food Safety

The environmental sample analysis laboratories are not intended to conduct AST. Their skill set stops at counting bacteria obtained on selective media (for the most part). However, the Laboratory of Food and Environmental Hygiene (LHAE) of the Pasteur Institute of Dakar (IPD) is collecting strains for research work and the laboratory of experimental bacteriology of the IPD also deals with AST. The National Laboratory for Analysis and Control (LANAC), under the supervision of the Ministry of Commerce, conducts some AST on environmental samples (mainly taken from farms: litter, manure, animal drinking water, sewage).

Both laboratories have important capacity building needs (in terms of equipment, staff training, LIMS, etc.) to be effectively involved in AMR monitoring.

LANAC and LHAE, as well as five other university and/or private laboratories fall under the Ministry of Commerce. Only LANAC and LHAE are involved in AMR monitoring.

LANAC has staff trained in AST and has the basic equipment required to conduct AST. However, given the ancillary nature of AMR in food microbiology activities, AST is only sporadically performed on a few identified and purified strains. LANAC activities related to AMR surveillance are limited at this time.

To date, no organization has the full capacity within the food and environmental sectors for reporting AMR surveillance data to the MSAS DL.

3.6 Rational use of antimicrobials

Within human health, the MSAS Department of Pharmacy and Drug (DPM) is responsible for:

- Development and monitoring of the regulatory framework for the production, importation, distribution and issuance of pharmaceuticals (including antimicrobials);
- Monitoring the implementation of the national pharmaceutical policy;
- Inspection of public pharmacies (11,000 in Senegal) and pharmacies at health centres.

The National Pharmacy Supply (PNA) [la Pharmacie nationale d'achat] and the Regional Pharmacy Supply (PRA) [les pharmacies régionales d'approvisionnement] provide drugs to the public sector care structures. Private health facilities use private wholesalers-distributors (there are 4 in Senegal) who can purchase pharmaceuticals but are subject to authorization by the DPM. As a result, the DPM is in principle able to know the volumes of antimicrobials officially introduced into the country. A parallel informal market seems to exist, however, it is very difficult to assess the importance of it.

The National Laboratory for Drug Control (LNCM) [Laboratoire National de Contrôle des Médicaments] is responsible for quality control of all health products imported and sold in Senegal. The capacity of this laboratory is limited and the quality of the drugs introduced and consumed in the country cannot always be measured effectively due to the capacity challenges.

In addition, self-medication is pervasive and the purchase of antimicrobials at the pharmacy without a prescription, although contrary to the law, is not uncommon. DPM and LNCM are jointly developing a Strategic Plan (2019 - 2024) with technical support provided by USAID. One of the objectives of this Plan is to eradicate the irrational use of antimicrobials by prescribers, providers and consumers.

In the field of animal health, antimicrobials are widely used in all production systems whichever the species and whether they are reared intensively or extensively. Antimicrobials are used for therapeutic, prophylactic, metaphylactic and growth promotion purposes.

Informal pharmaceutical distribution channels pose a real problem in Senegal (as in most countries in sub-Saharan Africa), particularly with extensive and semi-intensive family farms. These informal pharmacies offer drugs at a good price but of inconsistent and unreliable quality (unknown origin, inferior concentration of the active ingredient or no active ingredient, expired products, etc.).

Another challenge for Senegal is the role played by para-veterinarians, often used as auxiliary veterinarians working in the public and private sectors. Although it is against the law (their status is not officially recognized), these para-veterinarians commonly prescribe and use antimicrobials.

Intensive farms (mainly poultry in Senegal) usually rely on veterinary services and more reliable antimicrobial supply networks. However, it appears that antimicrobial use to promote growth, although officially banned in Senegal, is common (with subtherapeutic dosages administered over long periods), which represents a major risk for the emergence of AMR.

The authorization for the marketing of veterinary drugs (including antimicrobials) is granted by the West African Economic and Monetary Union (WAEMU) for its 8-member states (including Senegal). The authorization to import these drugs into Senegal (there is no production at the national level) is the responsibility of the Division of Pharmacy and Medicine of the Department of Veterinary Services (DSV) within MEPA. The DSV is therefore able to report the volumes of antimicrobials for veterinary use entering the country.

The quality control of antimicrobials used in animal health is based on the Drug Control Laboratory of the EISMV (which has a mandate for the quality control of veterinary drugs for all WAEMU countries). This laboratory is relatively well equipped. In particular, this laboratory is able to conduct liquid chromatography and mass spectrophotometry, which allows the identification of molecules present in a sample of drugs to measure the total active ingredient.

4 Scope of the Fleming Fund Senegal Country Grant

The Fleming Fund Country Grant in Senegal aims to strengthen surveillance systems for AMR and AMU in the areas of human health, animal health and, to some extent, in the areas of food control and the environment. This support will include:

- Strengthened governance systems to support AMR and AMU surveillance using a One-Health approach, including support for information-sharing between sectors and evidence-informed decision-making.
- Capacity building for national reference laboratories and some sentinel laboratories (see Table 1). According to the needs identified, this support may include laboratory equipment, reagents and consumables and infrastructure (renovation, remodelling and/or expansion, supply of generators, etc.).
- Capacity building and improvement of best practices for staff working in the sites listed in Table 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[5].

