



FLEMING FUND COUNTRY GRANT

Eswatini Project Implementation Progress Overview

JULY 2023



The
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Fund



CONTENTS

PROJECT BACKGROUND	2
PROBLEM STATEMENT	2
SCOPE OF THE FLEMING FUND COUNTRY GRANT	3
IMPLEMENTATION SITES	4
OBJECTIVES	5
PROGRESS OF ACHIEVEMENTS	6
CROSS CUTTING QUALITY ASSURANCE OF AMR TESTING LABORATORIES	16
ONGOING ACTIVITIES	17
FUTURE FOCUS AREAS	18

PROJECT BACKGROUND

In April 2020, ICAP at Columbia University received a Fleming Fund Country Grant (FFCG) from the UK Department of Health and Social Care under its Fleming Fund program to support the Government of the Kingdom of Eswatini (GKOE) to strengthen surveillance systems in both the human and animal health sectors facilitating a stronger One Health Approach to surveillance on antimicrobial resistance (AMR), antimicrobial use (AMU), and antimicrobial consumption (AMC). A grant amounting to USD 3.12 (£2.5) million was used for the implementation period from April 2020 to March 2023, with an additional USD 1.011 (£0.809) million cost extension through Dec 2023. This progress report covers up to June 2023, and project activities are still ongoing. To implement AMU, AMC, and AMR surveillance activities, ICAP closely worked with the national AMR Containment Committee (AMRCC) and national stakeholders from the Ministry of Health (MOH), the Ministry of Agriculture (MOA), and the Ministry of Natural Resources & Energy (MONRE).

PROBLEM STATEMENT

AMR, defined by the World Health Organization (WHO) as the resistance of microbes such as fungi, bacteria, viruses, and parasites to antimicrobial medicines (WHO, 2020), is an increasing health threat globally. AMR occurs naturally as microbes evolve and adapt to change, but is also exacerbated by factors such as low-quality medicines and incorrect prescriptions with wrong dosages; over-prescribing and over-dispensing of antimicrobial medicines by health workers; poor patient compliance with treatment courses; poor infection prevention and control practices in hospitals and clinics; lack of access to clean water, poor sanitation and hygiene; and lack of surveillance systems for monitoring the use of antimicrobial agents. The rise in resistant pathogens is a public health concern because infections with resistant microbes lead to severe and longer illnesses, increased costs of treatment, and increased mortality¹.

1. WHO AMR. <https://www.who.int/health-topics/antimicrobial-resistance>. Accessed on 14/10/2023



Figure 1. Eswatini National Antimicrobial resistance containment strategic plan.

Without harmonized and immediate action on a global scale, the world is heading towards a post-antibiotic era in which common infections could once again kill. In response to this crisis, the 68th World Health Assembly conducted in May 2015 adopted a global action plan on AMR that outlined objectives to address the above-mentioned challenges, and also called upon member states to develop national action plans (NAPs) to contain AMR. The GKOE appointed the AMRCC in 2016 with members from the MOH, MOA, MONRE, FAO, WHO, and academia country office representative. The AMRCC developed a National AMR containment strategic plan for 2018 - 2022 (Figure 1). However, this strategic plan was not translated to action until resources were made available in April 2020 from the UKAID through the Fleming Fund program.

SCOPE OF THE FLEMING FUND COUNTRY GRANT

A Request for Proposals (RFP) for a Country Grant to support surveillance of antimicrobial-resistant bacteria in Eswatini was announced by the UK Department of Health and Social Care, under its Fleming Fund Grants Programme, in response to a request for support from the GKOE. The FFCG for Eswatini is focusing on strengthening surveillance systems for AMR, AMU, and AMC in both the human and animal health sectors with the aim of strengthening a one health approach to surveillance aligned to the national AMR policy framework.

The surveillance systems are to monitor the use of antimicrobial agents and AMR patterns, a critical process that informs processes to strengthen the rational use of antimicrobial agents so to contain AMR. Information gathered from AMR surveillance enables policymakers to make evidence-based decisions for combating AMR and implement interventions that improve the rational use of antimicrobial agents, proper selection and listing of antimicrobial agents into national essential medicines, and review and update standard treatment guidelines.

The FFCG is managed by Mott MacDonald, the Management Agent, who is responsible for the management of partners, their performance, technical delivery, and financial accountability.

IMPLEMENTATION SITES

In the FFCG, six sentinel sites from both human and animal sectors were identified for strengthening AMR surveillance. In the human health sector, one hospital was selected from each of the four regions. The two laboratories under the Division of Veterinary and Livestock Services (DVLS) were included as a surveillance sites. The six sentinel sites are listed in the Table 1 below.

