Understanding and building the gender intersectionality landscape for the prevention of antimicrobial resistance in Sierra Leone-The UB-GILPAR Project

Principal Investigator: Dr. Sulaiman Lakoh

Abstract

Background: The main goal of this project is to strengthen intersectoral collaboration in the prevention of antimicrobial resistance (AMR) using a one health approach. The project will create a platform to understand gender intersection with other demographic dimensions and socio-economic perspective at a human, animal and environmental sector interface in AMR prevention in Sierra Leone. The project's overall outcome is establishing a coordinated AMR prevention framework that defines gender intersection with other demographics, social and economic dimensions in Sierra Leone.

Methods: We will achieve this goal by conducting desk review to inform a qualitative study on gender intersectionality in AMR prevention using an impact pathway logic model as an analytical framework (Anderson et al., 2011). We will find out what works (outcomes and impacts of AMR interventions on gender intersectionality)? How (strategies and outputs, type of governance approach and specificity of interventions on AMR prevention)? Whom (actors, organizations, type of activities)? And why (barriers/failures, opportunities/key success factors on AMR prevention)? The findings from the qualitative study will be used to train stakeholders and develop a road map on gender intersection with other demographic and socio-economic dimensions in AMR prevention in Sierra Leone.

Location: Western Area of Sierra Leone

Timeline: January 2024 and February 2025

Scientific background and state of the art

AMR is a growing public health problem. In a recent global estimate, AMR is responsible for about 4.5 million deaths worldwide, with the highest death rates in West Africa (Murray et al., 2022). Many low-income countries, such as Sierra Leone, do not have sufficient resources to undertake interventions to prevent AMR ((Cox et al., 2017). These gaps may have contributed to the deep-rooted challenges in this field, including inappropriate use of antibiotics in humans (Lakoh et al. 2022; Lakoh et al. 2023), and high prevalence of multidrug-resistant pathogens in humans and animals of Sierra Leone (Lakoh et al., 2020; Mansaray et al., 2022).

Sierra Leone, a low-income country in West Africa, has been affected by major public health emergencies, including the largest Ebola outbreak [GoSL, 2015]. Before the 2014-2016 Ebola outbreak, the country had no multisectoral response system to prevent AMR. Consequently, the government established a One Health coordinating system to guide multi-sectoral response to emerging global health threats such as AMR in 2020. However, this development has not changed the country's multisectoral approach to AMR prevention. There is little information on the AMR prevention landscape in the country. A recent way to understand complex health issues such as the threat posed by AMR is to apply the concept of intersectionality. The concept of intersectionality describes the ways in which systems of inequality based on gender, sexual orientation, disability, gender identity, class and other forms of discrimination “intersect” to create unique dynamics and effects, particularly on health. Gender inequalities in health has been recognized as critical in addressing complex challenges in health (Annandale et., al 2020, Heise et. al 2019, Campos-Serna et al. 2013), including addressing the threats posed by AMR. The interaction of human biology and socio-cultural norms and beliefs make women more susceptible to AMR. Women's exposure to AMR and antimicrobial use (AMU) is higher during pregnancy, menstruation, childbirth

and abortion. In addition, young women face higher risk of contracting sexually transmitted infections (STIs) and other diseases (Batheja et., al, 2022, Jones et al. 2022).

All forms of inequality are mutually reinforcing and must therefore be analysed and addressed simultaneously to prevent one form of inequality from reinforcing another. For example, tackling the gender pay gap alone – without including other dimensions such as socio-economic status – will likely reinforce inequalities among women. Thus, the relevance of this project.