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

A laboratory needs assessment was conducted for some of the sites listed in Table 1 during the preparation of this request for proposals to understand the current capacity. These sites are indicated in green in Table 1. The successful grantee will need to conduct laboratory needs assessments on the remaining sites, using the tool which will be provided by the Fleming Fund Management Agent, Mott MacDonald.

Table 1: List of Selected Laboratories for the Senegal Country Grant[6]

Legend: Sites assessed by the Management Agent **Sites to be assessed by the grantee**

No.	Site Name	Location	Sector
1	Laboratoire National de Santé Publique	Thiès	Human Health
2	Hôpital régional de Saint-Louis	Saint-Louis	Human Health
3	Centre Hospitalier Universitaire de Fann	Dakar	Human Health
4	Hôpital Le Dantec	Dakar	Human Health
5	Laboratoire Albert Royer	Dakar	Human Health
6	Hôpital Principal	Dakar	Human Health
7	Laboratoire de l'hôpital militaires Ouakoum	Dakar	Human Health
8	Laboratoire National d'Elevage et de Recherches Vétérinaires (LNERV)	Dakar	Animal Health
9	Laboratoire de Microbiologie et Immunologie de l'EISMV	Dakar	Animal Health
10	Laboratoire régional rattaché à la DSV	Saint-Louis	Animal Health
11	Laboratoire régional rattaché à la DSV	Tombacounda	Animal Health
12*	Laboratoire National de Contrôle (LANAC)	Dakar	Food Health
13*	Laboratoire Sécurité Alimentaire et Hygiène Environnement (LSAHE) – Institut Pasteur de Dakar	Dakar	Food and Environmental Health
14*	Laboratoire de Microbiologie de l'Institut de Technologie Alimentaire (ITA)	Dakar	Food Health

*Food Safety and Environment sites have been identified, but inclusion as active sentinel sites will only be determined based on the findings of Output 3.6. Applicants should budget for these three laboratories, but inclusion as active sentinel sites is a decision of the Management Agent based on the reporting of Output 3.6 by the Grantee.

4.1 Grant Objectives and Outputs

The three objectives and related specific outputs proposed for the initial Fleming Fund Country Grant to Senegal are listed in **Error! Reference source not found.** below. Applicants are expected to respond to this RFP by developing and proposing activities that are both costed and demonstrate appropriate indicators of grant implementation. Reflection back to the NAP is encouraged.

An inception phase will be initiated upon lead grantee appointment. The duration of this phase will be determined during grant agreement, but will not exceed six months, and a final implementation plan will be agreed upon at the end of the inception phase. All proposals should include the full implementation plan, as the inception phase is for refinement, not development of, the full implementation plan.

[6] Initial sites for inclusion – with the potential for additional sites to be added within the duration of the grant, as agreed upon by the High Council for Global Health Security [Secrétariat Permanent du Haut Conseil pour la Sécurité Sanitaire Mondiale] and Mott MacDonald.

Sustainability is key to the success of this Country Grant. The current NAP, although costed, there is currently contains no formal financial commitment to activities within the NAP from the Government of Senegal. The lead grantee will be expected to undertake a sustainability assessment of FF investment, and a key response within the proposal for this Country Grant should include strategies for engaging with the Senegal government to build consensus for sustainably supporting investment made beyond this Country Grant.

During the inception phase, the grantee will:

- Initiate, facilitate or complete work on the attainment of Outputs with the High Council for Global Health Security, as outlined below.
- Collaborate with the Fleming Fellows and their Host Institutions to understand the Fellowship workplans.
- Conduct needs assessments at the remaining 9 surveillance sites using the tools and methodology provided by the Management Agent
- Finalise the procurement plans for a) equipment and renovation needs for the surveillance sites and b) consumables and reagents to conduct safe and secure quality bacterial identification and susceptibility testing

All activities proposed should correspond to the list of eligible expenses in Annex 1.

Table 2: Objectives and Outputs of the Senegal Country Grant

Objective/Output
Objective 1: Strengthen One-Health Governance and Data Sharing
Output 1.1: Support the official adoption of the National Action Plan for AMR
Output 1.2: The National Platform for Global Sanitary Security (PNSSM) is supported by an AMR working group that meets regularly
Output 1.3: AMR surveillance data is routinely shared between MSAS, MEDA, MEDD and institutions working within AMR
Output 1.4: AMR surveillance data in human health is submitted to GLASS
Output 1.5: A national symposium on AMR is held for knowledge sharing
Objective 2: Strengthen the AMR and AMU surveillance system in human health
Output 2.1: The LNSP is functioning as the National Reference Laboratory for AMR
Output 2.2: AMR sentinel sites are functional and regularly transmit AMR data to the National Reference Laboratories
Output 2.3: Conduct a situational analysis to better understand the AMR role and contribution of key private laboratories within the public health AMR surveillance system
Output 2.4: AMR data is collected from human health sentinel sites and analysed by MSAS DL and MSAS DPM
Output 2.5: An AMU surveillance programme is designed, costed and piloted
Output 2.6: Effective clinical and laboratory data integration at human health sites within the AMR surveillance network
Output 2.7: Biosafety and biosecurity is improved within all human health laboratory sites
Output 2.8: Improved use of AMR data by clinicians for the rational use of antimicrobials
Objective 3: Strengthen the AMR and AMU surveillance system in animal and environmental health
Output 3.1: The LNERV is functioning as the National Reference Laboratory AMR for animal health