TABLE 1: SELECTED SENTINEL SITES FOR PHASE I FFCG AMR SURVEILLANCE

No.	SITE	LOCATION	SECTOR
1	Mbabane Government Hospital	Mbabane	Human
2	Raleigh Fitkin Memorial Hospital	Manzini	Human
3	Good Shepherd Hospital	Siteki	Human
4	Hlatikhulu Government Hospital	Hlatikhulu	Human
5	Central Veterinary Laboratory	Manzini	Animal
6	Food Hygiene Laboratory	Manzini	Animal

OBJECTIVES

In the FFCG, the following three key strategic objectives were identified to strengthen AMR/AMU/AMC surveillance.

OBJECTIVE 1

The AMRCC is strengthened to oversee and monitor AMR, AMU, and AMC surveillance across sectors.

OBJECTIVE 2

Improved country capacity for AMR and AMU/AMC surveillance in the human health sector.

OBJECTIVE 3

Improved country capacity for AMR and AMU/AMC surveillance in the animal health sector.

PROGRESS OF ACHIEVEMENTS

OBJECTIVE 1

The AMRCC is strengthened to oversee and monitor AMR, AMU, and AMC surveillance across sectors.

STRENGTHENING GOVERNANCE AND LEADERSHIP

Technical support was provided to develop various key documents, including the AMRCC terms of reference (TORs), to strengthen AMR surveillance and One Health Approach. As stipulated in the TOR, ICAP and the AMRCC introduced a quarterly review process to review surveillance implementation and challenges encountered.

STRENGTHENING KNOWLEDGE AND SKILLS OF AMRCC MEMBERS IN AMR SURVEILLANCE

ICAP working with EcoHealth Alliance (www.ecohealthalliance.org), provided a training on One Health approach and AMR data analysis and interpretation for AMRCC members and key technical experts from the three ministries (Figure 2).



Figure 2. Training on One Health approach.



Figure 3. Implementation Plan development workshop. Pigg's Peak. 28-30 Oct. 2020.

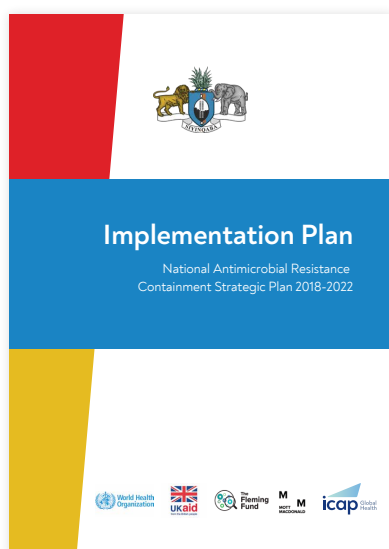


Figure 4. Implementation Plan of the AMR strategy.

DEVELOPMENT OF IMPLEMENTATION PLAN FOR THE AMR STRATEGY

ICAP provided both technical and financial support to the AMRCC and facilitated the development of a costed implementation plan for the National AMR strategy (2018-2022) (Figures 3 and 4). As execution of the AMR strategy was delayed, the implementation plan was developed for the period 2021-2025.

ICAP also supported the AMRCC to develop annual implementation plans where activities were identified for support with the FFCG and activities that should be streamlined to respective sectors for consideration using respective government recurrent budget.

INCREASING AWARENESS AND UNDERSTANDING OF AMR ACROSS ALL LEVELS

The support from the FFCG allowed Eswatini to hold different campaigns during the World Antimicrobial Awareness Week (WAAW) with different events including the official launching of the WAAW at the ministerial level in November 2020 (Figures 5 and 6), 2021, and 2022. ICAP has collaborated with the in-country WHO office on the following:

- Planning and implementation of WAAW 2022 activities in Eswatini.
- Training and orientation of Eswatini teams on WHO Global AMR and Use Surveillance System (GLASS) processes.
- Registration of Eswatini on the GLASS to enable reporting of local AMC and AMR trends globally.

STRENGTHENING DATA SHARING AND DISSEMINATION

Using the AMRCC quarterly review meetings, ICAP facilitated regular data sharing on the implementation of activities and provided progress update on the AMR/AMU/AMC surveillance data generated from human and animal health sectors among the AMRCC members. Additionally, ICAP facilitated a national data dissemination workshop where the Ministers of three sectors (MOH, MOA, and MONRE), the Minister of Health, WHO country representative, British High Commissioner, public and private sector hospitals, and other stakeholders were present (Figure 7).

