Benin, October 2023

ICARS-supported projects in Africa

INTERNATIONAL CENTRE FOR **ANTIMICROBIAL RESISTANCE** SOLUTIONS

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Reducing the import of antimicrobial resistance through day-old chicks and eggs

BENIN

Project sector
Terrestrial and Aquatic Animals

Project partners
Directorate of Livestock of Ministry of Agriculture, Livestock and Fisheries

Polytechnic School of Abomey-Calavi, University of Abomey-Calavi, University of Abomey-Calavi

The Territorial Agricultural Development Agencies; Association of Private Veterinarians of Benin (AMeVeP)

Union of Suppliers of Inputs and Services in Poultry Farming of Benin (UFISAB)

National Union of Poultry Farmers of Benin (UNAPB)

Timescale
15 February 2023 - 15 August 2024

ICARS funding
149,948 USD

Context

The government of Benin is currently deploying efforts to reduce antimicrobial resistance (AMR) and antimicrobial use (AMU) in humans. Importantly, in 2016, WHO supported the Ministry of Health to develop a national action plan (NAP) for the prevention and control of healthcare associated infections, with the overall aim of significantly reducing the use of antimicrobials in humans.

However, there is currently limited international support for AMR efforts in the veterinary sector, despite the inclusion of the sector in the national action plan to fight AMR. Regarding the poultry sector, Benin does not have enough hatcheries and thus relies to a large extent on imports to procure day-old chicks. This represents a risk for Benin to import antimicrobial resistant bacteria carried by those chicks which can then disseminate throughout the Beninese value chain. Illegal imports of day-old chicks are estimated important in Benin.

Problem

ICARS funded a co-development study in July 2022 in Benin which revealed the presence of multidrug-resistant bacteria (*E. coli, Salmonella* spp., *Enterobacter cloacae, Bacillus cereus, Pseudomonas* spp. and *K. pneumoniae*) with a predominance in the informally imported day-old chicks compared to the formally imported ones. For example, 80% and 93 % of *E. coli* strains isolated from illegally imported day-old chicks were resistant to ciprofloxacin and gentamicin, respectively.

Project overview

The project aims to design and support the implementation of a microbiological certification system (MicS) for imported day-old chicks and hatching eggs in Benin. The objectives/work packages (WP) of the project are to:

- Conduct an in-depth mapping of the poultry value chain in Benin, including the formal and informal sectors and routes involved in day-old chick and hatching egg imports in Benin.
- Assess the knowledge and practices of the main stakeholders of the poultry value chain in Benin.
- Determine the types and levels of antimicrobial resistance in priority bacteria (*E. coli, Enterococcus faecalis/faecium* and *Salmonella* spp.) in day-old chicks and hatching eggs imported formally and informally.
- Explore with relevant stakeholders (formal and informal) the conditions and set-up criteria of the MicS.
- Suggest the design and content of a potential future formal and legal MicS for imported day-old chicks and eggs.

ICARS INTERNATIONAL CENTRE FOR ANTIMICROBIAL RESISTANCE SOLUTIONS

Outcomes

The project will lead to a much better understanding of the poultry value chain organization and actors in Benin, which is essential to implement interventions in this sector. The knowledge and practices of these actors will also be better known, as well as the risks of AMR import through hatching eggs and day-old chicks in Benin. The design and feasibility study of the MicS will represent a significant milestone in the efforts of Benin to protect its poultry value chain and consumers from AMR.

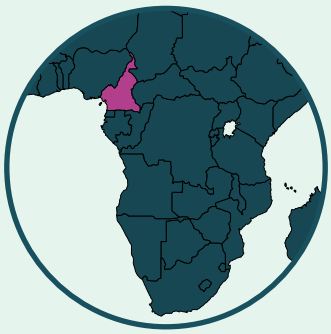
"The import of day-old chicks and eggs presents a significant risk for the spread of antimicrobial resistance, but there are strategies that can help reduce this danger and safeguard public health. This project will lead to the establishment of a microbiological certification system for imported poultry products in Benin through a multicentric approach. We are really excited to see the powerful results."

Dr Victorien Dougnon,
Associate Professor in Microbiology,
University of Abomey-Calavi

"This project will explore the required conditions that will need to be in place in order to establish a microbiological certification system for imported poultry products in Benin to avoid the importation of resistant bacteria. It's an ambitious project and we are looking forward to seeing the results."

Dr Annick Lenglet, Science Team Lead, ICARS

Preventing AMR Spread from Wastewater through Urban Agriculture in Cameroon



CAMEROON

Project sector
Environment

Project partners
Ministry of Health

Centre for Research in Infectious Diseases (CRID)

Ministry of Agriculture and Rural Development (MINADER),

University of Yaoundé 1

Timescale
January 2025 - January 2029

ICARS funding
672,228.88 USD

Context

In Cameroon, antimicrobial resistance (AMR) is an emerging public health challenge, exacerbated by the overuse of antibiotics and untreated wastewater used in urban agriculture. Urban agriculture, which contributes significantly to food security and employs 11% of the population, often relies on untreated wastewater, exposing crops to antibiotic-resistant bacteria (ARB) and antibiotic-resistance genes (ARGs). Studies in Cameroon have linked wastewater irrigation to increased AMR in crops, highlighting urban agriculture as a potential vector for AMR dissemination. However, the health impacts of these practices and the effectiveness of current interventions remain unclear. Addressing these challenges requires cost-effective wastewater treatment interventions and alignment with the National Action Plan on AMR to mitigate risks in both natural and built environments.

Problem

In Cameroon, untreated wastewater used for irrigation in urban agriculture poses a significant public health challenge by facilitating the transmission of AMR and pathogens. This issue is particularly critical in Yaoundé, where urban agriculture plays a vital role in food security and employment yet relies on wastewater that harbors ARBs and ARGs. Despite its relevance, AMR transmission through wastewater irrigation remains under-researched, leaving a critical gap in understanding and mitigating this pathway. The lack of cost-effective and sustainable mitigation strategies exacerbates the risk of AMR dissemination, threatening public health and agricultural productivity. This project aims to interrupt the AMR transmission cycle, safeguard public health, and promote sustainable agricultural practices through targeted interventions and collaborative stakeholder engagement.

Project overview

In Cameroon, the use of untreated wastewater for irrigation in urban agriculture poses significant public health and environmental risks by facilitating the spread of AMR through ARB and ARGs. This project aims to mitigate these risks by developing and implementing cost-effective and sustainable mitigation strategies to interrupt the transmission of AMR from wastewater to the food chain. By leveraging stakeholder collaboration, genomic epidemiology, and farm-level interventions, the project will generate evidence to inform policy changes, enhance wastewater management practices, and promote sustainable agricultural productivity.

INTERNATIONAL CENTRE FOR ANTIMICROBIAL RESISTANCE SOLUTIONS

Project objectives

1. Assess the prevalence of AMR in wastewater used for irrigation and its associated risks to public health through a cross-sectional study and genomic epidemiology.
2. Design and test farm-level and market-level interventions to reduce AMR transmission from wastewater irrigation while preserving agricultural yields.
3. Use genomic epidemiology to monitor AMR transmission from wastewater to crops, markets, and households, providing critical data on this under-researched pathway.
4. Collaborate with key stakeholders, including the Ministries of Agriculture and Public Health, to integrate findings into national policies and promote sustainable wastewater reuse practices.
5. Conduct training programs, participatory mapping, and awareness campaigns to engage stakeholders and encourage adoption of sustainable practices in urban agriculture.

Solutions and outcomes

- Knowledge, attitudes, practices, barriers, and facilitators related to AMR, wastewater use, and hygiene assessed.
- Temporal and genomic data on ARBs, ARGs, and transmission pathways collected and analyzed.
- Effective, cost-effective strategies for AMR reduction identified, validated, and monitored for impacts on ARB/ARG levels, crop yield, and quality.
- Public, farmer, and policymaker awareness of AMR increased, with communities equipped to implement sustainable practices.
- Policies promoting sustainable practices and AMR reduction enacted, supported by strengthened collaboration among researchers, stakeholders, and government.
- Effective interventions adopted across LMICs, enabling broader implementation and government-supported funding.

Removal of AMR genes and bacteria from wastewater using modular advanced treatment solutions (HOTMATS)

GHANA

Project sector
One Health

JPIAMR partners
Karslruhe Institute of Technology (KIT), Germany

Norwegian Institute of Water Research (NIVA), Norway

University of Nairobi, Kenya

Timescale
February 2022-January 2024

ICARS funding
250,000 EURO

Context

The environment and water bodies are largely unattended and remain a high priority in National Action Plan (NAP) for antimicrobial resistance (AMR). In Ghana, a particular problem of interest is the fact that wastewater effluents are generally untreated and often discharged into water bodies. The Ministry of Health and its implementing bodies are interested in tailored solutions that can be implemented on the ground in low- and middle-income countries (LMICs) to reduce antibiotic resistant bacteria (ARB) and genes (ARG) in wastewater effluents. This project's collaboration with the Ministry helps to situate it within the national priorities of the Ghana AMR Policy.

Problem

AMR poses a critical health threat with major economic and societal consequences. Globally, AMR dissemination is mainly due to the emission of antibiotic resistant bacteria (ARB), antibiotic resistance genes (ARG), facultative pathogenic bacteria (FPB) and AMR driving substances, contained in human and animal waste, spilling into the environment. Much effort has been spent on unravelling the sources, sinks and transmission pathways of AMR in a number of AMR screening studies globally. The main hotspots of anthropogenic AMR include:

- point-sources, e.g., hospitals, nursing homes, domestic households, the pharmaceutical industry, animal husbandry, and slaughterhouses
- urban wastewater treatment plants (WWTPs)
- other diffusive sources.

The effluents from AMR hotspots are mostly discharged into the public sewage system, which plays an important role as a recipient of potentially harmful and AMR-driving substances as well as ARB & ARGs.

"The project provides a unique opportunity to test state-of-the art technological solutions in varied real-life settings (low-middle-high income countries) simultaneously. This will help provide valuable learnings for better, quicker and context-specific deployment of technological innovation for AMR mitigation."

Jyoti Joshi, Senior Science Advisor, ICARS

ICARS INTERNATIONAL CENTRE FOR ANTIMICROBIAL RESISTANCE SOLUTIONS

Project overview

This project aims to implement and assess modular advanced solutions for effective and decentralised wastewater treatment at selected point sources of AMR emergence. The applied technologies will primarily target AMR pollution and pathogens in wastewater streams directly at AMR hotspots. This means moving away from 'end-of-pipe' approaches applied at wastewater treatment plants (WWTPs) and address intervention in all three pillars of One Health. The project will help to use an advanced system to destroy antimicrobial resistant bacteria (ARB) and facultative pathogenic bacteria (FPB) in wastewater.