Output 3.2: The EISMV microbiology laboratory and the DSV sentinel sites are functional and routinely transmit AMR data to LNERV
Output 3.3: AMR surveillance data is collected and analysed by the MEPA DSV
Output 3.4: A protocol for AMR surveillance in broilers and layer hens is in place and ensures that good quality samples from broilers and layer hens are regularly sent to all laboratories
Output 3.5: AMU and AMC surveillance strategies and plans are developed, piloted and costed
Output 3.6: Conduct a situational analysis to better understand AMR capacity and potential contribution within the agri-food and environmental sectors
Output 3.7: Biosafety and biosecurity improved across all animal health supported laboratories, including sample transportation

4.2 Duration of the grant

This grant is expected to last for 24 months.

4.3 Funding Envelope

Grant applications should be in the region of £3-5 million, including all capital and recurrent costs, overheads and management costs.

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.

4.4 Procurement

Laboratory equipment, reagents and consumables

An indicative procurement plan for laboratory equipment, reagents and consumables was compiled during the site assessments conducted by the Management Agent for the sites in Table 1, above. The first round of procurement will be based on these assessments to ensure early start up.

The remaining sites (indicated in grey in Table 1), will be assessed by the grantee, who will develop a second-round procurement plan during the inception phase. The assessments will utilise the tools provided by the management agent and will include assessment of infrastructure to determine what renovations are required. For all human health laboratory sites, including those assessed by the Management Agent, applicants should include a placeholder budget of £200,000 per sites. For animal health laboratory sites, applicants should include a placeholder budget of £100,000 per site.

During the inception phase, 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 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.

5 Grantee Roles and Responsibilities

The main role of the grantee will be to plan and execute outputs and deliver the objectives listed above. The Grant is designed as an AMR laboratory capacity building and systems strengthening intervention. 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 strengthen the selected reference and surveillance sites' capability and capacity to generate and share AMR surveillance data on both a national and international basis.

6 Key measures of success

Country Grants will eventually be 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, for the first Country Grant, it is important to note that:

(i) Applicants are not expected to select from and use these indicators for this first Country Grant. While it is possible that some of the formal indicators may trigger towards later stages of the grant award, the likelihood of this will be reviewed and discussed by Mott MacDonald with the successful applicant.

(ii) For the purposes of this first grant, process level indicators will be used to track progress against the work plan. The grantee is expected to utilise the indicators proposed above or to propose alternative SMART indicators in line with the outputs summarised above.[7] These will then be negotiated and agreed with Mott MacDonald as the Management Agent.

(iii) No Country Grant will be expected to use all the Fleming Fund indicators. Instead a relevant sub-set of indicators will be proposed by the grantee for joint agreement with Mott MacDonald.

(iv) The Fleming Fund will be independently evaluated by ITAD, a specialist evaluation firm, who have been appointed by the UK Department of Health and Social Care for this purpose. 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 grant principles described above. All grants are subject to review and evaluation by the evaluators, and full co-operation with the evaluators by all grantees is expected.

7 Key partnerships, alignment and coordination

The Country Grant must be delivered in alignment with the AMR National Action Plan for Senegal and should support the national effort and take account of current capacity levels, future absorptive capacity, alignment with other AMR related initiatives including those undertaken by multilateral agencies such as FAO and WHO. In addition, the Grantee will need to build strong collaboration and coordination with local academic and research institutions at different levels for technical and other support.

[7] SMART indicators refer to indicators that are specific, measurable, achievable, relevant, and time bound.

8 Complementing other grants from the Fleming Fund Grants Programme

This first 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 and the Regional Grants. For details see www.fleming.org

It is anticipated that Senegal will receive several Fleming Fellowships, for animal health and human health. Successful applicants will receive specialised training in AMR and AMU data management and analysis, laboratory quality management, and in advanced laboratory technical skills.

Upon completion, Fellows are expected to become technical leaders in AMR and AMU surveillance in Senegal, and it is hoped that they will play a role as mentors and active trainers in capacity building activities that will be implemented through this Country Grant. Therefore, once established, the Grantee is expected to work in collaboration with Fleming Fellows and potentially their Host Institutions (who provide remote support to the Fleming Fellows).

In addition, 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 for maximising the sharing of AMR data and learning at the regional and global levels.