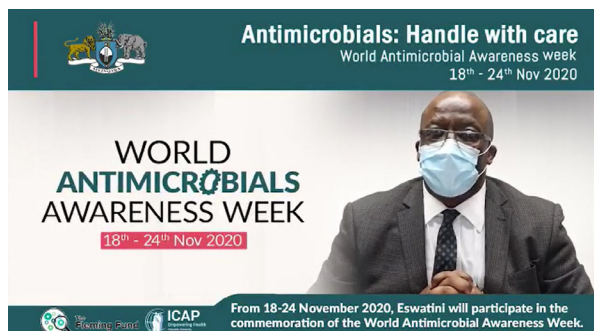


Figure 5. WAAW video clip by MOH in Siswati.



Figure 6. WAAW video clip by MOA in Siswati.



Figure 7. Minister of Health Honorable Minister Lissie Khosi with British High Commissioner, WHO Country representative, ICAP Country director and participants of Data dissemination workshop during WAAW 2022, 24 Nov. 2022.

STRENGTHENING ONE HEALTH DATA FLOW SYSTEM

One of the key challenges is the absence of a system for regular data sharing among sectors. A one health data flow architecture was developed, and infrastructure improvements are being finalized. An investment of SZL 376,765.69 and SZL 1,081,966.60 were spent to improve the required databases in the human and animal health sector, respectively. In the Animal Health, electronic Laboratory information systems is being developed and it is now in the piloting stage.

Different databases are being developed (Figure 8) in the human health and animal health sectors to lay the ground for a one health data flow system and promote national policy decision-making.

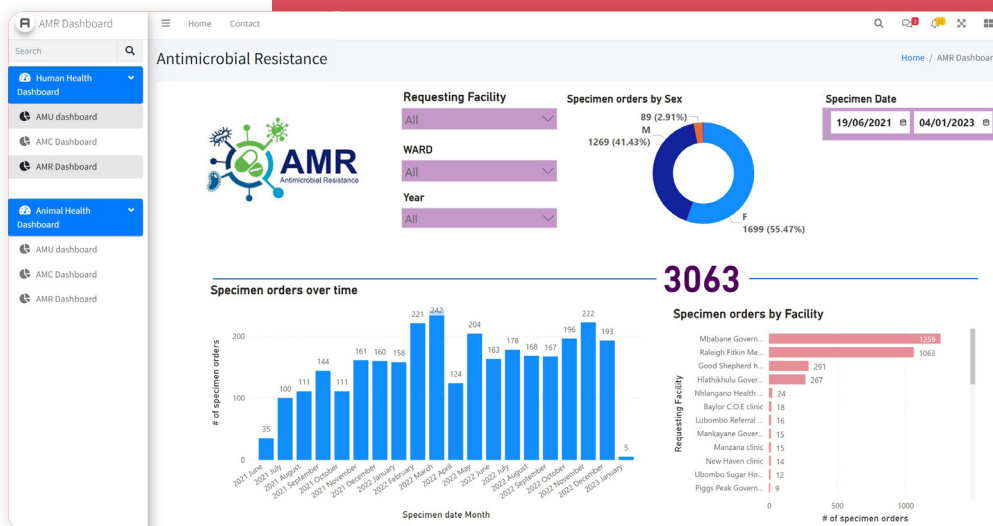


Figure 8. Snapshot of AMR / AMU / AMC dashboard.

CONDUCTED NEEDS ASSESSMENT

Through the support from the FFCG, ICAP conducted needs assessment for renovation in the four human health sentinel sites: Mbabane Government Hospital (MGH), Hlathikhulu Government Hospital (HGH), Raleigh Fitkin Memorial Hospital (RFM), and Good Shepherd Hospital (GSH).

OBJECTIVE 2

Improved country capacity for AMR and AMU/AMC surveillance in the human health sector

INFRASTRUCTURE IMPROVEMENT AND PROCUREMENT OF LABORATORY EQUIPMENT

Following the identification of the infrastructure needs for conducting optimized bacteriological testing in the respective sentinel sites, ICAP worked with the MOH to renovate the four hospital laboratories in these sites (Figures 9-11) including media preparation, sample processing for culture and antibacterial susceptibility testing, and designation and renovation of a biorepository room for long term storage of bacterial isolates for further scientific use at MGH, the national reference laboratory.



Figure 9. Renovation works Mbabane reference laboratory.