The research team also aims to demonstrate the superiority of the novel pilot-scale treatment systems, as opposed to state-of-the art solutions, by collecting and treating effluents from AMR hotspots, including a hospital, nursing homes, and a slaughterhouse. This will reduce the risk associated with ARB/FPB spreading from hotspots to the downstream natural environment, and to unburden central WWTPs.

The project will also assess the modalities for technology transfer from high income countries (HICs) to low- and middle-income countries (LMICs) by conducting a willingness to pay study for uptake of decentralised treatment of AMR in LMICs.

Outcomes

- Establish a new technological decentralized and source-orientated approach to contribute to the reduction of the burden of AMR at important sources, i.e., hospitals, nursery homes, slaughterhouse, and major transport pathways.
- Quickly translate research into commercialisation of outputs in the form of intervention technology development, and policy uptake by local (regulators of hospitals, nursery homes, food production) and regional/governmental authorities
- Combine the scientific and interdisciplinary competences and data across our international consortium, as well as knowledge transfer to LIMCs.
- Create a new hub for sharing knowledge, data and technology between researchers, stakeholders (hospitals, WWTPs, food industry) and authorities, to strengthen the cooperation between EU and non-EU countries.

Identifying challenges with antibiotic use in surgical services and implementing evidence-based interventions

GHANA

Project sector
Humans

Project partners
Ministry of Health

University of Health Allied Sciences (UHAS)

University of Ghana Medical School/ University of Ghana (UGMS/UG)

Ghana Health Service

Food and Drugs Authority (FDA)

Komfo Anokye Teaching Hospital (KATH)

Timescale
March 2024 – March 2027

ICARS funding
674,393.98 USD

ICARS INTERNATIONAL CENTRE FOR ANTIMICROBIAL RESISTANCE SOLUTIONS

Context

Antimicrobial resistance (AMR) is a global health challenge associated with increased morbidity, mortality and healthcare costs. To combat AMR, it is essential to strengthen infection prevention and control (IPC) measures and promote judicious antimicrobial use in health delivery, including in surgical prophylaxis. Surgical site infections (SSIs) are a significant burden, particularly in low/middle-income countries (LMICs), and present a considerable cost. Studies in Ghana report higher SSI incidence than the global average, underscoring the need for implementing interventions focusing on improving IPC procedures and the use of antibiotics for Surgical Antibiotic Prophylaxis (SAP). Although interventions have been suggested for reducing SSI worldwide, there are challenges with implementing such recommendations in Ghana due to cost implications and, to some extent, the behaviour of healthcare practitioners.

Problem

To prevent the development of SSI, SAP is an evidence-based practice. However, an issue associated with SAP in Ghana is the high level of non-adherence to national treatment guidelines. For example, antibiotics are prescribed for a longer duration than the recommended one day for caesarean section. Poor IPC measures, such as hand hygiene and facemask use could also contribute to the high SSI incidence in Ghana. Many facilities lack formal Antimicrobial Stewardship programs and IPC structures, which could strengthen antimicrobial use and implementation of IPC protocols. Additionally, data from field surveillance conducted by Ghana's Food and Drug Authority showed substandard antiseptics and disinfectants on the Ghanaian market which may be accessed in healthcare facilities.

Project overview

The aim of the project is to reduce the incidence of SSI and improve appropriate antimicrobial use (AMU) by addressing challenges associated with SAP and IPC practices in surgery. The objectives are multifaceted: evaluating baseline antibiotic prescribing and IPC practices, assessing the quality and appropriate use of antiseptics and disinfectants, and understanding health practitioner behavioural and institutional factors influencing antibiotic use and IPC. The project will develop and implement potentially sustainable interventions on rational use of antibiotics in SAP and IPC practices, evaluate their effectiveness and cost-effectiveness, and make recommendations for scaling up, informing policy decisions for broader implementation. The objectives are:

- a) To determine baseline antibiotic prescribing practices in line with the Ghana Standard Treatment Guidelines or other acceptable standard guidelines (e.g. WHO guidelines for surgical prophylaxis) in four study hospitals.
- b) To assess baseline IPC practices in surgical settings of the project sites in line with IPC protocols of Ghana
- c) To assess the quality of antiseptics and disinfectants used in surgical units and in particular at the project sites in Ghana
- d) To assess individual behavioural drivers of the healthcare practitioners in surgical units, challenges and institutional factors affecting appropriate antibiotic use in surgery and IPC practices.
- e) To develop and implement sustainable evidence-based interventions to address the identified challenges with the use of antibiotics in surgery and IPC practices.
- f) To evaluate the effectiveness and cost-effectiveness of the interventions addressing antibiotic use in surgery and IPC practices, and make recommendations for scale-up.
- g) To assess the likely mechanisms for sustainability and scale-up, and disseminate findings to all stakeholders including policy and decision-makers.

Study Design
This study will take the form of a Quality Improvement Study with mixed methods, using a Plan-Do-Study-Act (PDSA) approach.

The implementation research cycle will use a before-and-after approach to measure the impact of the intervention and thus link evidence generated to improve practice and also advance impactful public health policies and programmes.

Study sites
This project aims to test the implementation of surgical antibiotic prophylaxis and IPC interventions across 4 hospitals in Ghana: 1 teaching hospital (Korle Bu Teaching Hospital), 2 regional hospitals (Eastern Regional Hospital Koforidua and Yendi Municipal Hospital) and 1 district hospital (Holy Family Hospital) (n=4).

Outcomes

- 30% relative reduction from the current 10% SSI rate to 7% with multimodal interventions.
- Reduced SSI in abdominal surgeries.
- Reduced length of hospital stays and associated costs.
- Improved adherence to national standard treatment guidelines (STG)/WHO/approved institutional guidelines on appropriate SAP.
- Increased IPC level based on WHO IPC Assessment Framework.
- Change in Knowledge, Attitude and Practices (KAP) of healthcare professionals.

Efforts to strengthen antimicrobial stewardship preparedness in anticipation of improved access efforts for novel antibiotics in Kenya

KENYA

Project sector
Humans

Project partner
Aga Khan University Hospital, Nairobi

Timescale
November 2024 - November 2026

ICARS funding
389,973.14 USD

Context

In Kenya, 43% of its population lives in poverty and the increasing prevalence of drug-resistant pathogens poses significant challenges. The country recorded 8,500 deaths attributable to AMR and 37,300 deaths associated with AMR in 2019. To address the issue of AMR and maintain the effectiveness of antibiotics while reducing resistance, Antimicrobial Stewardship (AMS) Programmes have widely been recognized as necessary tools for effectively managing antimicrobial usage. However, AMS initiatives in Kenya remain fragmented and confined to a limited number of facilities, and ensuring that the right patient receives the right antibiotic at the right time, after its registration in the market, poses a significant challenge. With the anticipated introduction of new reserve antibiotics in the country, this project aims to establish a comprehensive, evidence-backed framework for strengthening antimicrobial stewardship (AMS) preparedness in tertiary healthcare facilities across the country. By focusing on developing pragmatic and sustainable use pathways for new antibiotics, the project is designed to set the groundwork for minimizing resistance development and enhancing overall healthcare outcomes.

Problem

This project aims to identify the crucial gaps that need to be filled to create an ideal sustainable AMS ecosystem in select healthcare facilities which enables the culture of appropriate use so that such hospitals can become role models for other facilities to use reserve antibiotics responsibly. An investigation into human behavioural complexities involved in the implementation of AMS and economic aspects and the costs of creating the ideal ecosystem is an important part of this research.

Project overview

The goal is to develop a solid, evidence-based understanding of the field situation in tertiary care facilities in Kenya to develop pragmatic optimal & sustainable use pathways for the use of a novel antibiotic (Antibiotic X) with minimum resistance development. Considering the likelihood of new antibiotic introduction in Kenya in the next couple of years, this project contributes to AMS preparedness in the long term.

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Specific Objectives

1. Conduct a situational analysis of:

- current AMS capacities, processes, and capabilities in select HCF
- policy levers to enable stewardship efforts in HCF
- potential to build an economic case and resource generation for AMS scale up in Kenya (representative of LMIC context

2. Establish an AMS enabling ecosystem by:

- Developing a stakeholder map for AMS uptake and scale up in Kenya that identifies strategic stakeholders and potential strategies for engaging them to improve AMSP in HCF
- Fostering linkages of the HCF leadership team with national authorities (NAP-AMR, National Regulatory Authority etc) to specify the strategic milestones of the TANDEM-ABX roadmap, enable sharing of current AMS activities, organise stakeholder consultations and work together with ICARS and experts to develop tools and standards relevant for AMS integration with country priorities (country buy-in)

3. Develop optimal use clinical protocols and clinical decision pathways through a panel of experts that provide advice for sustainable use of reserve antibiotics (diagnostic stewardship, safety monitoring and active pharmacovigilance) and monitoring of the antimicrobial resistance to it.

4. Develop a case for the social innovation (including- behavioural, policy and economic case) needed to scale up AMS in Kenya.

Outcomes

- Change in antibiotic prescription practices in select tertiary healthcare facilities in Kenya
- Develop and implement training and mentorship best practices in AMS for pharmacy, clinicians and intensivists, IPC personel and lab staff to work together for optimal AMS practices
- Establish the economic costs and behavioural factors to be considered for strengthening AMS capabilities sustainably in critical care facilities of hospitals in Kenya

Augmenting core strategies of antimicrobial stewardship to improve Surgical Antibiotic Prophylaxis and management of Surgical Site Infections

KENYA

Project sector
Humans

Project partners
Health Standards Quality Assurance and Regulations, Ministry of Health

Department of Pharmacology, Clinical Pharmacy and Pharmacy Practice, University of Nairobi

Department of Clinical Microbiology, Aga Khan University

Infection Prevention Network Kenya

Timescale
1 February 2025 - 31 December 2028

ICARS funding
580,003 USD

INTERNATIONAL CENTRE FOR **ANTIMICROBIAL RESISTANCE** SOLUTIONS

Context

Kenya's National Policy and Action Plan (NAP) on the Prevention and Containment of Antimicrobial Resistance was launched in 2017. Its implementation is coordinated through the National Antimicrobial Stewardship Interagency Committee.