Research objectives and specific aims

The main goal of this project is to strengthen intersectoral collaboration on the prevention of AMR at a human-animal-environment interface using a one health approach. The project will create a platform to understand gender intersection with other demographic dimensions and social and economic diversity in AMR prevention in Sierra Leone in line with the objectives of the National Science, Technology and Innovation Council (NSTIC) of Sierra Leone. The overall outcome of the project is a coordinated AMR prevention framework that defines gender intersection with other demographics, social and economic dimensions in Sierra Leone. Our specific aims are:

- **Objective 1:** To understand gender intersectionality in the AMR prevention landscape by mapping existing structures and capacity for AMR prevention through desk reviews, key informant interviews, and stakeholder engagement. We hypothesize that there are various stakeholders with a different social, demographic and economic background in the field of AMR in Sierra Leone but these are not currently known. These stakeholders will be known with our intervention. The proposed output for this phase is a defined gender intersectionality framework in the AMR prevention landscape in Sierra Leone. The outcomes of this objective are **1)** a defined gender intersectionality framework in the AMR prevention landscape in the Western Area of Sierra Leone and **2)** Manuscript with a proposed title 'Gender intersectionality with other dimensions in AMR prevention landscape in Sierra Leone: a qualitative study'
- **Objective 2:** To build the capacity of stakeholders working on the AMR space in the Western Area of Sierra Leone. We will use the information generated from the landscape analysis to build the capacity of AMR stakeholders through training. Our proposed output for objective 2 is an informed AMR prevention stakeholders in Sierra Leone.
- **Objective 3:** To develop a road map for gender intersectionality in AMR prevention in Sierra Leone. We will build a consensus and define a road map on AMR that takes into consideration the intersection of gender and other demographic dimensions with social and economic diversity of AMR prevention in Sierra Leone. Our proposed output is a road map for gender intersectionality in AMR prevention in Sierra Leone.

Description of the project

1. Project design and study duration

The project will use a longitudinal approach with a timeline spanning 14 months (January 2024 to February 2025), focused on understanding and improving the AMR prevention landscape in the Western Area of Sierra Leone. We will build upon the groundwork laid by our existing initiatives such as the Western Area Antimicrobial Stewardship Program (Lakoh et al. 2023). We will employ an impact pathway logic model as an analytical framework, derived from Anderson et al. (2011), to dissect the factors that contribute to gender intersectionality AMR prevention. This model will guide us in answering research questions such as:

- What works in AMR prevention (e.g., Successful interventions for treating STIs and thereby reducing inappropriate antibiotic use)?
- How are these interventions executed (e.g., Training of healthcare professionals)?

- By whom are they implemented (e.g., Government ministries, department and agencies, NGOs)?
- Why do they work or not work (e.g., Community engagement, funding)?

2. Study settings

Sierra Leone has an estimated 8 million people, 42% of whom are under 15 and over 50% are women (SSL 2015). It is a poor country with an income per capita of $410 in 2022 [IMF 2023]. The country has five geographic regions, including the Western Area (urban and rural), which is the most densely populated region with about 1.5 million people and includes the capital, Freetown (SSL 2015).

The country established a national AMR program and one health coordinating platform in 2018 and 2020, respectively. After consultation with several stakeholders in Sierra Leone, the Western Area of Sierra Leone was selected for the implementation of the project in the midst of little resources as it provides a central role in the implementation of health activities in the country.

3. Sample size

We will use a heterogeneous, horizontal sampling approach using maximum sampling variance and an actor network theory. This means that we will 'follow' each AMR prevention intervention to identify those who created, implemented and were impacted by it (O'Neill et al. 2014). We will interview ≥10 AMR prevention stakeholders for each case using the impact pathway logic model (Anderson et al. 2014). We will query whether and how gender intersection considerations were embedded in policy development, implementation or evaluation. We will continue sampling until the case has been fully described and no new relevant actors are identified.

4. Study population

The project will evaluate individuals, institutions or organizations and youth groups working in the field of AMR prevention to understand gender intersectionality in Sierra Leone.

5. Sampling method

The project will be implemented in three phases as shown the framework in Appendix 1.

- **Phase I: Analysis of the AMR prevention landscape**

In phase I, we will use the impact pathway logic model to determine gender intersectionality in the AMR
prevention landscape through desk reviews, stakeholder meetings and key informant interviews. We plan to map stakeholders under the human, animal and environmental domains in the public and private, including healthcare workers, livestock and wild life farmers, engineers, environmentalists, civil society groups, youth-led organizations, non-governmental and community-based organizations, government ministries, departments and agencies and other policy makers and implementers that are critical in AMR prevention.