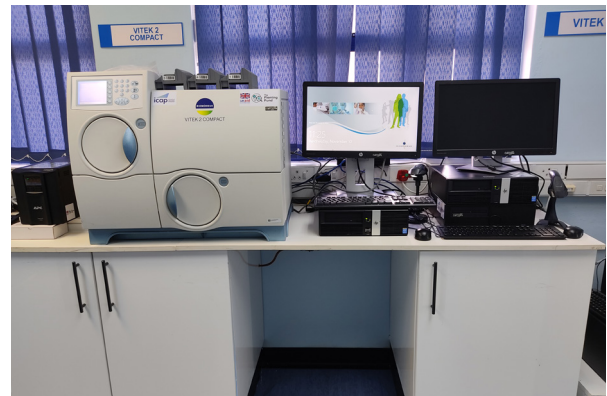


Figure 10. Park home of Microbiology lab at HGH.



Figure 11. Equipping of Renovated labs MGH.

Major and ancillary laboratory equipment for the four labs were procured. Specialized blood culture systems (BD BACTEC™ FX Blood Culture System) incubators, autoclave, glasswasher, drying oven etc. were produced for the four sentinel sites. As a reference laboratory, MGH was also equipped with Biomerieux laboratory equipment called Vitek MS and Vitek Compact II to automate bacterial identification and susceptibility testing. Table 2 shows the costs incurred in renovating and equipping the four human health sentinel sites.

TABLE 2: RENOVATIONS AND EQUIPMENT COSTS FOR THE LABORATORIES

FACILITY NAME	RENOVATION COSTS	EQUIPMENT COSTS
MGHL	SZL 999,285.17	SZL 3,711,800.00
RFMHL	SZL 795,948.55	SZL 1,259,480.00
GSHL	SZL 525,845.55	SZL 1,178,500.00
HGHL	SZL 804,257.98	SZL 1,258,520.00

CAPACITY BUILDING FOR ROUTINE TESTING AND HUMAN RESOURCE

To ensure the initiation of bacteriological testing in the sentinel sites and improve service delivery, ICAP supported the procurement and delivery of laboratory reagents including media, biochemical tests, antibiotic discs, reference strains and other consumables. Technical support in the development of different laboratory standard operating procedures (SOPs) and tools to strengthen microbiological testing was provided coupled with provision of trainings on different thematic areas including biosafety & biosecurity, laboratory supply chain, sample collection and bacteriological testing methods for laboratory staff from the sentinel sites (Figure 12).

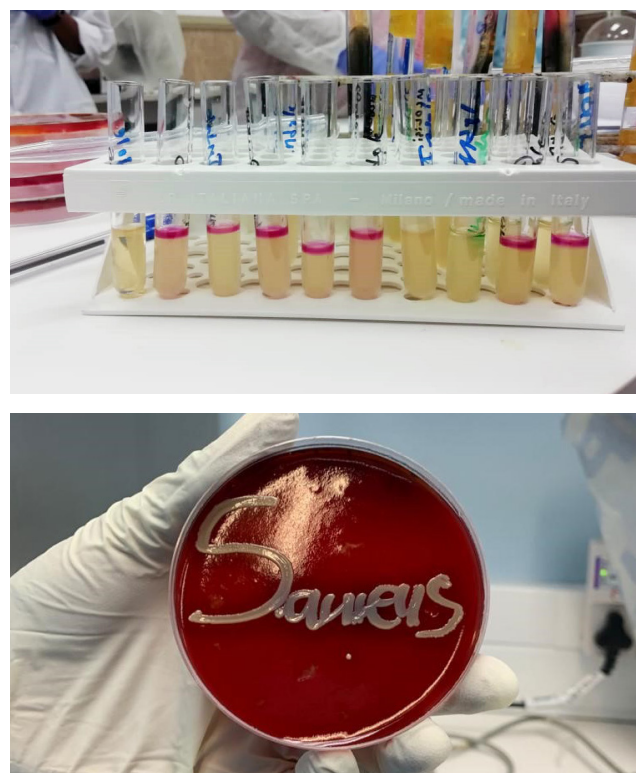


Figure 12. Bacteriology testing training for sentinel sites.

STRENGTHENING ANTIMICROBIAL STEWARDSHIP (AMS) PROGRAM

AMS committees were established in two of the four sentinel sites; and reinforced in the other two sites that already had AMS committees. Terms of reference (TORs) for the AMS committees were developed and committee members were trained in AMU/AMC principles, and data collection, analyses, and use. Private sector pharmaceutical wholesale and public sector central medical stores (CMS) representatives were trained on AMC. A surveillance protocol for AMU and AMC in the human health sector was developed and this protocol guided the data collection, analysis, and reporting that is happening to the AMS committees, AMRCC, senior officials in the ministries, the community (during WAAW commemoration), and Fleming Fund.