As part of the NAP's strategic objective of promoting appropriate use of antimicrobials, national AMS guidelines were developed and published in 2020. These guidelines focus on optimising the use of antimicrobials in human health through strengthening Medicines and Therapeutics Committees (MTCs) to ensure patient safety, optimal treatment outcomes, and reduced costs of treatment. The implementation of the AMS guidelines on a local level has been slow with less than 30% of the hospitals countrywide having established an AMS programme two years after the launch. The limited implementation of AMS guidelines has partly been caused by difficulties with adapting them to facility and county level, and there is a need to tailor them to the local hospitals' needs. Up to date national guidelines on Surgical Antibiotic Prophylaxis (SAP) and empiric management guidelines for Surgical Site Infections (SSIs) are currently not available.

Problem

SAP is commonly associated with irrational antibiotic use in LMICs. Studies have shown that up to 40% of prescriptions in this situation may be inappropriate or suboptimal. There are multiple complex reasons for this behaviour, including limited diagnostic support and laboratory capacity, mistrust in lab reports, and lack of confidence in the facility's infection, prevention and control processes- prompting surgeons to fear SSIs and choose to administer broad-spectrum antibiotics.

In surgical settings, AMR can lead to:

- longer hospitalisation periods
- extended duration of antibiotic therapy (often with toxicities associated)
- higher healthcare expenditure
- increased mortality and morbidity
- need for surgical revisions

AMR features prominently in SSIs, which form one of the most common Healthcare Associated Infections (HAIs). In Kenya, the establishment of a national HAI surveillance system, including surveillance for Caesarean Section (CS) SSI, is a key priority in the National IPC Strategic Plan for Healthcare Services. Early implementation findings from HAI surveillance on SSIs post caesarean section in some level 4 hospitals have indicated poor compliance to surgical prophylaxis guidelines.

Project overview

The project aims to play a significant role in optimising SAP and reducing the burden of inappropriate antimicrobial use. This project will also build on the existing HAI surveillance system in Kenya, to further strengthen the quality of healthcare delivery, especially in surgical departments.

The aim of the study is to develop and deploy Guidelines for Surgical Antibiotic Prophylaxis (SAP) and treatment of Surgical Site Infections (SSIs) within health care facilities, to achieve at least 60% compliance and optimize the surveillance and management of SSIs in three counties. One county-level government hospital and one private hospital will be included from each county.

The specific objectives of the project are to:

- Evaluate the bacteriological profile and antibiotic sensitivity of SSIs and map the use of antibiotics as a part of routine SAP, in secondary and tertiary hospitals in three counties of Kenya
- Develop guidelines and information, education and communication (IEC) materials for SAP based on bacteriological and AST profiles, and through standard evidence synthesis processes
- Pilot SAP guidelines and IEC materials to support uptake of guidelines in secondary and tertiary hospitals in three counties in Kenya
- Assess the behavioural and social enablers and barriers to uptake of SAP guidelines by prescribers, including its acceptability, feasibility, and appropriateness
- Conduct an economic evaluation to assess the cost and benefits of the implementation of guidelines, IEC materials and the clinical decision support system (CDSS)
- To support development of national guidelines on management of SSI including surveillance and treatment of SAPs.

Outcomes

- Improved prescription practices of antibiotics for (selected) SAP in 6 secondary and tertiary care facilities of three counties of Kenya
- Improve AMS policies and practices that utilise intervention results to sustain appropriate antibiotic use and use of antibiotics contained in the standard treatment guidelines (STGs) for SAP and SSIs in Kenya supported by facility administration.

Reducing mastitis incidence and improving antibiotic stewardship in Kenyan smallholder dairy systems

KENYA

Project sector
Terrestrial and Aquatic Animals

Project partners
Ministry of Agriculture and Livestock Development

International Livestock Research institute

University of Nairobi

Kenya Veterinary Association

Strathmore University

Timescale
September 2024 - September 2027

ICARS funding
619,071.32 USD

Context

- Kenya has one of the largest and fastest-growing dairy sectors in Sub-Saharan Africa, contributing 6–8% to the country's gross domestic product.
- Studies indicate a high prevalence of subclinical mastitis—mild infections without visible clinical signs—exceeding 50%.
- The high prevalence is often attributed to poor husbandry practices and a lack of diagnostic and treatment guidelines, leading to widespread non-targeted antibiotic use in resource-limited smallholder settings.
- Recent studies show that over 90% of dairy farms use antimicrobials to treat bovine mastitis, primarily oxytetracycline, penicillin, cephalosporins, and streptomycin.
- Approximately 40% of veterinary antimicrobials are sold without a prescription, mainly through agrovet shops, where most staff lack the qualifications to dispense veterinary drugs.

Problem

Many smallholder farmers lack the resources to properly diagnose and treat mastitis, leading to inappropriate antimicrobial use and the presence of drug residues in milk. This contributes to the development and spread of resistant bacteria, posing a significant threat to food safety and security.

INTERNATIONAL CENTRE FOR ANTIMICROBIAL RESISTANCE SOLUTIONS

Project overview

This project aims to develop and test a scalable and feasible mastitis management programme to promote prudent antimicrobial use in Kenyan dairy farms. Key activities include:

- Conducting a situational analysis of mastitis prevalence, antimicrobial resistance, and antimicrobial use practices in smallholder dairy systems.
- Evaluating the direct and indirect costs of mastitis at farm, cooperative, and national levels while modelling the benefits of different prevention, control, and treatment strategies.
- Investigating the knowledge, attitudes, awareness, practices, and behaviours related to mastitis prevention among farmers and animal health providers.
- Co-creating, implementing, and evaluating a mastitis management programme at three levels: farm, animal health providers, and cooperatives.

Outcomes

The project aims to develop a draft National Mastitis Control Strategy based on evidence and inclusive of all levels of the dairy production chain.

"This is the first ICARS-supported project aimed at reducing AMR in dairy farms. Dairy production plays a vital role in combating hunger and malnutrition globally. This project seeks to ensure milk safety and quality by reducing infectious diseases, antimicrobial use, residues, and resistance. At the same time, it explores an economic model that benefits farmers and cooperatives, enabling them to produce higher-quality milk in Kenya."

Dr. Claudia Cobo Angel, Science Advisor: AMR mitigation, ICARS

Rationalising antibiotic use in treatment of bloodstream infections and urinary tract infections in patients treated in healthcare facilities in Malawi

MALAWI

Project sector
Humans

Project partners
Ministry of Health

Antimicrobial Resistance Coordinating Centre (AMRCC)

Kamuzu University of Health Sciences

Lilongwe Medical Relief Trust

Timescale
January 2024 - December 2027

ICARS funding
650,000 USD

Context

The misuse of antibiotics globally, in clinical and community settings, is a significant factor contributing to the development of antimicrobial resistance (AMR). Sub-Saharan African countries, including Malawi, have shown a high prevalence of AMR due to irrational use of antibiotics. These countries face a substantial burden of infectious diseases, such as Urinary Tract Infections (UTIs) and Bloodstream Infections (BSIs), and a correlation has been observed between antibiotic consumption and the prevalence of resistance.

Malawi has initiated an Antimicrobial Stewardship Programme, but it is still in its early stages. National guidelines have been established, and some facilities have formed committees to oversee stewardship activities, particularly in tertiary and district hospitals. However, these committees are still finding their footing and require ongoing support from the AMRNCC.

Point Prevalence Surveys, along with the AMRNCC, revealed a limited number of antibiotic prescriptions backed by microbiology evidence. As of now, there have been no formal studies conducted to evaluate the effectiveness of the AMS programme.

Problem

This project aims to thoroughly characterise existing prescription and management practices for UTI and BSI infections, establish and strengthen a formal AMS programme in six selected Malawian facilities, and assess the value of this intervention to optimise antibiotic use for BSI's and UTI's management. The evidence generated through this study will be invaluable in informing critical stakeholders at the healthcare and national-level, facilitating evidence-based decision-making to enhance patient safety and inform the development of AMS guidelines mitigation of AMR in the country.

INTERNATIONAL CENTRE FOR ANTIMICROBIAL RESISTANCE SOLUTIONS

Project overview

The project's aim is to implement an Antimicrobial Stewardship (AMS) programme in adult patients with Bloodstream Infections (BSIs) and Urinary Tract Infections (UTIs) in 6 Malawi public healthcare facilities to reduce inappropriate antibiotic use by 20% and improve prescription practices over a 3-year timeframe. The specific objectives are:

1. To investigate the baseline prescriber knowledge, attitudes, and practices (behavioural research) regarding antibiotic use for the treatment of UTIs and BSIs in selected Malawian public healthcare facilities including prescription audit/PPS.
2. To design, implement and evaluate the AMS Programme on prescription practices and antibiotic use for the treatment of UTIs and BSIs in the selected facilities.
3. To assess the economic impact of implementing AMS programme for BSIs and UTIs in the 6 selected healthcare facilities.
4. To develop policy briefs on the burden of AMR and the value of an AMS Programme based on the results as to inform a sustainable scale up plan for AMS in Malawi.

Outcomes

1. Improved appropriate use of antibiotics for the treatment of UTIs and BSIs in selected primary, secondary and tertiary health care facilities in Malawi.
2. Improved and demonstrated evidence to support the sustainability and scale up of the AMR intervention for BSI's and UTI's in the targeted health facilities.
3. Improved understanding of the policy and system enablers and barriers (economic, behavioural and policy related) to support scale-up and sustainability of the AMS intervention in UTI's and BSI's in Malawi.

Optimising vaccination and biosecurity regimes to enhance fight against AMR in commercial poultry production

TANZANIA

Project sector
Terrestrial and Aquatic Animals

Project partners
Ministry of Livestock and Fisheries in Tanzania

Sokoine University of Agriculture (SUA)

Ministry of Agriculture

Irrigation, Natural Resources and Livestock in Zanzibar,

Zanzibar Livestock Research Institute (ZALIRI)

Timescale
1 May 2022 - 31 October 2026

ICARS funding
803,088.23 USD

INTERNATIONAL CENTRE FOR ANTIMICROBIAL RESISTANCE SOLUTIONS

Context

In April 2017, Tanzania launched their National Action Plan to guide mitigation strategies in line with the Global Action Plan on antimicrobial resistance (AMR) using a One Health approach. In Tanzania, there is currently high usage of antimicrobials in livestock, for example, between 2010 and 2017, consumption of antimicrobials in livestock reached approximately 12.2 million tonnes (Kimera et al., 2020; Mdegela et al., 2021; Sangeda et al., 2021). In the animal sector, the highest consumption of antimicrobials is in short-cycle food producing animals, in particular poultry, which are reared commercially under intensive production systems.