9 Application requirements

9.1 Grantee Eligibility Criteria

Lead grantee applicants must satisfy the following eligibility criteria before applications can be assessed:

- Eligible lead grantee organisations are: National institutes (such as universities or research institutes); Non-Governmental Organisations; UN Agencies; Private companies.
- Can be a single organisation or consortium; if a consortium, lead grantee applicant must evidence it has the appropriate governance, coordination mechanisms, and documented track record to manage sub-grantees.
- Must demonstrate that they are registered to work within the country, including the submission of essential documents such as; current business registration certificate or equivalent, articles of incorporation, current tax clearance certificate, social security certificate, annual audited statements for the past three years.
- Lead grantee applicant must demonstrate they are competent and sufficiently experienced in successfully supporting laboratory capacity development, disease surveillance, capacity building, and One Health in LMICS.
- Lead grantee applicant must demonstrate that they are fully functional in both French and English.
- Lead grantee applicant must be able to provide all information required to demonstrate that adequate and tested financial management controls and levels of authority are in place and are adhered to.
- References from clients for previous work undertaken within the last five years are welcome

9.2 Language Considerations

For the purposes of the Senegal RFP, it is important to note that lead grantee applicants must demonstrate that they are fully functional in both French and English. In-country key stakeholder engagement, deliverable outputs and surveillance reporting will need to be provided in French. Simultaneous translation services are not allowable within this grant, therefore all staff and contractors must be fully functional in French. However, all engagement and reporting by the grantee to the Management Agent must be provided in English. The above is also stated within the Grantee Eligibility Criteria (9.1).

9.3 How to apply

Prospective lead grantees must register their interest to apply by emailing flemingfundWA@mottmac.com to receive an invitation to **the Applicant Information Session,** and an example of the Application Pack.

The Applicant Information Session (AIS) will be organised **in Dakar, Senegal on 13 March 2019**. The details of the venue will be shared with applicants registering their interest.

Ahead of the AIS, an example Application Pack will be shared and will include the application form, budget and milestones template and Guidance Notes. Following the AIS, the **official Application Pack** will be sent out to prospective Grantees who have registered their interest to apply for the grant.

To apply, please complete the application form and budget and monitoring template provided, in line with the Guidance Notes, by the deadline indicated in Section 9.5.

Note the key requirements set out at the beginning of the Country Grant Application Form:

- When submitting the application document, press “Reply All” from the **official Application Pack** automated email that you received 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.
- The submission deadline is: **15 April 2019, 17:00 GMT.**
- Applicants should observe the word limit. Additional words outside the limit will be disregarded.
- All documents included as part of the proposal must be submitted by separate e-mail 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.
- Your application is conditional upon your acceptance of the grant agreement (format will be shared in the application pack).

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

9.4 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 will be assessing the application on the following key areas:

- 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

9.5 Restrictions/limitations

Any potential conflict of interest known at the time of registration should be flagged to the Management Agent at that time. If a potential conflict of interest arises after that point in time, the prospective lead grantee must clearly disclose this in the proposal.

9.6 Key dates

Publication of RFP: 21 February 2019

Deadline for registering interest to attend the Applicant Information Session: 05 March 2019, 1700 GMT

Applicant Information Session: 13 March 2019

Deadline for registering to apply for Grant: **15 March 2019,** 1700 GMT

Application deadline: **15 April 2019,** 1700 GMT

Anticipated start date of grant: 27 May 2019

9.7 Contact details and support information

Any questions on the Request for Proposals should be sent to flemingfundWA@mottmac.com **The Management Agent will endeavour to respond to queries within 72 hours.**

10 Objectives and Outputs

10.1 Objective 1: Strengthen One-Health Governance and Data Sharing

Output 1.1: Support the official adoption of the National Action Plan for AMR

At the time of writing this call for proposals, the AMR National Action Plan (2017-2021), published in December 2017, was not formally adopted by the Government. It is up to the High Council for Global Sanitary Security to formalize the adoption of the NAP.

The Grantee should work with the relevant ministries and stakeholders to provide technical and financial support to promote official adoption of the Nation Action Plan. The Grantee should also undertake a budgetary analysis for implementation of the NAP to promote roundtable discussions to identify sources of funding, and integration of the NAP budget into country financial planning.

At the end of the first six month of the grant, we expect the following to have been achieved:

- The roles and responsibilities of each of the ministerial departments for the implementation of the AMR National Action Plan are clearly defined and approved by the High Council.
- The financial resources necessary for the implementation of the first year of the AMR National Action Plan are identified by the Steering Committee of Global Sanitary Security.
- The activities in the NAP have been costed, and plans are developed to identify potential sources of funding.

Output 1.2: The National Platform for Global Sanitary Security (PNSSM) is supported by an AMR working group that meets regularly

Multidisciplinary thematic groups corresponding to the different areas of the International Health Regulations (IHR) have been set up. The list of these thematic groups and their composition have been validated by the Steering Committee of Global Sanitary Security.

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

- The AMR thematic group meets regularly and transmits the results of its work to the World Health Security Task Force.
- The Laboratories theme group meets regularly and transmits the results of its work to the World Health Security Task Force.
- The Global Sanitary Security Task Force, the Global Sanitary Security Steering Committee and the High Council for Global Sanitary Security take into account the data from the AMR / AMU surveillance and use it as evidence to inform their decision-making processes corresponding to their respective areas of responsibility.