OBJECTIVE 3

Improved country capacity for AMR and AMU / AMC surveillance in the animal health sector

CONDUCTED NEEDS ASSESSMENT

In the animal health sector under the Department of Veterinary and Livestock Services, ICAP conducted needs assessment for renovation in two laboratories – the Central Veterinary Laboratory (CVL) and the Food and Hygiene Laboratory (FHL) to determine renovations, equipment, and laboratory reagents needs.

INFRASTRUCTURE IMPROVEMENT AND PROCUREMENT OF LABORATORY EQUIPMENT

The two laboratories were renovated, and major and minor equipment procured for bacteriological testing (Figures 13 and 14).



Figure 13. Renovation of Microbiology lab of FHL.



Figure 14. Renovated reception room of CVL & FHL.

A biorepository room for storage of AMR bacterial isolates for further scientific use was also renovated and equipped (Figure 15). Table 3 shows the costs for renovating and equipping the two laboratories in the animal health sector.



Figure 15. Renovated biorepository room.

TABLE 3: RENOVATIONS AND EQUIPMENT COSTS FOR LABORATORIES IN THE ANIMAL HEALTH SECTOR

FACILITY NAME	RENOVATION COSTS AND CONTRACTOR NAME	EQUIPMENT COSTS
CVL	SZL 1 236 086.96	SZL 1 301 840.00
FHL	SZL 982 762.50	SZL 398 198.00

STRENGTHENING SAMPLE COLLECTION AND TRANSPORTATION IN THE ANIMAL HEALTH SECTOR

The Central Veterinary Laboratory and Food Hygiene Laboratory have been receiving samples collected and transported through either government vehicles, or the collection and delivery of samples were being made by the beneficiaries (farmers) themselves. To improve the sample collection and timely transportation and delivery of samples to the respective laboratories, ICAP through the FFCG procured a customized sample transportation vehicle valued at SZL 764 275.00 and this vehicle was handed over to the MOA. The handover was done by His Excellency the British High commissioner, Mr. Simon Boyden, to the Minister of Agriculture, Hon. Jabulani C. Mabuza (Figure 16). This vehicle was instrumental in supporting the AMR surveillance in live poultry and poultry meat and enabled the collection of specimens from poultry farms and abattoirs.



Figure 16. His Excellency the British High commissioner, Mr. Simon Boyden, handing over the customized sample transportation vehicle to the Minister of Agriculture, Hon. Jabulani C. Mabuza, 01 September 2022.

STRENGTHENING BACTERIOLOGICAL TESTING IN THE ANIMAL HEALTH SECTOR

To support bacteriology testing in the animal health laboratories, major and ancillary laboratory equipment for both the CVL and FHL to the value of SZL 1 301 840.00 and SZL 398 198.00 respectively were procured. Laboratory reagents including media, biochemical tests, antibiotic discs, reference strains and other consumables were also procured and delivered to these laboratories. Stock is replenished according to average monthly consumption factoring in minimum and maximum stock levels. ICAP provided technical support in the development of different laboratory SOPs and tools to strengthen microbiology testing. Different pieces of training including biosafety & biosecurity, laboratory supply chain, sample collection (Figure 17) and bacteriological testing methods (Figure 18), for laboratory staff from the two laboratories as well as training on veterinary epidemiology for animal health workers were conducted.



Figure 17. Training on Sample collection from chickens.

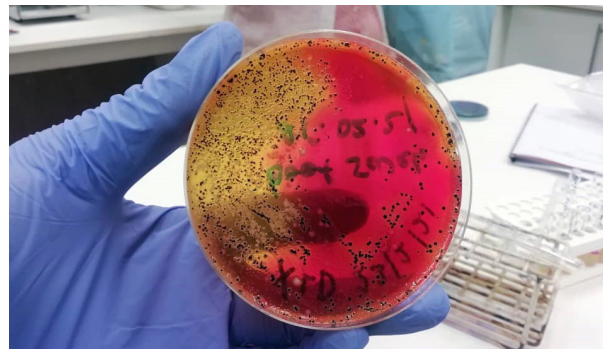


Figure 18. Bacteriology testing training.