Problem

The United Republic of Tanzania is experiencing a surge in commercial poultry production at an average annual growth rate of 6.4% in response to increased demand for eggs and broiler meat (United Republic of Tanzania URT, 2021). This increased demand has led to intensified poultry production, which increases the risk for poultry diseases if proper preventive and control measures are not instituted. In Tanzania, inadequate vaccination and biosecurity measures have led to increased disease burden in poultry farms and higher antimicrobial use. Consequently, increased non-prudent antimicrobial use in poultry can negatively impact the safety of poultry products for human consumption.

"While vaccination and biosecurity are effective in the poultry sector globally, these are not always tailored to local realities and are therefore not feasible. This exciting project will look at the most appropriate vaccine and biosecurity mechanisms in three Tanzanian settings to support healthy and sustainable poultry production"

Erica Westwood, Senior Science Advisor, ICARS

"In commercial livestock production systems, vaccination and biosecurity are key requirements that must go hand in hand to ensure food security and safety, in particular to fight against antimicrobial resistance"

Professor Robinson Mdegela, Sokoine University of Agriculture

Project overview

By generating evidence at the farm level this project aims to address real-time challenges that farmers are likely to face when implementing the interventions and to develop solutions to facilitate its smooth uptake. This project aims to optimise, promote and apply these vaccination regimes to the local context.

Specific objectives for the project include:

1. To establish baseline knowledge, attitude and practices (KAP) of actors in the value chain on vaccination and biosecurity measures in commercial poultry production.
2. To analyse existing policy and regulatory frameworks that govern the use of vaccines and biosecurity measures in commercial poultry production.
3. To investigate the effectiveness of defined vaccination and biosecurity regimes in reducing diseases occurrence and the use of antimicrobials in selected settings
4. To investigate the factors that prevent effectiveness of vaccines and cold chain management systems.
5. To develop and test a business model for sustainable vaccination and biosecurity interventions.
6. To build capacity through training and disseminate project findings to relevant stakeholders using a knowledge translation approach.

This project will take place in small and medium sized commercial poultry farms in Tanzania.

Outcomes

This project intends to reduce antimicrobial use, and therefore antimicrobial resistance emergence through tailored vaccination and biosecurity regimes in commercial poultry production.

The project also will identify potential factors contributing to vaccine failure along the supply chain and assess the efficacy of vaccines along the supply chain to the last mile. This project will further identify the factors affecting best practices for the delivery of vaccines at farm level and build human resource capacity.

The project will build local capacity to support collaborative on-farm training. By involving farmers throughout the study lifespan, it is intended that they will see first-hand the benefits for poultry health and growth while also understanding the economic benefits of implementing preventative measures. This will be further supported through the production of a business case to assess the costs and benefits from interventions, to support future scale up.

Evidence generated from this project is expected to inform national policy and regulatory levers.

Farmer adds vaccination to feed in Tanzania, April 2022

Mitigating the spread of antimicrobials and resistant microbes through treatment of manure

TANZANIA

Project sector
Environment

Project partners
Ministry of Livestock and Fisheries in Tanzania

Sokoine University of Agriculture (SUA)

Ministry of Agriculture

Irrigation, Natural Resources and Livestock in Zanzibar,

Zanzibar Livestock Research Institute (ZALIRI)

Timescale
1 May 2022 - 31 October 2025

ICARS funding
622,299.47 USD

Context

In April 2017, Tanzania launched their National Action Plan to guide mitigation strategies in line with the Global Action Plan on antimicrobial resistance (AMR) using a One Health approach. There is currently high usage of antimicrobials in livestock in Tanzania, for example, between 2010 and 2017, consumption of antimicrobials in livestock reached approximately 12.2 million tonnes (Kimera et al., 2020; Mdegela et al., 2021; Sangeda et al., 2021). In the animal sector, the highest consumption of antimicrobials is in short-cycle food producing animals, in particular poultry, which are reared commercially under intensive production systems.

Problem

While intensive poultry farming is on the rise to meet the increased demand for animal derived protein and income, there is a parallel increase in the use of antimicrobials for prevention and control of diseases. Evidence suggests that only a small portion (10-30%) of orally administered antimicrobials are utilised, leaving the majority (70-90%) to be excreted in manure as parent or metabolized compounds.

Poultry manure is a desirable fertiliser used in crop production, aquaculture, and other food production. The use of manure could lead to increased environmental contamination with antimicrobial residues and antimicrobial resistant pathogens and genes across the food chain.

"This project will assess, together with private companies, how different ways of composting poultry manure can reduce antimicrobial residues and resistant microorganisms. Treated and quality manure fertiliser is in demand for farmers producing high value crops, and in particular, organic farmers"

Prof. Anders Dalsgaard, Senior Scientific Advisor, ICARS

"The remedy for AMR challenges requires a One Health approach to ensure the health and wellbeing of humans, animals, and the environment. The use of simple manure treating technologies provide an opportunity to use safe poultry manure for safe food"

Prof. Robinson Mdegela, Sokoine University of Agriculture

INTERNATIONAL CENTRE FOR ANTIMICROBIAL RESISTANCE SOLUTIONS

Project overview

This project theorises that adoption of simple and cost-effective poultry manure processing technologies and processes could reduce the spread of antimicrobials in the environment, by intercepting the transmission cycle in humans, animals and the environment.

Specific objectives for the project include:

1. To establish the knowledge, attitude, and practices (KAP) of commercial poultry manure farmers/processors on current use of poultry manure and associated potential food safety risks.
2. To strengthen existing regulatory frameworks that support increased uptake of processed and safe use of manure from commercial poultry farms.
3. To optimise poultry manure processing technology for mitigating antimicrobial residues and bacterial antimicrobial resistance.
4. To build a business case for value added poultry manure from farm to end users and propose means for commercialisation and guidance for scaling-up after the project period.
5. To build capacity through training and disseminate project findings to relevant stakeholders using a knowledge translation approach.
6. To evaluate the impact of the manure processing technology on employment/ income, manure quality and value, and reduced antimicrobial resistant contamination.

Outcomes

This project intends to introduce manure processing technology that will aid in treating manure in Tanzania, leading to safer fertiliser for organic and non-organic products, and ultimately safer food products. It is expected to have an added benefit of creating employment opportunities for small businesses for manure composting and fertiliser sales.

Outcomes from this project are intended to inform and lead to revision of national policies with recommendations regarding the safe use of poultry manure in short cycle horticultural crops in urban and peri-urban areas of Tanzania mainland and Zanzibar.

Interventions to control the dynamics of antimicrobial resistance from chickens through the environment (ENVIRE)

TUNISIA

Project sector
One Health

JPIAMR partners
Freie Universität

French Agency for Food, Environmental and Occupational Health & Safety

Veterinary Academy of Lithuanian University of Health Sciences

Wrocław University of Environmental and Life Sciences

Leibniz Institute for Agricultural Engineering and Bioeconomy

Timescale
May 2022 – April 2025

ICARS funding
270,320 EURO

Context

Poultry meat has seen an explosive increase in recent decades as a means to provide affordable protein. Due to the increased demand for poultry, this has led to the development of industrial-sized poultry farms globally. In these farms, antimicrobials are used prophylactically, peri-prophylactically, as growth promoters and therapeutically. This leads to unnecessary overuse of antimicrobials in the poultry themselves and results in environmental contamination from these antimicrobials (and therefore antibiotic residues), mostly in the effluents of these farms. The overall ENVIRE consortium will aim to address the reduction of AMR in chickens and in the environment of chicken farms in Europe and Tunisia.

Problem

The development of AMR in poultry populations, the environment and ultimately in humans is encouraged through:

1. High level of unnecessary antimicrobial use in farmed poultry for both prophylactic, peri-prophylactic, growth promotion and therapeutic use
2. High level of contamination in industrial and farm effluents with antibiotic residue

"Fighting antibiotic resistance comes in small steps that should be strategic, orderly and well thought out. Well within the one health concept, our interventions start on the consumer's table and ends in the environment. We are confident that with the solution we offer we can have an impact in the fight against antimicrobial resistance."

Wejdene Mansour, Associate Professor, Faculty of Medicine Ibn Al Jazzar

INTERNATIONAL CENTRE FOR ANTIMICROBIAL RESISTANCE SOLUTIONS

Project overview

The project will investigate possible interventions to reduce selection and spread of AMR from chicken production and the environment and ultimately to humans via foodborne, occupation and environmental routes.

The project aims to reduce antimicrobial use in poultry through the introduction of plantbased therapy (phytotherapy) with thyme and/or lavender. This part of the project will both undertake a lab-based and farm-based approach and explore whether phytotherapy leads to changes and/or reductions in the resistance profiles of bacteria colonising poultry populations.

The second part of the project will explore the use of an adsorbent bio-derived polymer as a novel technology to reduce the contamination of antibiotic residues in effluents. This part of the project will take place exclusively in the laboratory. However, the adsorbent will be tested first using artificially contaminated water and thereafter with water taken from two industrial poultry farms.

Outcomes

- Improved therapeutic model for chickens with colibacillosis using medicinal plants as integrated in the poultry feed
- Proven model of treatment of farm effluents
- Dissemination of the above solutions to engage with stakeholders (including farmers) and policy makers associated with dysbiosis, which include enhanced susceptibility to pathogen infection

Results

Poster on ENVIRE Project (Interventions to control the dynamics of antimicrobial resistance from chickens through the environment) at 9th Symposium on Antimicrobial Resistance in Animals and the Environment - 3-5 July 2023, Tours, France. The study investigates the presence of multidrug-resistant bacteria in the KAMECH catchment area's deep water ecosystem. It found 52 bacteria in 100 samples, with notable presence of β-lactam-resistant strains and genes like blaNDM and blaCTX-M15. The dissemination of these bacteria poses significant risks to human, animal, and environmental health.

Constructed wetlands for mitigating antimicrobial resistance in reclaimed water used for the irrigation of food crops (CARMA)

TUNISIA

Project sector
Environment

Project partners
Ministry of Health; Faculty of Medicine Ibn Al Jazzar Sousse; National Research Institute for Rural Engineering; Water and Forestry; Alliance Against Antimicrobial Resistance; Scientific society; BEDER Organization for citizenship and equitable development; Ministry of Agriculture, Water Resources and Fisheries; Office national de l'Assainissement; Water Users' Association

Timescale
January 2025 - January 2029

ICARS funding
799,684 USD

Context

Antimicrobial resistance (AMR) poses a significant public health and environmental challenge in Tunisia. Antibiotic consumption in the country ranked second globally between 2000 and 2015, reflecting a high usage rate. Contributing factors to rising AMR in Tunisia include inappropriate antibiotic use in human and veterinary medicine, limited public awareness about responsible antibiotic consumption, and a lack of robust environmental detection and surveillance systems. The environmental dimensions of AMR are exacerbated by water scarcity, the reuse of treated wastewater in agriculture, and inadequate removal of antimicrobial residues during wastewater treatment. Efforts to combat AMR are ongoing, with Tunisia's National Action Plan emphasizing surveillance, awareness, and infection prevention, yet gaps in addressing the environmental aspects remain critical.