Output 1.3: AMR surveillance data is routinely shared between MSAS, MEPA, MEDD and institutions working within AMR

The ministries and entities involved in AMR surveillance include:

- MSAS - DGS, DL, DP, DPM, PRONALIN and LNSP;
- MAER – ISRA/LNERV;
- MEPA – DSV; and
- MEDD - Direction des Parcs Nationaux (DPN).

At the end of the grant, the following results are expected:

- Representatives of these different entities actively participate in the meetings of the High Council High for Global Sanitary Security, Steering Committee and Task Force World Sanitary Security; they use these platforms to share information available on AMR in the areas of human and animal health and - where appropriate - in the environmental sector.
- MSAS and MEPA work together to understand the determinants of AMR in the areas of human and animal health; they identify the risk factors that need to be addressed.
- MSAS and MEPA produce AMR surveillance reports in their own sector; these reports include a section in which monitoring data from other sectors are taken into account and the potential consequences for their sector are analysed.

Output 1.4: AMR surveillance data in human health are transmitted to GLASS

At present, Senegal does not transmit AMR data to the GLASS. At the end of the programme, the following results are expected:

- The MSAS DL prepares an annual report on the progress of AMR surveillance; this report includes surveillance data for the following bacteria: *Acinetobacter spp., Escherichia coli, Klebsiella pneumoniae, Neisseria gonorrhoeae, Salmonella spp., Shigella spp., Staphylococcus aureus*, and *Streptococcus pneumoniae*.
- This report is discussed within the framework of the AMR thematic group.
- The World Health Security Task Force transmits Senegal's report to WHO.

Output 1.5: A national symposium on AMR is held for knowledge sharing

There is great value in organizing an annual AMR Symposium to allow all Fleming Fund participants and other stakeholders in the human and animal health sectors as well as the environment and food security sectors to discuss the information generated by the programme. This will allow AMR stakeholders to synthesize knowledge generated to better understand the situation of AMR in Senegal. A positive output of this symposium would be the further identification of priorities for future actions and possibly the updating of current response strategies.

The organization of these annual symposia should be through the Permanent Secretariat of the Task Force on Global Sanitary Security.

At the end of the grant, the following results are expected:

- A symposium on AMR is organized with the active participation of representatives from the health, animal health, environment and food security sectors.
- A better understanding of the dynamics and cross-sectoral interconnections of AMR and AMU in Senegal.
- An update on policies and strategies to combat AMR in Senegal.

10.2 Objective 2: Strengthen the AMR and AMU surveillance system in human health

Output 2.1: The LNSP is functioning as the National Reference Laboratory AMR

The LNSP located in Thiès plays the role of National Reference Laboratory (LNR) and provides various support and training in the field of AMR. However, the laboratory's capacity to cover NRL activities needs to be strengthened.

Through the duration of the country grant, the grantee must support the LNSP to:

- Detect and track resistant phenotypes and map at a national level to contribute to informing appropriate treatment regimens;
- Design and make available to the network of laboratories (sentinel sites) decision trees for AMR bacteria phenotypic identification for transmission to the LNSP;
- Provide IT support to allow data collection at laboratory sites for input to LIMS and conduct a laboratory capacity assessment questionnaire for AMR surveillance, by level, to better manage capacity building needs;
- Effectively coordinate the laboratory network to ensure staff capacity building,
- Establish a simple biorepository at the NRL, with relevant training and SOPs for isolate selection, storage, metadata collection and use of isolates;
- Establish an Internal Quality Control (IQC) programme within the LNSPs capabilities as well as External Quality Assessment (EQA) programme for the detection of AMR and interpretation of results;
- Ensure data notification to the DL and the Task Force of the National Platform for Global Health Security "One Health" for AMR monitoring, as well as the use of data as evidence to inform at the national and international level (e.g. workshops, seminars, congresses);
- Put in place basic molecular techniques (Polymerase Chain Reaction - PCR) for molecular characterization of strains and the study of genetic resistance profiles; carry out genetic mapping that can inform decision-making at the national level.

At the end of the grant, it is expected that the NRL will be able to:

- Effectively monitor AMR surveillance activities.
- Provide continuous capacity building support the AMR laboratory network with Reference Laboratory activities.
- Standardize the supply of culture media, reagents and consumables.
- Standardize the maintenance of AMR equipment.
- Support the continued standardized entry of data into LIMS to ensure quality and validity.
- Monitoring and validating the AMR results.

Output 2.2: AMR sentinel sites are functional and regularly transmit AMR data to the National Reference Laboratories

The sentinel laboratory network identified in Table 1 (level 1) must be equipped and capable so they can directly support the LNSP as the National Reference Laboratory: The grantee will collaborate with the Task Force of the National Platform for Global Health Security "One Health" for AMR surveillance to set up an external quality assessment (EQA) programme for laboratories and sites supported.

- Develop SOPs to produce reliable data and ensure traceability;
- Identify needs for culture media, reagents and consumables, as well as management of inventory;
- Strengthen the capacity of lower level laboratories; and
- Continually monitor the evolution of resistance profiles and create databases as required for the use of the LNSP and DL, without duplication of existing systems.