We will review the existing literature to examine the AMR policy and implementation environment using a gender perspective. The information generated will be disaggregated by age, sex and other demographic and social variables and coded to inform the key informant interviews and further mapping of the stakeholders. Thereafter, we will develop a protocol using purposeful and snowball sampling techniques to identify stakeholders and conduct in-depth interviews to understand the scope of gender considerations in AMR activities in Sierra Leone. Through their experience narratives, we will explore themes such as gender disparity in AMR prevention. We will analyze and hold stakeholder meetings to validate the findings and identify gaps in gender intersectionality in AMR prevention. The proposed output for this phase is a defined gender intersectionality framework in the AMR prevention landscape in the Western Area of Sierra Leone.

- **Phase II: Meeting to train stakeholders in the field of AMR and disseminate the findings**

During this phase, we will use the findings from the landscape analysis to train and create awareness about AMR prevention among stakeholders. We will also use this meeting to disseminate the findings from this study. Our proposed output for aim 2 is an informed AMR prevention stakeholder in Sierra Leone.

- **Phase III: Build a consensus and establish a road map on AMR prevention in Sierra Leone**

In the last phase, we will engage stakeholders to build a consensus and map actionable strategies that address gender intersectionality and other gaps in AMR prevention. We will map strategies under gender mainstreaming in AMR, impact of climate change on AMR, advocacy, community engagement, governance and leadership, and research, development, and innovation**.** Our proposed output is a road map for gender intersectionality in AMR prevention in Sierra Leone, including mainstreaming performance measures into one health to track sustainability.

6. Data collection

To facilitate our key informant interviews, we will conduct a desk review of grey and peer reviewed literature to identify similar studies querying gender intersectionality in AMR prevention. We will use these studies to inform the development of an interview guide. We will also use the intersectionality-based policy analysis framework to inform questions on how gender intersectionality in AMR prevention was prioritized, decided, implemented, and evaluated. We will collect participant demographic information (occupation, years in practice, role in AMR decision making, organization, age, gender, social and economic status).

Consenting individuals will participate in a single, semi-structured 60–90-minute key informant interviews by experienced qualitative researchers. Interviews will be offered in local languages, and data will be translated to English prior to analysis and transcribed verbatim. Interviewers will take detailed field notes during interviews.

7. Data management and analysis

We will assign a unique ID to all participants. Participants names will not be included in the transcripts. Audio files of the key informant interviews will be stored on a secured computer before transcription. Transcriptions and audio files will only be accessible to the study team. Any paper copies will be stored in a locked filing cabinet. Audio files will be permanently deleted after transcriptions are complete. The anonymized written transcripts will be stored for a minimum of 10 years.

Summary statistics of the findings of the key informant interviews will be generated for demographic variables to gain insights into the diversity of the study groups. Interview data will be coded using open and axial coding to generate themes. Two experienced researchers will independently read three transcripts from each unit of analysis to gain familiarity with the content and conduct open coding to develop a codebook. Each research duo will double-code 20% of randomly selected transcripts. Coding discrepancies between -1 and 0.7 will be discussed and resolved by coders; a third reviewer will resolve disagreements. We will continue double coding sets of n=3 interview transcripts until interrater reliability is ≥0.70. The remaining transcripts will be singled coded using thematic analysis. We will report our findings using a gender intersectionality lens, which is relatively nascent in qualitative methods but aligns well with our study methods.

8. Quality assurance

Involvement of various country experts on AMR in developing this proposal is the initial measure to improve the quality of the proposed research work. All the collaborators rigorously scrutinized the developed proposal.

Despite this initial mapping of stakeholders, further mapping will be carried out prior to the commencement of the research work. Following mapping, all the stakeholders will be engaged to review, standardize, and validate the study protocol and tools.

The study guide for the key informant interviews will be pretested and corrections will be made for minor errors. Training will be provided to the research team, and effective supportive supervision will be carried out at all stages of the research work.