Problem

In Tunisia, wastewater treatment plants (WWTPs) are a significant source of environmental contamination, with 69.4% of water samples from WWTPs found to contain extended-spectrum beta-lactamase (ESBL)-producing E. coli or K. pneumoniae. The incomplete metabolism of antibiotics (ATBs) in humans and animals, combined with improper use and discharge, contributes to antibiotic residues entering wastewater, creating selection pressure for antimicrobial resistance gene (ARG) acquisition in environmental bacteria. While treated wastewater is reused for agricultural irrigation, current treatment processes are insufficient to remove antibiotic residues, antimicrobial-resistant bacteria (ARB), and ARGs. There is also a lack of integration of environmental dimensions into Tunisia's National Action Plan on AMR. Therefore, innovative and sustainable approaches, such as nature-based solutions like constructed wetlands, are needed to improve wastewater treatment and mitigate the spread of antimicrobial resistance.

Project overview

In Tunisia, the reuse of reclaimed water for irrigation presents environmental and health risks due to the transfer of ATBs, ARB, and ARGs into the food chain. The CARMA project aims to mitigate these risks by implementing nature-based solutions, specifically CWL, to improve effluent quality and reduce the spread of antimicrobial resistance. The project will generate evidence of CWL effectiveness, develop strategies for national-scale implementation, and foster stakeholder engagement through awareness and capacity-building initiatives.

ICARS INTERNATIONAL CENTRE FOR ANTIMICROBIAL RESISTANCE SOLUTIONS

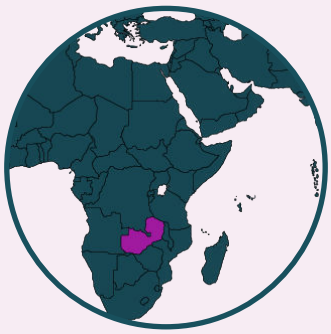
Project objectives

1. Assess the efficiency of constructed wetland, used as a polishing treatment process, in removing ATBs, ARB, and ARGs in reclaimed water and in reducing the risk of transfer to food chain.
2. Conduct a comprehensive analysis of barriers and opportunities and provide a roadmap for progressive scale up of the CWL at the national level, to improve the quality of reclaimed water used for irrigation.
3. Raise awareness and build capacities among stakeholders, potential end-users and beneficiaries to encourage broader stakeholder engagement, cross-sectoral partnerships and sustainable practices against the EDAR.

Solutions and outcomes

- Quantitative and qualitative data on ATBs, ARBs, and ARGs in water resources and agricultural products collected, with AMR transfer pathways in wastewater reuse comprehensively analyzed.
- Monitoring protocols for water sampling established and optimized, and a feasibility study integrating technical, economic, health, environmental, and social dimensions completed to guide decision-making.
- Reports and policy briefs produced to inform farm-level implementation, national scale-up, and regulatory changes, with policymakers mobilized to support nature-based solutions.
- Local communities and the public mobilized to adopt responsible antimicrobial practices, increasing awareness and acceptance of AMR mitigation measures.
- A post-doctoral course on EDAR launched in Tunisia, fostering One Health professional training, with academic collaboration and research around EDAR enhanced to inform future strategies.

Optimisation of antimicrobial use in BSIs and UTIs in various health sector settings in Zambia



ZAMBIA

Project sector
Humans

Project partners
Zambia National Public Health Institute,

Ministry of Health, Lusaka University Teaching Hospital,

University of Zambia,

Matero First Level Hospital, Lusaka

Timescale
17 January 2022 - 16 January 2025

ICARS funding
550,000 USD

Context

Zambia is a landlocked country in Southern Central Africa, with a population of about 18.3 million people. It has a centralised government and healthcare is provided by the government, faith-based organisations and the private sector.

Zambia faces similar challenges to many other LMICs, such as weak health systems and chronic stock-outs of diagnostics and medicines including antibiotics. It depends on almost 100% importation of its medical and diagnostic needs.

Problem

Antimicrobial resistance (AMR) is a global concern which poses a serious risk to public health. In clinical practice worldwide and Zambia in particular, urinary tract infections (UTIs) and bloodstream infections (BSIs) are clinical syndromes associated with indiscriminate use of antibiotics leading to antibiotic resistance (ABR). The consequences of ABR include:

- prolonged hospitalisation
- mortality
- increased healthcare costs

This is made worse with institutions that do not have antimicrobial stewardship programmes.

INTERNATIONAL CENTRE FOR ANTIMICROBIAL RESISTANCE SOLUTIONS

Project overview

This project aims to improve the appropriate use of antibiotics for BSIs and UTIs by 20% among prescribers across the continuum care within 2 years, by introducing an antimicrobial stewardship programme in selected Zambian healthcare facilities. BSIs and UTIs will be used as proxies along the continuum of care. Implementation will occur in 3 tertiary hospitals and 6 primary healthcare facilities.

"This project is timely in Zambia as we seek to develop evidence-based treatment guidelines for common syndromes we struggle with, claiming many lives and causing more morbidities."

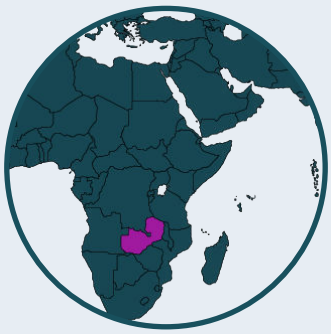
Professor Lloyd Mulenga, University of Zambia

Outcomes

The expected outcomes include

- increased compliance to treatment guidelines;
- appropriate AMU (drug choice dose, route, duration, dosing frequency) in BSIs and UTIs treatment;
- reduction in hospital length of stay;
- reduced treatment costs
- evidence-based management of UTIs and revision of Standard Treatment Guidelines (STGs)
- establishment of model AMS sites to provide training for other institutions and a blueprint for upscaling

Combating antimicrobial resistance and antimicrobial residues in the Zambian poultry sector



ZAMBIA

Project sector
Food and Feed

Project partners
Ministry of Livestock and Fisheries Central Veterinary Research Institute

Ministry of Fisheries and Livestock

University of Zambia

Veterinary Association of Zambia

Timescale
1 May 2022 - 30 April 2025

ICARS funding
558,168 USD

Context

In response to the call made by the World Health Organization (WHO) in 2015, Zambia developed its National Action Plan (NAP) in 2017. The NAP was informed by a 2016 Situational Analysis, which looked at antimicrobial resistance (AMR) and antimicrobial use in the human, animal and plant sectors.

The Zambian NAP mirrored the WHO's Global Action Plan with a focus on:

- raising awareness and knowledge of AMR among practitioners and communities
- strengthening surveillance and research
- improving infection prevention and control (IPC) practices
- improving optimisation of antimicrobial use (AMU)
- making an investment case for diagnostics and new treatments

Problem

Growing consumer demand for poultry products in Zambia has resulted in non-prudent antimicrobial use on farms, with the intent to prevent and treat poultry diseases for growth optimization and maximising profits. While Zambia has made progress against antimicrobial resistance (AMR), limited actions have been implemented to encourage farmers and veterinary personnel to use antimicrobials in a more prudent manner, and there are no treatment guidelines for poultry diseases in Zambia.

"Antimicrobial use in poultry production is complex with several actors involved in prescribing, sales and use. To create change we must better understand these behaviors and suitably tailor interventions. This project will develop interventions to target and engage numerous actors, in order to have impact at the farm level to help contain and tackle AMR in Zambia."

Erica Westwood, Senior Science Advisor, ICARS

INTERNATIONAL CENTRE FOR ANTIMICROBIAL RESISTANCE SOLUTIONS

Project overview

The aim of this project is to reduce antimicrobial use in broiler production and residue presence in broiler meat.

We will establish 8 farmer field schools in two provinces of Zambia (Copperbelt and Lusaka) and measure the schools' impact on antimicrobial use, residue presence and farmer knowledge, attitudes and practices. Measuring antimicrobial use will involve testing antimicrobial presence in commercial feeds. Economic analyses will also be carried out to quantify the economic impact for the farmers of participating in the schools and implementing what they learn (eg biosecurity measures that prevent diseases).

A second intervention will consist of developing and disseminating treatment guidelines and training veterinarians on how to use these guidelines. This intervention will complement the farmer field schools to reduce antimicrobial use and residues.

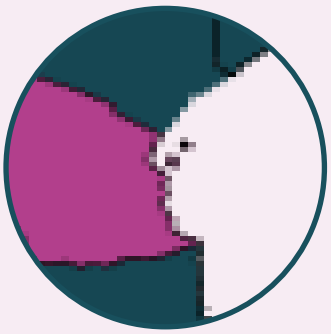
Outcomes

Together, these interventions are intended to improve farmer practices, reduce non-prudent antimicrobial use in farms and residue presence in broiler meat. We will provide measurable data to make a case to policy makers and community actors for sustaining and scaling up the farmer field school programme, if proved impactful.

"Zambia has made some strides in implementation of its AMR National Action Plan and the support from ICARS has come at an opportune time to augment the gains made so far in the fight against AMR."