Output 2.3: Conduct a situational analysis to better understand the AMR role and contribution of key private laboratories within the public health AMR surveillance system

Currently there are several private laboratories that are understood to be providing capacity support to the public health system. There are three human health sites that have been identified, Institut Pasteur du Dakar and Laboratoire BIO 24 also in Dakar, as well as Hôpital Saint Jean de Dieu in Thiès, but there are potentially others. The Grantee should engage with the public health officials and the private laboratory services currently providing capacity support to better understand this support provided and how private sites can contribute to the AMR surveillance system.

By the end of inception, the Grantee is expected to produce:

- A comprehensive situational analysis of the current AMR related role, contractual agreements and capacity of private laboratories to contribute to the public health AMR surveillance system; and
- Evidence-based recommendations and strategic planning to support and transfer the capacity from the private laboratory system into the public health system – including a costed implementation plan.
- Inclusion of private laboratory AMR surveillance data into the public health surveillance system.

Based on the recommendations, the Management Agent will determine the alignment with Fleming Fund activities and approve the implementation of any strategies. The applicant should include a general budget for capacity building activities within this output, which will become the total budget for the costed implementation plan. Capacity building activities should be initially targeted at the three aforementioned sites, and could include innovative approaches to training, mentoring, public-private initiatives, surveillance activities, quality assurance etc. The Management Agent will work with the Grantee within the available budget to set achievable priorities based on the evidence produced in the way forward recommendations.

Output 2.4: AMR data is collected from human health sentinel sites and analysed by MSAS DL and DPM

The capabilities of the MSAS DL need to be strengthened to enable it to:

- Propose strategic management options for AMR in human health to the coordinating committee of the Task Force for Global Health Security;
- Support the LNSP with laboratory network coordination activities;
- Monitor laboratory needs for reference strains (quality control), equipment, culture media, reagents, consumables and coordinate inventory management;
- Support the analysis and presentation of AMR surveillance data to ensure the use of data as evidence to inform at the national and international level (e.g. reports, publications, seminars, conferences); and
- Ensure an External Quality Assessment (EQA) programme for the detection of AMR and interpretation of results.

Output 2.5: An AMU surveillance programme is designed, costed and piloted

By the end of inception, the Grantee should have engaged DPM and other key stakeholders to better understand, evaluate and analyse the existing and potential sources of data.

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

- Capacity engagement with the DPM and other key stakeholders to support the design process;
- Initial design of the AMU surveillance programme, including analysis plan;
- Pilot of the initial AMU surveillance programme;
- Key recommendations and learning from the initial pilot, including sharing of data findings with MSAS, MEPA, MEDD and other institutions working within AMR; and
- Final AMU surveillance programme design and costing approved by the Task Force for Global Health Security.

Output 2.6: Effective clinical and laboratory data integration at human health sites within the AMR surveillance network

Clinical data must be integrated into the LIMS (Data Management Information System) so that available demographic, treatment and outcome data is linked to laboratory results to contribute to better utilisation and understanding of AMR data. Exchange platforms (e.g. workshops, seminars, etc.) must be put in place to enable laboratories to communicate consistently with clinicians for the sharing of clinical data and AMR.

At the end of the grant, the following results are expected:

- Workshops and other forms of communication between clinicians and microbiology laboratory managers are implemented in the supported sites.
- Clinical data is incorporated into the LIMS of the supported sites.

Output 2.7: Biosafety and biosecurity is improved within all human health laboratory sites

Biosafety and biosecurity requires the effective establishment and monitoring of good laboratory practices throughout the laboratory network to:

- Protect biological samples from contamination;
- Prevent unintentional exposure of personnel to various pathogens;
- Avoid environmental contamination by biological agents
- Ensure safety conditions are implemented and respected in the laboratories; and
- Laboratory staff are trained in the implementation of the biosafety and biosecurity manual.

Working with laboratory sites identified in Table 1; at the end of the grant, the following results are expected:

- The laboratories are equipped with appropriate safety equipment and staff are wearing personal protective equipment while conducting testing
- Biosafety cabinets are operational, maintained and being used by staff appropriately
- A functioning Biosafety and Biosecurity system is in place

Output 2.8: Improved use of AMR data by clinicians for the rational use of antimicrobials

PRONALIN is working along DL to develop and disseminate across the public health care facilities strategies and guidelines aimed at improving the rational use of antimicrobials, improving hygiene and promoting IPC measures. Within the hospitals linked to the sentinel sites covered by the programme, the Grantee will develop mechanisms for (i) improving communication of AMR data to the clinicians, to the Workplace Health and Safety Committees (CHST) and to the Nosocomial Infection Control Committees (CLIN) and (ii) engaging clinicians in the review, development and implementation of clinical guidelines in relation with the use of antimicrobials. At MSAS level, the Grantee will insure a smooth communication of AMR data and information related to the use of antimicrobials between the DL and PRONALIN.