The study team will adhere to all ethical protocols and follow standards and norms at every research stage. Data generated from this study are going to be appropriately managed. The authors will make appropriate declarations where they are needed prior to dissemination of findings.

Sustainable Health System (SHS) will appropriately manage the allocated financial resources for the research work. The internal audit of SHS will periodically review the management of the financial resources of the research project. Where an inevitable risk is anticipated, the research team will communicate this to NSTIC, clearly stating the possible mitigation strategies.

At the end of the project, financial as well technical reports will be prepared and submitted to NSTI. SHS and the research team welcome any request from NSTIC to carry out an external audit evaluation of the project implementation during and after its expiration.

9. Disseminated results and publication.

We will publish our findings in Open Access peer-reviewed journals and present them at national and international conferences where relevant. We will also summarize the findings and report them to the Sierra Leone Ethics and Scientific Review Committee and the Scientific Committee of Sustainable Health Systems (SHS).

We will publish our findings in open-access peer-reviewed journals according to the Equator network guidelines (e.g., STROBE). Internationally, we will engage with NSTIC to identify suitable forums for dissemination. We aim to produce multiple modes of information dissemination and methods to ensure relevant ministries, departments and agencies, other partners in the one health platform, participants and communities can access the study findings, including information leaflets, social media, and policy briefs.

Finally, we have proposed a training and dissemination meeting during the project implementation to make stakeholders well-informed about the findings and AMR in general.

Significance, importance, innovation, and potential benefit

Globally, there are major gaps in knowledge on gender intersectionality in AMR prevention. A PubMed search in October 10, 2023 using the term 'gender intersectionality in antimicrobial resistance' revealed only two articles and none reported information on gender intersectionality in the context of one health (Wemrell et al. 2022; Gautron et al. 2023). We have proposed an innovate project that will leverage the one health platform to understand and build gender intersectional landscapes and address inequalities and disparities in AMR prevention in Sierra Leone. Our proposal development engaged female and male collaborators in the one health framework, demonstrating the ability of women to take leadership roles in AMR prevention in a low-income country. A private-public sector interface will be created through the one health platform.

Our project is creative in that innovative approaches such as the use of technology to aid appropriate antimicrobial use and online mentorship services will be the bedrock of the AMR prevention landscape analysis. Another uniqueness of this project is the local ownership of a landscape analysis in AMR prevention in a low-income country like Sierra Leone.

Applicability-Expected uses and future technological development

In anecdotal discussions with Sierra Leoneans in the field of AMR, they hypothesize that the activities of AMR prevention among different stakeholders are sub-optimal because many do not have sufficient capacity to implement AMR prevention activities. Evidence from a scoping review has shown that one health approaches enhance strategies to prevent global health threats such as AMR (Robbiati et al., 2023). Furthermore, the intersection of gender and other demographic dimensions with social and economic dimensions in AMR prevention on AMR in Sierra Leone are unclear. Therefore, it is important to understand and build the AMR prevention landscape. Knowing more about the AMR prevention landscape has important public health implications for addressing disparities, including intersectional gaps between gender and other dimensions and climate change.

The planned step-by-step approach to understanding and framing the gender intersectional landscape in the Western Area will provide innovative learning tools for national AMR landscape analysis in Sierra Leone and other low-income countries. This project will develop a framework that will strengthen multi-sectoral collaboration in the prevention and control.