ESTABLISHMENT OF SHEEP BLOOD DONATION CENTER

Furthermore, the FFCG provided financial support to establish a sheep blood donation center (Figure 19) in collaboration with the University of Eswatini (UNESWA) at a total investment of SZL 1,449, 987.00. Initially six sheep were procured but by June 2023 there were 39 sheep in the center. A memorandum of agreement between UNESWA, Ministry of Health, and Ministry of Agriculture on how to sustain the sheep blood center beyond the FFCG was developed, approved by the three ministries, and signed by the Attorney General for the Government of Eswatini.



Figure 19. Sheep Blood collection center at Luyengo Campus, University of Eswatini.

UNDERSTANDING THE AMU/AMC IN THE ANIMAL HEALTH SECTOR

ICAP in collaboration with the DVLS conducted a situational analysis to understand the landscape of the AMU and AMC in the animal health sector. Based on the assessment findings, ICAP facilitated the development of costed AMU/AMC surveillance protocol in the animal health sector and the AMU surveillance was piloted in poultry.

STRENGTHENING AMR SURVEILLANCE IN THE ANIMAL HEALTH SECTOR

ICAP facilitated the development and implementation of an AMR surveillance protocol in live chicken where samples are being collected from live poultry just before they are sold for meat consumption. Additionally, AMR surveillance protocol in poultry meat was also developed and being implemented to identify targeted zoonotic bacteria that can potentially be infecting humans. Bacteriological culture and susceptibility testing from samples of live poultry and poultry meat are being handled by the CVL and FHL respectively. To strengthen the scope of implementation of AMR surveillance in other food animals or food of animal origin, a concept note to conduct a value chain analysis was developed to determine and prioritize the next target for AMR surveillance in the animal health sector.

CROSS CUTTING QUALITY ASSURANCE OF AMR TESTING LABORATORIES

QUALITY ASSURANCE OF AMR TESTING LABORATORIES

The six laboratories (four in the human health sector and two in the animal health sector) have been enrolled in external quality assurance (EQA) schemes. The four sentinel sites in the human health are enrolled to EQA with the proficiency testing (PT) scheme of the National Health Laboratory Service (NHLS) of South Africa, and in house developed EQA from the existing biorepository at the reference laboratory of MGH. The two animal health laboratories (CVL and FHL) are also engaged in an international EQA scheme where the Fleming Fund Country grant supported the enrolment to a VETQAS of UK, Royal GD of Holland. FHL has been enrolled to a food bacteriology proficiency testing that is provided by National Laboratory association of South Africa. Additionally, with a regional Fleming Fund support implemented by African Society of Laboratory Medicine (ASLM), all six sentinel sites are enrolled to a pilot AMR proficiency testing that is being implemented by NHLS, South Africa.

ONGOING ACTIVITIES

Currently, ICAP is facilitating the functions of AMRCC in line with the AMRCC TORs. ICAP is working with the AMRCC to support the establishment of a One Health committee, as such, TORs for this committee have been drafted. The service utilization of bacteriological testing services in the human health sentinel sites is being strengthened. A laboratory information system for the animal health laboratories has been developed and it is being tested in the laboratories for further improvement. The One Health data flow system workplan and the database (dashboard development) for both human and animal health sectors are underway, while the AMR/AMU/AMC surveillance data collection, analysis, and interpretation is continuing. The value chain analysis protocol on food of animal origin to inform future AMR surveillance in the animal health sector is under development. ICAP is also facilitating the participation of Eswatini through reporting to the WHO GLASS and the reports for data collected in 2022 were uploaded in July 2023.

FUTURE FOCUS AREAS

Despite the remarkable achievements that the country has demonstrated in implementing the first phase of the Fleming Fund Country Grant, the access to bacteriology testing is limited to some hospitals and the volume of laboratory samples tested is still low, which requires decentralization/roll-out of bacteriology services, strengthening the samples referral system, training of lab professionals, clinicians, pharmacists and strengthening AMS committees as well as putting in place a robust system for AMR data management system in the context of the “One Health” approach. Expanding the scope of AMR surveillance in the animal health sector and inclusion of the environment are among the areas that need further intervention. Enhancing integrated AMR surveillance such as the implementation of the Tricycle protocol that includes human, animal and environmental sectors will enhance the implementation of one health approach. Establishing and strengthening the functions of One health committee, data sharing agreement, and data use for policy decision making are among the priorities that need further focus in future interventions.

MISSION

ICAP transforms the health of populations through innovation, research, and global collaboration.

VISION

Healthy people, empowered communities, thriving societies.



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