Dr. Anna Songolo, Permanent Secretary, Ministry of Fisheries and Livestock

Zanzibar Antibiotic Treatment Of Childhood Infections To Improve Health Outcomes (ZAN-TOTO)



ZANZIBAR (TANZANIA)

Project sector
Humans

Project partners
Preventive Services and Health Education, Ministry of Health – Zanzibar

Zanzibar Health Research Institute (ZAHRI)

Mnazi Mmoja Hospital (MMH)
Public Health Laboratory

(PHL)– IdC Pemba Health Improvement Project Zanzibar (HIPZ)

Zanzibar Livestock Research Institute (ZALIRI)

Subject matter experts from CUHAS (Catholic University of Health and Allied Sciences)-Bugando, Tanzania & Global Health Unit (GHU), Rigshospitalet, Denmark

Timescale
1 February 2023 - 31 January 2026

ICARS funding
635,000 USD

Context

Zanzibar is a part of the United Republic of Tanzania and the Zanzibar Action Plan on Antimicrobial Resistance (ZAP-AMR) was developed in 2019, but there is currently no national AMS policy and guidelines. The overall magnitude of AMR in Zanzibar is largely unknown due to limitations in surveillance and research, but infectious diseases are common, and studies have shown that inappropriate use of antimicrobials is common. The Zanzibar AMR situational analysis 2020, showed high levels of antimicrobial resistance to commonly used antimicrobials in both human and animal health. Multidrug resistance patterns were observed for most isolates, with resistance to tetracycline, ampicillin and the third-generation cephalosporin being 100%, 98% and 78%, respectively. Most healthcare workers, particularly nurses and pharmacists, record injectable drugs on drug sheets but do not keep track of oral drugs given to children in wards. In addition, noncompliance with Zanzibar Standard Treatment Guidelines and National Essential Medicines List , as well as treatment without supportive laboratory results, leads to irrational use of antimicrobial agents.

Problem

Clinical information from Mnazi Mmoja Hospital (MMH) and Chake Chake Hospital (CCH) in Zanzibar shows a notable AMR burden in neonates and children with febrile illness and diarrhoea. Although nearly 75% of children were prescribed antibiotics, only a quarter of treatments were justified. Empirical use of antibiotics in these two groups of children is very common, and there is an extremely low utilization of laboratory services to guide rational antimicrobial therapies. Lack of rapid point of care diagnostics at the bedside and streamlined communication between the laboratory personnel and other health personnel (clinicians, pharmacists and nurses) makes coordinated response measures against AMR elusive. Improving neonatal survival and health is a global agenda, as approximately 2.4 million children die in the neonatal period every year.

"The project provides a unique opportunity to tackle antimicrobial resistance by bringing together pediatric and antimicrobial stewardship experts from GHU, Rigshospitalet, Denmark and CUHAS, Tanzania to work with hardworking and committed local team. It will contribute to the Ministry of Health-Zanzibar's vision of building local research and implementation capacities to safeguard children's health, as well as protecting the effectiveness of the antibiotics needed to treat life threatening childhood infections."

Jyoti Joshi
Senior Science Advisor, ICARS

INTERNATIONAL CENTRE FOR ANTIMICROBIAL RESISTANCE SOLUTIONS

Project overview

The project aims to optimize antibiotic use in admitted neonates and children (0-12 years) with febrile illness and diarrhoea by achieving a 30% reduction of inappropriate antimicrobial use. By introducing antimicrobial stewardship programmes including use of a Point of Care C-Reactive Protein (POC-CRP) test as a decision support tool to guide antimicrobial susceptibility testing (AST) in the lab and measuring compliance with the stewardship interventions in MMH, Vitongoji Hospital and CCH over three years of implementation, the project aims to develop a standard for future roll-out in all secondary and tertiary hospitals in Zanzibar. The age groups included are neonates (0-28 days) at risk of or with clinical signs of sepsis, and children (29 days to 12 years) with febrile illness and diarrhoea. The project interventions are designed to provide an implementation model for evidence-based AMS activities specifically using the Plan-Do-Study-Act (PDSA) Model.
The project is divided into five work packages (WPs).

1. A baseline study on the behavioural, clinical, microbiological, policy and economic drivers of antibiotic use, and baseline data of the AMS and AMR burden.
2. Develop, implement and evaluate AMS interventions following the PDSA cycle.
3. Randomised control trial of the introduction of inflammatory marker C-Reactive Protein Point of Care Test (CRP POCT).
4. Develop an economic case for sustaining these initiatives and scaling them up to other tertiary and secondary hospitals in Zanzibar.
5. The implementation of all WPs will be streamlined through a work package on national policy, coordination, and sustainability.

Outcomes

- Improved appropriate antibiotic prescription practices amongst healthcare workers for neonates and children with febrile illness and diarrhoea in MMH and CCH.
- Evidence of the effectiveness of CRP POCT in clinical decision making for guiding antibiotic use for admitted neonates with risk of sepsis, or clinical signs of sepsis and children with febrile illness and diarrhoea at MMH and CCH.
- Inform key stakeholders on the cost and mechanisms for rolling out an AMS programme in tertiary and secondary hospitals.
- Increased resources for sustainability and scale up in tertiary and secondary hospitals based on assessment of AMS barriers and enablers.

"The outcomes of this project will improve rational antibiotics prescription and use and therefore improving effectiveness of antibiotics in the treatment of childhood illness in Zanzibar. The learning from this project will guide intervention in other hospitals in Zanzibar for combating antimicrobial resistance."

Dr Mayasa Ali, Director General, Zanzibar Health Research Institute (ZAHRI), Ministry of Health, Zanzibar

Strengthening biosecurity practices in the poultry value-chain in Zimbabwe, to reduce the use of antibiotics

ZIMBABWE

Project sector
Terrestrial and Aquatic Animals

Project partners
Directorate of Veterinary Services (DVS) – Ministry of Lands, Agriculture, Water, Fisheries and Rural Development

Faculty of Veterinary Sciences – University of Zimbabwe

Veterinary Unit – Medicines Control Authority of Zimbabwe

Agricultural Research Council (ARC)

The Poultry Producers Association of Zimbabwe

Timescale
1 March 2023 -
1 March 2026

ICARS funding
596,872 USD

Context

Zimbabwe launched its first National Action Plan for AMR in 2017, after a situational analysis of AMR in human, animal, and environmental sectors in the country. Findings from the analysis showed significant and growing resistance, including indications of high levels of multidrug resistance in *E. coli* . Antimicrobial use (AMU) in both humans and animals was identified as the main driver for increased AMR. Antimicrobials are widely used in the production of food animals in Zimbabwe and are often available without prescription or veterinary oversight. Stakeholders have expressed concern about the perceived misuse/overuse of antibiotics in food-producing animals due to poor poultry husbandry and biosecurity and there is limited data on AMU and AMR in the livestock sector (FAO AMR/AMU Situational Analysis 2016).

The guiding principle of the NAP is a whole-of-society engagement including a One Health approach. Within the framework of the NAP, the Zimbabwe AMR Core Group (AMRCG), a multi-sectoral group is established to coordinate AMR mitigation activities and strengthen collaboration and information sharing between the human health, animal health, food safety and environmental health sectors. Since the launch, however, there has been slow implementation of the planned AMU/AMR activities mainly due to financial constraints against a background of economic pressures.

Problem

Poultry, especially broilers, is contributing significantly to food and income security of small and medium scale farmers in Zimbabwe. Due to unemployment, more people are venturing into poultry production. Lack of experience and knowledge about good poultry husbandry often causes low productivity and high mortality in the flocks, problems that the farmers attempt to curtail by using antibiotics prophylactically.

"The project reinforces the Government of Zimbabwe's thrust towards strengthening food and nutrition security whilst ensuring that food is safe for consumption. The project addresses the strategic objective 3 of the 'One Health' AMR National Action Plan, which focuses on reducing the need for antimicrobials by improving infection prevention and control, farm practices and biosecurity, water sanitation and hygiene, and immunisation. I am grateful to ICARS for this investment and am optimistic that the project will bring transformation in the small holder poultry sector in the project district areas and will be a strong foundation for future scaling up."

Dr Pious V Makaya,
Director Department of Veterinary Technical Services, Zimbabwe

ICARS INTERNATIONAL CENTRE FOR ANTIMICROBIAL RESISTANCE SOLUTIONS

In the livestock production sectors the usage of antimicrobials remains a challenge to accurately quantify, and large data gaps persist in documenting patterns of antimicrobial use in food producing animals. Antibiotic residues have been reported in meat samples sold from backyard broilers, and in chicken samples analyzed by the Central Veterinary Laboratories in 2012, Multi-Drug Resistance (MDR) was detected in 12% of the *Salmonella* Enteritidis isolates. Furthermore, sales of antimicrobials from agrovet shops and mixing of antimicrobials in feeds are largely unregulated in Zimbabwe.

Project overview

The aim of the project is to reduce AMU in small to medium scale broiler farms by improving biosecurity and animal husbandry practices through educational initiatives. The study will be conducted in three selected districts in Zimbabwe, with small/medium scale commercial poultry farmers. The specific objectives/Work Packages (WP) are to:

1. Evaluate baseline antibiotic use and biosecurity practices, and determine the antibiotic sensitivity of *E. coli* isolated from chickens.
2. Assess the effectiveness of training small/ medium scale commercial broiler farmers on operational and infrastructural biosecurity practices and good animal husbandry practices, through a Farmer Field School (FFS) approach, and evaluate its feasibility and uptake in Zimbabwe.
3. Map the poultry feed supply chain and the type of antibiotic content in broiler feeds in Zimbabwe, with an aim to inform a policy on antibiotic-mixed feeds.
4. Evaluate the social, economic, normative, cultural, and behavioural barriers in optimal uptake of biosecurity training directed at broiler farmers and assess the costs and benefits of implementing the interventions in the Zimbabwean context.
5. Design and implement a roadmap to disseminate the learnings of the project to all the relevant stakeholder groups in the poultry value chain in Zimbabwe.

Outcomes

- Optimised usage of antibiotics in small/ medium scale commercial broiler farms in Zimbabwe, through improved biosecurity and good animal husbandry practices .
- Improved policies and practices that utilise intervention results to sustain rational antibiotic use and adoption of biosecurity and good animal husbandry practices in small/medium scale broiler farms in Zimbabwe.

"This project brings together key stakeholders from the public and private sector with the aim to identify cost-effective and scalable solutions for small and medium scale broiler producers to reduce antimicrobial use. The interventions and capacity development on effective biosecurity and husbandry improvements are expected not only to reduce the current misuse of antimicrobials but also improve the overall poultry health, thereby improving the profitability for local chicken producers."

Dr. Kristina Osbjer,
Veterinary Advisor, ICARS

Field visit to poultry farm, Zimbabwe, March 2023

Improving the management of urinary tract infections in Zambian women through the use of innovative community engagement approaches

ZAMBIA

Project sector
Humans

Project partners
Eden University, School of Pharmacy

Funding partners
Wellcome Trust

Timescale
10 January 2022 – 30 September 2023

ICARS Funding
295,901.90 USD

Context

Following the development of the Zambian National Action Plan (NAP) in 2017, several activities are being conducted that include antimicrobial stewardship programs, surveillance, infection prevention and control, and raising knowledge and awareness among healthcare providers. These are within the scope of an ICARS project which aims to reduce the inappropriate prescribing of antibiotics to treat bloodstream infections and urinary tract infections (UTIs).