Project governance and partnership

The AMR landscape analysis will be implemented by Sustainable Health Systems (https://www.shssl.org/), which is a not-for-profit organization based in Sierra Leone, committed to generating evidence-based solutions tailored to the local healthcare landscape. The focus of SHS is on meeting the specific needs of healthcare users, managers, and policymakers through robust research and effective collaboration. **The Principal Investigator:** Dr. Sulaiman Lakoh –Specialist Physician/Infectious Disease Consultant. Dr. Sulaiman Lakoh is a specialist physician with an advanced medical degree in internal medicine and infectious disease and has over fifteen ten years of experience working with the National AMR, HIV and TB Programs of Sierra Leone supporting the development and implementation of policies. As the Executive Director of Sustainable Health Systems, his work has been funded by the NIHR, Canadian Institutes of Health Research, Pfizer, the International Society for Infectious Diseases, and the World Health Organization Special Program for training and research on tropical diseases to test and implement interventions designed to improve clinical outcomes for people affected by infectious diseases. To date, he has published more than 74 articles on infectious diseases in Sierra Leone and across Africa. **Co-PI:** Dr Matilda N. Kamara is a medical doctor and alumnus of the World Health Organization Structured Operational Research Initiative (SORT IT). She has over 2-year experience with research related to antimicrobial resistance and has published more than 9 articles on PubMed and 5 more in press. Her recent implementation investments have included – rolling out implementation research on Carbapenem resistance *Enterobacteriaceae* in West Africa. **Project Coordinator:** Baihah Molleh-With more than 10 years of experience in mixed-method research, Bailah currently works at Sustainable Health Systems Sierra Leone as a Research Administrative Coordinator. In this role, he has mastered project coordination, data management, and stakeholder engagement, overseeing monitoring and evaluation processes specializing in public health and malaria interventions. Utilizing platforms like REDCap for data capture and Atlas.ti and NVivo for data analysis, Bailah's work has been pivotal in translating qualitative research into actionable policy recommendations.

SHS will partner with the National Focal and deputy Manager for AMR and Disease Surveillance Programs of the Ministry of Health to implement this program. A member of the grant team will leverage the data generated from this grant for his dissertation.

Sustainability plan

This project will complement our previous efforts on AMR prevention in Sierra Leone, including the surveillance of healthcare-associated infections in two secondary hospitals in the Western Area, the Carbapenem-Resistant Enterobacteriaceae in West Africa, and the Western Area Antimicrobial Stewardship Program. Our proposed road map for gender intersectionality in AMR prevention in Sierra Leone will mainstream performance measures into the one health platform to track sustainability. Like our antimicrobial stewardship model at the national referral hospitals, our AMR landscape analysis will be institutionalized into the national AMR and one health coordinating platforms.

Gantt Chart

AMR Landscap Scooping in Sierra Leone

Years	Year 1				Year 2			
Quarters	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Project Planning and Initialization								
Ethics Application								
Desk Review and Protocol Development								
Qualitative Research and Manuscript Writing								
Stakeholder Engagement and Capacity Building								
Roadmap Development								
Report Preparation and Submission								
Dissemination and Training								