At the end of the grant, it is expected that PRONALIN will be able to:

- Provide training on AMR surveillance protocols, antimicrobial stewardship, and antimicrobial sensitivity data to clinical staff at surveillance sites;
- Increase clinician awareness and the use of diagnostic microbiology services at surveillance sites, with feedback of results in clinically useful timeframes;
- Increase the number of samples collected and sent to the laboratory for microbiological analysis;
- Ensure a software solution is being used at each surveillance site that allows collection of clinical information from the HIS and reduces unnecessary data entry at the laboratory;
- Ensure data reported by all reference and surveillance sites include both laboratory and clinical data; and
- Use the data to promote the appropriate and rational use of antimicrobials.

10.3 Objective 3: Strengthen the AMR and AMU surveillance systems in animal and environmental health

Output 3.1: The LNERV is functioning as the National Reference Laboratory AMR for animal health

LNERV is the NRL for animal health and, therefore, also for animal AMR monitoring. LNERV is reasonably well equipped with currently limited diagnostic and microbiology research facilities. However, there are prospects for expansion of the premises and renovation of equipment in the coming year. This point will have to be carefully assessed by the Grantee during inception.

With specific regard to AMR monitoring capacity, LNERV has staff with the necessary knowledge and skills. However, the LNERV faces challenges that may prevent it from functioning well as an NRL. For example: problems of maintenance of laboratory equipment due to lack of specialized technicians; recurrent power cuts; low throughput of quality samples, problems associated to inter-ministerial relations and lack of coordinated directives as animal health laboratories in Senegal depend on different ministries. Indeed, LNERV is hosted at ISRA, under the supervision of MAER, the EISMV microbiology laboratory and the 6 regional laboratories are under the DSV of MEPA.

In order to overcome these challenges, and build the capacity of the LNERV, the following activities will be expected:

- Under the LNERV, create a network of animal health laboratories. This would include:
    - Defining a set of roles and responsibilities for all laboratories; and
    - Creation of consultation mechanisms and information flows between the different government structures.
- Strengthen the capacity of the LNERV to:
    - Acquire project management and standard operating procedures (SOPs) tools for AMR monitoring (performing AST and interpretation of results);
    - Prepare external and internal quality assessment panels for periodic evaluation of laboratory capacity for AMR monitoring, as well as the sharing of data findings with DL and DSV;
    - Set up a laboratory data management system (LIMS) to centralize all AMR data in animal health; and
    - Coordinate AMU and AMR surveillance in poultry farms.

At the end of the grant, the following results are expected:

- Under the LNERV, the animal health laboratory network created is functioning properly (i.e. coordinating the labs participating in the network, providing SOPs for culture, identification and AST of all the bacteria included in the AMR surveillance, making sure regular communications are in place to share updates on surveillance progress, coordinating training programmes, etc.);
- The NRL is providing support and housing the biorepository of relevant animal health isolates;
- Staff at LNERV are trained to perform AST and is able to interpret the resistant phenotypes, including the detection of profiles such as the production of Extended Spectrum ß-lactamases (ESBL), AmpC and carbapenemases and, if possible, to serotype *Salmonella spp*.,
- Regular meetings between officials in animal health are organized to harmonize the working methodology and discuss data transmitted to LNERV; and
- AMR-monitoring data from different laboratories and sentinel sites are regularly collected, quality assured, stored and transmitted regularly to the DSV and the Task Force for Global Health Security World "One Health" for AMR surveillance (see result 3.3).

Output 3.2: The EISMV microbiology laboratory and the DSV sentinel sites are functional and routinely transmit AMR data to LNERV

Throughout the grant period, the following activities should be implemented:

- Evaluate the needs of the selected sentinel sites (infrastructure, equipment, staff capacity building, etc.) and provide the appropriate support;
- Ensure appropriate and continuous supply of culture media, reagents and consumables needed for AMR surveillance;
- Where capacity allows, establish basic molecular techniques (Polymerase Chain Reaction - PCR) to characterize strains at the molecular level and study genetic resistance profiles, as well as perform genetic mapping where data evidence can inform national decision-making.
- Supervise the management of equipment maintenance contract(s) and train personnel in charge of the maintenance of the infrastructure and equipment within laboratory (for both preventive maintenance and repair of equipment).

At the end of the grant, the following results are expected:

- Laboratories are renovated and equipped for AMR surveillance;
- All laboratory equipment has been calibrated and serviced and a maintenance plan is in place;
- Internal and external quality management systems are in place;
- A sample collection, storage and transportation system are in place and functional for each sentinel site. Staff are trained to safely collect, handle and transport good quality samples, including to the LNERV[8];
- Appropriate isolates are forwarded from zonal laboratories to LNERV for confirmation and archiving;
- Samples are labelled appropriately, and are accompanied by epidemiological and demographic information;
- Staff are trained and have the ability to perform AST with reliable results. All the laboratories have and work according to nationally agreed SOPs for identification and AST of agreed bacteria;
- Data is regularly, and properly, entered into the LIMS system and backed-up daily; and
- Data is regularly sent to the DSV for collation in a national database before analysis.

Output 3.3: AMR surveillance data is collected and analysed by the MEPA DSV

The LNERV plans to set up a Laboratory Information System (SILAB) which will connect all the services of the Senegalese Institute of Agricultural Research (ISRA) placed under the supervision of the Ministry of Agriculture and Rural Equipment (MAER).