Problem

In Zambia, gaps remain in the landscape of antimicrobial resistance (AMR) activities about how best to address public perceptions and practices that drive AMR. This includes identifying and understanding women's antibiotic-seeking behaviour. In Zambia, research has shown that some women with UTI symptoms buy antibiotics from pharmacies that sell them without prescriptions, and only seek medical attention when they do not recover. The complexity of AMR, and the fact that misuse of antibiotics can exacerbate it, is hard for most people to comprehend as it is not a visible condition. In addition, there is little research about AMR and gender in low- and middle-income countries broadly and Zambia specifically.

ICARS INTERNATIONAL CENTRE FOR ANTIMICROBIAL RESISTANCE SOLUTIONS

wellcome

Project Overview

Guided by the Wellcome 'Responsive Dialogues on Drug Resistance Infections' framework and toolkit, this project carried out Responsive Dialogues (RD) in three locations to identify contextually relevant solutions to mitigate AMR in the context of UTIs. RD uses a participatory-based approach to address the gap between local realities and policies by facilitating dialogue, learning and solutions to enable change in attitudes, behaviours, policies, and practices on the use of antimicrobials. Using the approach, stakeholders jointly examine and unpack evidence, data and messages provided by researchers and experts and produce solutions to address the issues, which will inform national policies. The project engaged stakeholders, decision makers and communities affected by or working on UTIs.

Outcomes

The main intended outcomes of this project are:

- Improved understanding of, and engagement with antibiotics and AMR, particularly in relation to UTIs amongst the public and key stakeholders in select communities.
- Co-creation of community-informed solutions and interventions that are policy relevant.
- Record of learnings from the pilot implementation and documentation of potential best practices for using RD to inform and improve One Health-based AMR responses in Africa beyond the health sector.

Results

Key stakeholders have shown increased understanding and awareness of the drivers, attitudes and behaviours in communities regarding antibiotic use and AMR, particularly in relation to UTIs. This was achieved by synthesizing and analysing AMR drivers from the project communities, categorised into five themes: individual, community, gender, health facility, and health system/systemic AMR drivers. These were presented to stakeholders through various meetings, conferences, symposiums, workshops and a policy brief.

The project effectively increased awareness and engagement regarding AMR and UTIs among community members. This was attributed to the innovative RD approach, which fostered learning and awareness about key AMR and UTI issues. The approach helped break some of the myths and misconceptions about UTIs and UTI management. In total, 125 community members (88 females, 37 males) were directly reached, and an estimated 500+ members were indirectly reached.

Following the dissemination of project results, some participants and representatives of health facilities informed the project team that they were able to integrate outcomes into their daily health facility routines, including in educational programmes. Community participants reportedly also changed their attitudes and behaviours concerning antibiotic misuse.

Francisco Venancio, Unsplash

Development of guidelines to facilitate Responsive Dialogues to tackle AMR in LMIC settings

CROSS-COUNTRY

Project sector
One Health

Project partners
The School of Public Health

University of the Western Cape, South Africa

Funding partners
Wellcome

Timescale
February 2023-December 2023

ICARS funding
124,437 USD

Context

The `Responsive Dialogues on Drug Resistant Infections´ approach was developed by Wellcome to support Public Engagement and community leadership. The Responsive Dialogues 'toolkit' has been piloted in Thailand and Malawi in the context of Antimicrobial Resistance (AMR) to generate solutions for addressing AMR that are grounded in local realities and embrace ideas and views from the public.

Guided by the Responsive Dialogues toolkit and supported by Wellcome, ICARS is currently partnering with Eden University in Zambia on a project which carries out Responsive Dialogues to identify contextually relevant solutions to mitigate AMR in the context of Urinary Tract Infections (UTI). The project complements another ICARS project that aims to improve antibiotic prescription practices for treating UTIs and blood stream infections in selected Zambian healthcare facilities via an antimicrobial stewardship programme.

The implementation of the Responsive Dialogues in the different geographical and socio-economic settings provided the opportunity to engage diverse communities in understanding AMR as well as the challenges that accompany this task.

Problem

Lessons learnt from the pilots, and current best practice in community engagement for AMR, public engagement and participatory approaches indicate the importance of scaling up community engagement and the need for a modular toolkit for researchers working in AMR to include communities in their projects. A new project has been launched to incorporate new learnings, and develop a simple set of resources (guidelines and learning module) that is easily accessible for engaging different stakeholders in diverse settings.

"The School of Public Health, University of the Western Cape has since its inception focused on the importance of recognising, profiling and strengthening community capacities and resources and within its purpose has noted that public health policy and practice should be influenced and informed by active communities. We look forward to working in partnership with ICARS and Wellcome to work on these guidelines to further enhance community engagement in tackling AMR, particularly in LMICs."

Dr Hazel Bradley,
Team Lead and Co-Principle Investigator

ICARS INTERNATIONAL CENTRE FOR ANTIMICROBIAL RESISTANCE SOLUTIONS

Project overview

Drawing on the lessons learnt from Responsive Dialogue pilots in Malawi, Thailand and Zambia, this newly announced project will build on the Responsive Dialogues Toolkit to develop guidelines and complementary training modules for facilitating Responsive Dialogues with diverse stakeholders for addressing AMR. The purpose of the guidelines is to empower interested stakeholders (researchers, civil society groups, educators, public health organisations etc) in undertaking the process. It will lay out the steps for facilitating 'Conversation Events' – which are at the core of the Responsive Dialogues approach – clearer, more accessible, streamlined, and relevant to a range of stakeholders in LMIC settings. This project will use participatory and multidisciplinary approaches, drawing on a diverse project team and key stakeholders from health, agriculture, and environment sectors – embracing the One Health spectrum to address AMR priorities.

Outcomes

ICARS intends to use the new guidelines to inform development and where relevant implementation of its projects in LMICs. Facilitating Responsive Dialogues via the guidelines will help to ensure that research projects are tailored to respond to each country's individual needs and challenges, and that interventions are guided by the problems that countries are committed to solve, rather than using a one-size-fits-all approach.

Results

Following a consultative meeting with representatives of all three Responsive Dialogues pilot projects, modular guidelines titled "Responsive Dialogues for Addressing Antimicrobial Resistance: Modular Guidelines and Tools for Community Engagement" and an introductory video have been developed and are publicly available via the ICARS Knowledge Hub. The Responsive Dialogue approach will be implemented in at least two ICARS projects in 2024/ 2025 and we continue to engage with partners to embed community engagement in ICARS projects.

"Community engagement is critical for creating a shared understanding of the scale and impact of AMR on our daily lives, and most importantly, co-creating solutions to tackle it together especially in Low and Middle-Income settings where resources are stretched."

Jyoti Joshi and Katharina Rogalla von Bieberstein, ICARS

Towards an antibiotic roadmap for the sustainable entry and management of antibiotic X (TANDEM-ABX) in low- and middle-income countries

Project sector
Human Health

Country partners
Aga Khan University Hospital Nairobi (AKUHN)

ReAct Africa Network (RAN)

Indian School of Business (ISB)

Christian Medical College Vellore (CMC Vellore)

Funding Partners
Novo Nordisk Foundation (493,600 USD)

Timescale
January 2024 - May 2025

Context

Antimicrobial resistance (AMR) is a growing global health crisis, particularly affecting low- and middle-income countries (LMICs). The diminishing antibiotic discovery pipeline also exacerbates the issue, with limited options of novel antibiotics available. While the need for novel antibiotics is significant in these countries, access and appropriate use remain a major issue.

As an initial measure, improving antimicrobial stewardship (AMS) programmes in conjunction with antibiotic access programmes in LMICs should be prioritised. However, rollout of AMS interventions remain a challenge in many settings, with inconsistent implementation, compliance and competing priorities.

The limited understanding of critical policy levers that help to scale up stewardship, and the exact role of different stakeholders at the national and subnational level, represent a further gap for the successful uptake of AMS. Therefore, there is a need to develop practical pathways to mainstream AMS programmes into the existing national policies and programmes of LMICs, facilitating the introduction of a new reserve class of antibiotics while ensuring their effectiveness and long-term sustainability as a 'global public good.'

Kenya Workshop, May 2024

Project overview

With a planning grant from the Novo Nordisk Foundation (NNF) this project aims to gain a detailed understanding of the current policy and health system contexts in select LMICs to support the development of a sustainable use framework for novel antibiotics. This entails undertaking preparatory activities, such as establishing partnerships with both public and private sectors at the national level and working closely with AMR stakeholders on a global, regional, and local scale to formulate the roadmap.

The preparatory activities will take place in selected countries – India (Asia) and Kenya (Sub-Saharan Africa), leveraging ICARS' existing partnerships with collaborators such as ReACT Africa Network (RAN) and other significant global AMR stakeholders.

Objectives

1. Establish a coordination Secretariat to undertake joint research and planning
2. Scope activities at a country level to gauge interest and generate buy-in of TANDEM-ABX
3. Identify potential partners/stakeholders for TANDEM-ABX
4. Undertake global level consultation and forward planning for TANDEM-ABX

Outcomes

This Planning Grant will enable ICARS to advocate for and develop a proof of concept for the TANDEM-ABX framework, as well as establishing strategic partnerships with local stakeholders, including institutions in the public and private sectors in LMICs.

India Workshop, November 2024

Data-driven implementation of behaviour change in Antimicrobial Stewardship in Low- and Middle-Income Countries (drive-AMS LMICs)

CROSS-COUNTRY

Project sector
One Health
Humans

Funding partners
Radboudumc, Nijmegen, The Netherlands (150,000 USD)

Timescale
1 January 2023 - 31 December 2025

ICARS funding
300,000 USD

Context

The burden of infectious diseases and spread of antimicrobial resistance (AMR) affects Low-and Middle-Income Countries (LMICs) more severely, with the African region having the highest death rate attributable to AMR.

Problem

Despite limited resources, most LMICs are trying to address AMR in the health sector through evidence-based strategies such as setting up of antimicrobial stewardship programmes (ASP). In existing training programmes, a lot of emphasis is placed on the 'WHAT' of AMS, and little attention is generally paid to the 'HOW' within an ASP: HOW to make sure that professionals comply to the 'WHAT' recommendations.

This usually requires a behaviour change approach, including understanding the determinants of antibiotic use, practical skills on how to implement AMS interventions and sustainably act upon these in an institutionalised way.

There is an identified growing need for ASP implementation-oriented support for AMS programmes for LMICs.