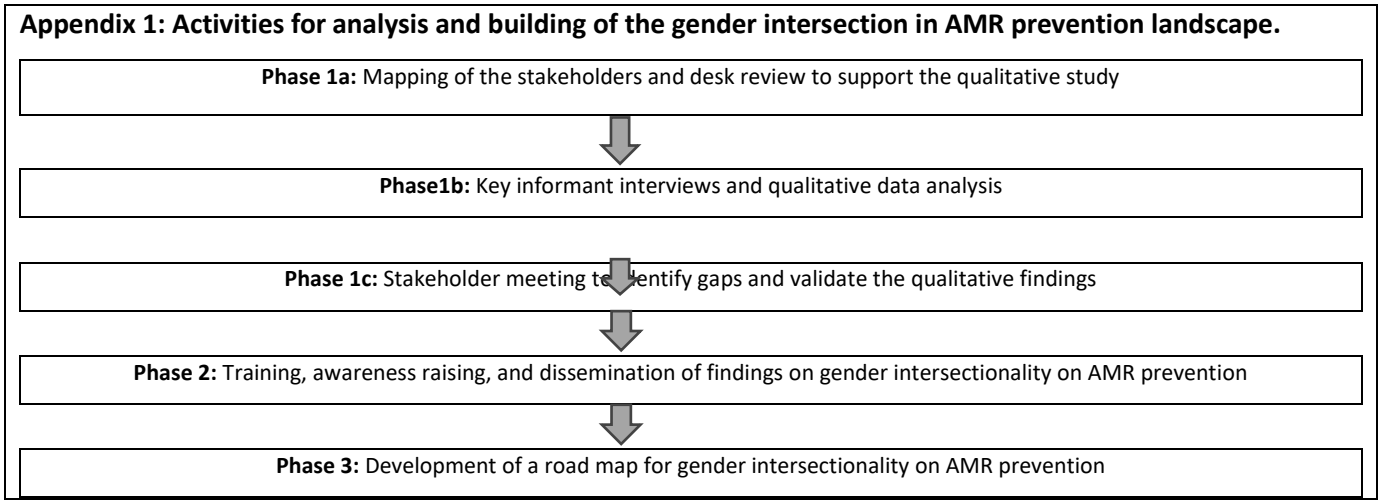
Budget and Work Plan

Budget Categories	Sub-Categories	Description	Unit Cost (USD)	Units	Total Cost (USD)	Justification	Funding Source
Personnel							
	Principal Investigator	Sulaiman Lakoh, 20% FTE	-	24	-	Role: Oversee the project, responsible for decision-making	SHS
	Technical Support and Statistician	Joseph Sam Kanu, 5% FTE	-	24	-	Role: Provide technical and statistical support	SHS
	Other Technical Support	Darlinda Fatmata Jiba, Matilda N. Kamara, 5% FTE each	-	24	-	Role: Provide technical support	SHS
	Project Coordinator	Umu Barrie, 40% FTE	-	24	-	Role: Overall coordination of the project	SHS
	Social Scientist and Data Analyst	Bailah Molleh, 25% FTE	-	24	-	Role: Coordinate and support the desk review and qualitative research	SHS
Sub Total SHS staff					0		
Ethical Approval	Ethics approval	Ethical application	500.00	1	500.00	Application for ethical approval from Sierra Leone Ethics and Scientific Review Committee	Project

Stationaries	Stationary cost	For trainings and workshops	1,000.00	1	1,000.00	Stationaries for running of the office and workshops	Project
Qualitative Research Key Informant Interviews	Transcription	Transcription of KIIs	50.00	40	2,000.00	40 KII interviews will be conducted, and record transcribed	Project
	Coding of Transcripts	Coding and categorization	20.00	40	800.00	The research coordinator will code the transcribed transcripts using Nvivo	Project
	Transportation	Internal transport	20.00	30	600.00	A Data collector will be hired for a total of 30 days to conduct Key Informant interviews in Wester Area urban.	Project
	Communication	Communication during data collection	3.00	30	90.00	Communication allowance for participant recruitment and coordination	
	Software Licenses	NVIVO qualitative data analysis software	499.00	1	499.00	For data analysis	Project
	Recorder	Digital tape recorder For the KII interviews	126.00	1	126.00	For recording of Key informant interviews	Project
Sub Total					**5,615.00**		
Stakeholder Engagement Workshops	Hall rental	Costs associated with organizing workshops	405.00	5	2,025.00	For Workshop	Project
	Tea break	Costs associated with organizing workshops	840.00	5	4,200.00	5 workshops will be conducted, and each will target 70 people	Project

	Launch	Costs associated with organizing workshops	1,190.00	5	5,950.00	5 workshops will be conducted, and each will target 70 people	Project
	Transportation reimbursement FT	Costs associated with organizing workshops	600.00	5	3,000.00	5 workshops will be conducted, and each will target 70 people	Project
	Transportation reimbursement-Provincial	Costs associated with organizing workshops	1,200.00	5	6,000.00	5 workshops will be conducted, and each will target 20 people from the provinces	Project
	Accommodation	Costs associated with organizing workshops	2,000.00	5	10,000.00	5 workshops will be conducted, and each will target 20 people from provinces	Project
	Rappatuer	Costs associated with organizing workshops	100.00	5	500.00	To capture key discussion points and produce a report at the end of each workshop	Project
Sub Total					**31,675.00**		
Dissemination	Publication Fees	Fees for publishing in open-access journals	2,000.00	1	2,000.00	To make findings publicly accessible	Project
	Media Coverage	Covering of the dissemination event	500.00	1	500.00	To cover the dissemination workshop	Project
Sub Total					**2,500.00**		
Total Budget					**39,790.00**		

Appendix 1: Activities for analysis and building of the gender intersection in AMR prevention landscape.



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