The DSV will have to set up a surveillance system adapted to poultry production in Senegal. This system should be designed so that it can be extended to other species, other types of production and other pathogens according to the priorities defined by the national authorities.

At the end of the grant, the following result is expected:

- The DSV regularly receives AMR surveillance data from all the laboratories involved in the surveillance system;
- Laboratory results are accurately matched to demographic and epidemiological details for each sample;
- Data is regularly backed up;
- The DSV is responsible for analysing and transmitting data results to the OIE; and
- Quarterly reports are produced, presenting results from analyses of the AMR surveillance data and sharing with the relevant TWGs, regional laboratories and other stakeholders as necessary.

Output 3.4: A protocol for AMR surveillance in broilers and layer hens is in place and ensures that good quality samples from broilers and layer hens are regularly sent to all laboratories

Initial Animal Health surveillance will focus on broiler and layer hens as a potential major focus of antimicrobial use and the emergence / propagation of resistant strains of bacteria. A surveillance strategy should be developed, with reference to the guidance which will be provided by the management agent, to ensure representative sampling. Field laboratory staff and/or students will be responsible for regularly collecting samples from healthy poultry and delivering these to the selected laboratories. A sampling protocol needs to be designed at the beginning of the grant period, in partnership with the epidemiologists from the DSV, to collect an agreed, representative, number of poultry samples in each area. Guidance can be provided by the Management Agent, or should be sought from international sources such as FAO. An SOP for collecting samples should also be prepared at the beginning of the grant period, if not already available, and sample

[8] In accordance with international guidelines (IATA)

collectors trained. Ethical practices and data protection of poultry owners should be considered during the development of SOPs. Good quality reagents and consumables need to be purchased for sample collection and transport.

The Grantee will need to support procurement of sufficient consumables and transport media for samples. The Grantee will also need to support development of standard operating procedures, if there are none available, and support training of field staff to collect and transport samples. Costs of sample collection and transportation need to be covered under the Grant.

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

- An AMR surveillance protocol for poultry, has been produced in collaboration with the DSV;
- Field laboratory staff and/or students have sent the required number of samples to the laboratories for diagnostic testing;
- Samples are labelled appropriately, transported in a safe manner, and are accompanied by epidemiological and demographic information; and
- Appropriate isolates are forwarded from surveillance sites to NRL for confirmation and archiving.

Output 3.5: AMU and AMC surveillance strategies and plans are developed, piloted and costed

Antimicrobials are widely used in all production systems for therapeutic, prophylactic, metaphylactic and growth promotion purposes. In addition, informal pharmaceutical distribution channels pose a real problem and there is no accurate data at the moment on AMC and AMU in the animal sector.

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

- An AMC and AMU surveillance strategy and plan which includes analysis planning, is developed, costed and agreed by month 12 of the grant;
- Capacity engagement with the MEPA DSV and other key stakeholders to support the design process;
- A pilot study of AMU has been completed;
- Key recommendations and learning from the initial pilot to improve surveillance protocols, including sharing of data findings with MSAS, MEPA and other institutions working within AMR; and
- Final AMU surveillance programme design, approved by the Task Force for Global Health Security.

Output 3.6: Conduct a situational analysis to better understand AMR capacity and potential contribution within the agri-food and environmental sectors

There are four laboratories involved in the field of food and environmental control. These laboratories belong to different institutions and are not organized into a network. The National Laboratory for Analysis and Control (LANAC), under the Ministry of Commerce, acts as a national reference laboratory for food control (chemical and microbiological analysis). The other food and environmental control laboratories are housed by the Institute of Food Technology (ITA) and the Institut Pasteur in Dakar for the Food Safety and Environmental Health Laboratory (LSAHE). The LSAHE is the National Reference Laboratory for food safety and the environment; this laboratory is also the FAO reference centre for AMR. The LSAHE currently transmits AMR data to the MEPA DSV, but the quality and consistency of the data has not been tested, as AST is not a routine activity of the LANAC and ITA laboratories.

By the end of inception, the Grantee is expected to produce:

- A comprehensive situational analysis of the current AMR related capacity and potential contribution of the existing food and environmental control laboratories to the AMR surveillance systems in place in the human and animal health sectors; and
- Evidence-based recommendations and strategic planning of an AMR surveillance system in food and environment – including a costed implementation plan.

Based on the recommendations, the Management Agent will determine the alignment with Fleming Fund activities and approve the implementation of any strategies. The applicant should include a general budget for capacity building activities (and possibly for refurbishment and equipment of the food and environmental control laboratories) within this output, which will become the total budget for the costed implementation plan. The Management Agent will work with the Grantee within the available budget to set achievable priorities based on the evidence produced in the way forward recommendations.

Output 3.7: Biosafety and biosecurity improved across all animal health supported laboratories, including sample transportation

As for human health, all laboratories require strengthening of their Biosafety and Biosecurity processes to ensure the safety of staff and the wider public.

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

- The laboratories are equipped with appropriate safety equipment and staff are wearing personal protective equipment while conducting testing
- Biosafety cabinets are operational, maintained and being used by staff appropriately
- A function Biosafety and Biosecurity system is in place in all laboratories

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.