Project overview

The overall aim of the drive-AMS LMICs project is to ensure sustainable and long-term capacity in LMICs for Antimicrobial Stewardship in human health with a One Health perspective and applicability.

The AMS masterclass & SPICE expert consultancy (drive-AMS) is an implementation programme with expert consultancy support through the Specialized Programme on Infectious Disease Care Everywhere (SPICE) expert registry. The goal of drive-AMS LMICs is to guide professionals and policy makers through the process of developing and implementing a successful ASP in their hospital, healthcare system, region, or country.

ICARS INTERNATIONAL CENTRE FOR ANTIMICROBIAL RESISTANCE SOLUTIONS

"Addressing AMR requires use of implementation science and innovative models of behaviour change. Our proven approaches to support national capacities focus not just on teaching how, but more importantly, on providing expert support for implementation on the ground."

Programme leads Dr Heiman Wertheim and Dr Jeroen Schouten, Radboudumc

Drive-AMS LMICs combines knowledge transfer and implementation into one programme to enhance the impact of data-driven training and sustainable AMS implementation, through:

- understanding AMS principles (BASICS, the WHAT);
- delivering 4-day AMS implementation masterclass on the HOW of AMS, and developing AMS intervention;
- providing 6-month post-course expert support (through the SPICE registry) for implementation.

The programme will be adapted to different LMIC contexts, together with experts from recipient countries.

Outcomes

This project aims to provide sustainable solutions through the following outcomes:

- Providing training and teaching tools adapted to LMIC contexts, transposing best practices from resource-rich to resource-constrained settings for AMS;
- Building sustainable in-country capacity for delivery of contextualised courses in AMS, that are accredited, of high quality and affordable for the national economy and circumstances;
- Ensuring structured and cost-effective expert support for implementation of AMS by building a registry of existing experts in the country and region in specific areas of AMS (SPICE LMICs registry).

Results

The first regional course was held in Moshi, Tanzania, 8-11 November 2023.

39 participants from 10 hospital teams (link to social media update about this?:

- 5 teams from Tanzania,
- 2 teams from Rwanda
- 1 team from Uganda
- 2 teams from Zimbabwe

During the course the teams were trained on the principles to implement a context-specific antimicrobial stewardship program, and they got the opportunity to design a small-scale quality improvement AMS program in their hospitals with feedback from the faculty.

"The Dutch AMS Masterclass & SPICE expert consultancy developed and delivered by Radboudumc is an excellent resource that can assist in changing behaviour and practice in human use of antimicrobials, while helping to help build national capacity for expanding and maintaining AMS programmes."

Dr Mirfin Mpundu
Regional Lead Africa, ICARS

Establishing a Center of Excellence for Antimicrobial Susceptibility Testing

KENYA

Project sector
One Health

Project partners
International Livestock Research Institute (ILRI)

European Committee on Antimicrobial Susceptibility Testing (EUCAST) Development Laboratory

Start date
June 2021

ICARS funding
168,586 USD

Context

Antimicrobial Susceptibility Testing (AST) of microorganisms is essential for determining which antimicrobials could be effective treatment options in human and veterinary medicine. It is essential both for targeted treatment as well as for empirical treatment. Reliable AST capacities are also necessary for local, national and regional authorities to understand the circulating resistance levels and patterns in a particular district, county, or country and is therefore critical for good antimicrobial stewardship.

AST can be done either by phenotypic methods or predicted from genotypic data. AST results are translated into categories of the expected effect of a given antibiotic for a particular microorganism as susceptible, intermediate or resistant (S/I/R) or susceptible and non-susceptible (S/NS) by means of breakpoints.

Problem

Reliable AST is a prerequisite for the appropriate treatment of infections in humans, livestock and aquaculture. This is increasingly true with the increased antimicrobial resistance (AMR). Furthermore, surveillance of AMR development requires good quality data. However, continuous delivery of accurate AST results has proven difficult for routine laboratories all over the world. Without appropriate training, experience and proper equipment, there will be inconsistencies in interpretation of AST results, even when reliable and standardised methods are used. A range of questions regarding testing and interpretation of test results frequently arise. There is need for continuous training and hence a training center to expand expertise in AST as well as to provide much-needed support to laboratories when discrepancies or challenges arise.

"AMR is a major One Health challenge that could threaten millions of lives and livelihoods worldwide and this unique partnership will contribute to preventing the threat of AMR through capacity development and solutions tailored to LMICs."

Jimmy Smith, Director General,
International Livestock Research Institute

ICARS INTERNATIONAL CENTRE FOR ANTIMICROBIAL RESISTANCE SOLUTIONS

Project overview

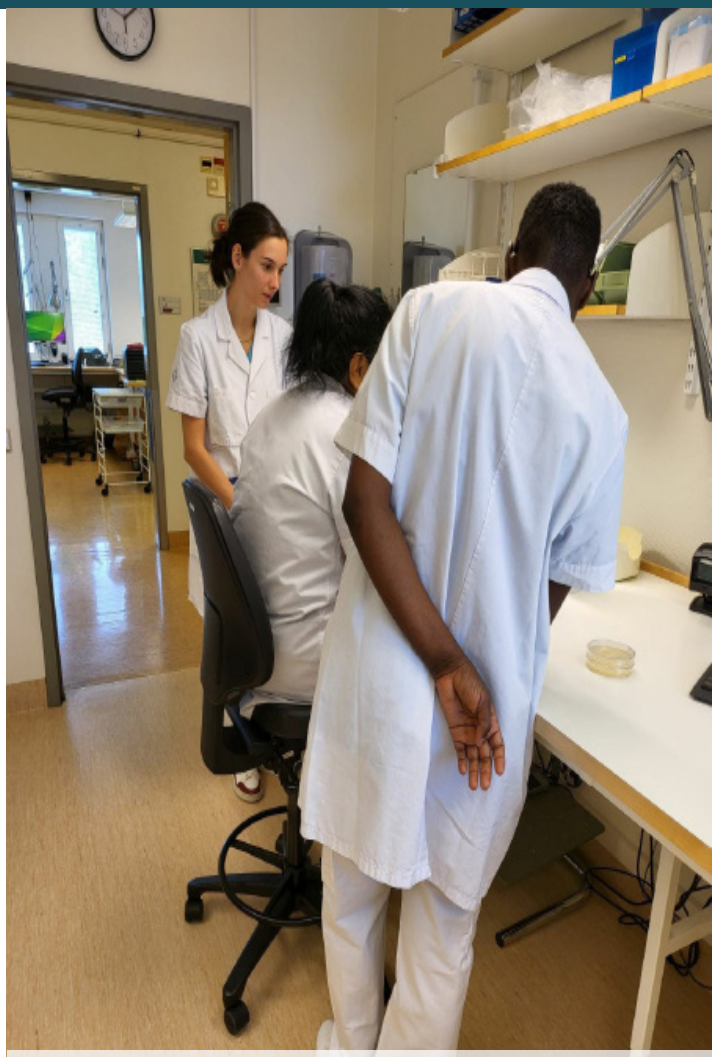
This project will establish an AST Center of Excellence for serving countries in Africa, covering pathogens in humans, livestock and aquaculture. The Center will support both human and veterinary clinical microbiology laboratories in Africa in all aspects of AST, including the development of standard operating procedures, offer training, provide support for troubleshooting, and perform comparison and quality control across manufacturers.

The Center will also contribute to breakpoint setting by providing MIC distributions for antimicrobial-microorganism combinations with a focus on pathogens from humans, livestock and aquaculture. A skilled AST Center in Africa would fill a gap in the region, provide training and advice for laboratories in LMICs, and support quality-assured AST across One Health projects. This would also increase the ability to produce robust AST data that can be compared with that of other laboratories and submitted to global surveillance programmes.

It is anticipated that the Center will become a regional reference laboratory and training center for LMICs in Africa, with the capacity to conduct regular trainings on AST to technicians from other laboratories, and to provide technical support for troubleshooting on an ongoing basis. The Centre will be placed within the state of the art laboratory facilities at the International Livestock Research Institute (ILRI), in Nairobi, Kenya, which hosts the CGIAR Antimicrobial Resistance Hub and also hosts a Capacity Development Unit.

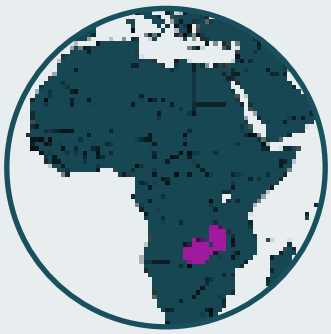
Outcomes

- The development of a regional reference laboratory with evidence-based competence in AST methodology
- The development of a reference AST strain collection
- Several open workshops on AST methodology, with 10-20 participants from several African laboratories
- Development of a standardised curriculum
- A capacity of 3-5000 diagnostic/project samples processed per year



AST training course at the EUCAST Laboratory in Sweden, attended by individuals from ILRI and NCDC, Georgia.

Supporting National Action Plans on antimicrobial resistance in Africa through contextualised tools for implementation research



ZAMBIA

Project sector
One Health

Country partners
ReAct Africa

Timescale
1 September 2021 - 30 March 2024

ICARS funding
255,207 USD

Context

Most countries globally have drafted National Action Plans (NAPs) for AMR across the One Health spectrum, but many are however struggling to implement the proposed activities as part of these NAPs. The challenges surrounding implementation vary between countries and can include: limited coordination of activities, lack of financial and human resources to implement activities, limited situational analysis on AMR in countries etc.

Problem

In Africa, NAP implementation is challenged by the limited availability of context specific tools and guidance to help countries prioritise and implement NAP activities.

Project overview

This project aims to develop and disseminate practical context-specific guidance and applied tools to support NAP implementation in low- and middle-income countries (LMICs), with a focus on the African context. This will include a standardised process for conducting situational analyses validated in Zambia, as well as other new and adapted tools and outputs.

Outcomes

ReAct has gathered multiple tools in the 'ReAct Toolbox' to help support countries implement their NAPs. There is a need to assess existing tools to understand their utility, and then identify and fill gaps to support NAP implementation through clear and specific guidance. This project aims to improve the ability for African countries to implement challenging sections of their NAP through relevant and tailored guidance within national or sub-national contexts.

"ReAct Africa is uniquely placed to identify the gaps and needs of African countries to help implement their National Action Plans on AMR. ICARS is privileged to co-develop this work with them."

Annick Lenglet, Science Team Lead, ICARS

"Translating policy into action requires context specific tools addressing local challenges in LMIC."

ReAct Africa

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