

# POLICY BRIEF

## *Generation of Environmental Health Antimicrobial Resistance (AMR) Data and Incorporation into the Integrated National Environmental Health Surveillance System (INEHSS) in Nigeria's Environment Sector.*

### EXECUTIVE SUMMARY

Effective control of antimicrobial resistance (AMR) needs to be multi-sectoral with various approaches. There has to be policies that give guidance for the AMR control strategies implemented at the field and laboratory levels. The laboratory needs to have requisite skilled human and material resources to generate quality AMR data, analyse and report/disseminate same to stakeholders for evidence-based decision making.

To this end the Fleming Fund Country Grant II (FFCG II) has supported the Federal Ministry of Environment (FMEEnv) and its departments and agencies to develop the Antimicrobial Resistance (AMR) Surveillance Strategy, conduct a laboratory baseline assessment for the National Environmental Standards and Regulations Enforcement Agency (NESREA) laboratories in Port Harcourt, Kano and Lagos, supply of consumables and reagents to the NESREA Port Harcourt laboratory, training of laboratory staff on WHONET, AMR active surveillance and Quality Management Systems (QMS) and development of the Integrated National Environmental Health Surveillance System (INEHSS).

There also was also training on AMR mitigation for 12 high-burden states, which were selected based on sanitation-related outbreak histories and existing environmental surveillance infrastructure. Key stakeholders and collaborators have been identified, which include Ministries, Departments and Agencies (MDAs) involved with human health, agriculture, livestock, food safety and environment, the private sector, donors and partners.

All these activities are in consonance with the One Health AMR National Action Plan 2.0 (2024 – 2028) and the FFCG II work plan. The goal of this support is to improve the generation of the quality and quantity of AMR data, analysis, reporting and dissemination of the data/information to implementers and policy makers as well as other stakeholders.

# INTRODUCTION

AMR in the environment is a significant component of a growing global health crisis. The overuse and misuse of antibiotics in human medicine, agriculture, and animal husbandry contribute to the spread of resistant bacteria in the environment, and contaminated water, soil, and air serve as reservoirs for antimicrobial-resistant genes, increasing the burden on public health.

## Drivers of AMR in the environment include:

- Effluent from pharmaceutical industries, hospitals and livestock farms
- Manure from livestock farms and abattoir waste
- Wastewater treatment gaps
- Airborne spread

At the global level, AMR issues are tackled by the quadripartite – the Food and Agriculture Organisation of the United Nations (FAO), World Organisation for Animal Health (WOAH), World Health Organisation (WHO) and United Nations Environment Programme (UNEP).

In Nigeria, under the auspices of the Fleming Fund Country Grant II (FFCG II), the key Ministries of Health and Social Welfare (FMHSW), Agriculture and Food Security (FMAFS), Livestock Development (FMLD) and Environment (FMEnv) are implementing activities to curb the menace of AMR. The key Ministries, Departments and Agencies (MDAs) and other stakeholders involved in the implementation of AMR activities in Nigeria operate under the One Health (OH) AMR governance structure shown below.

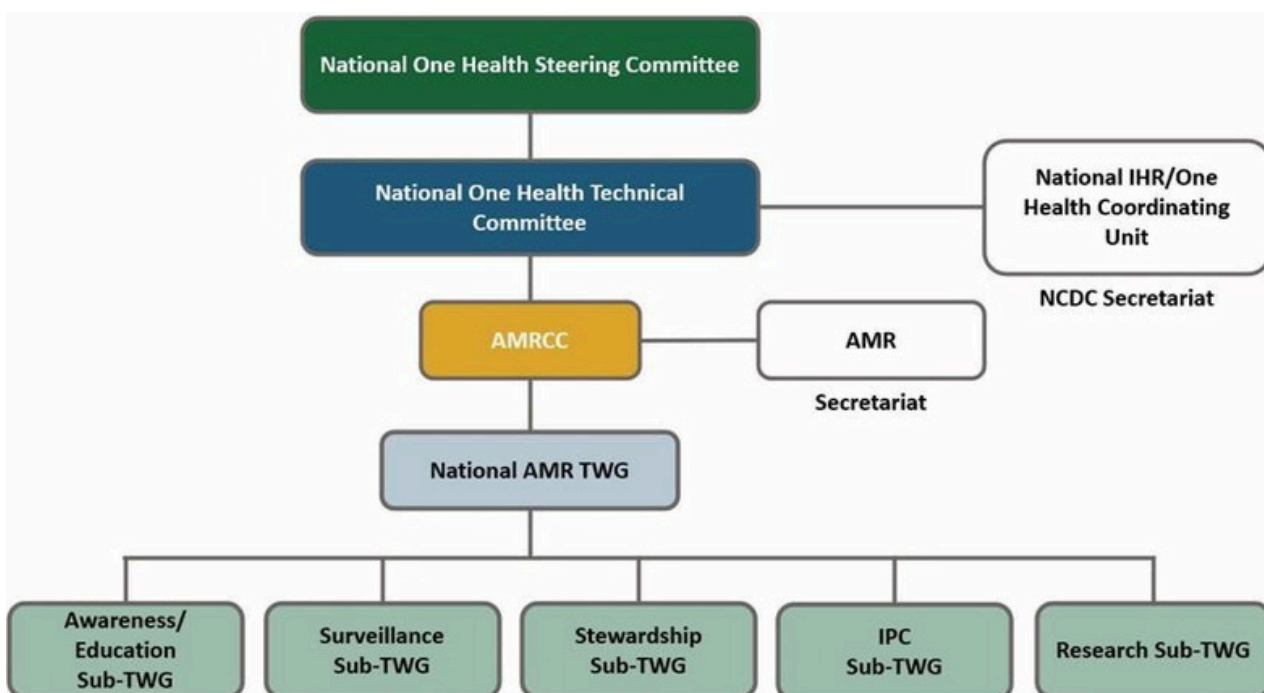


Figure 1: OH AMR Governance Structure

In Nigeria, the involvement of the environmental health (EH) sector is only recent, and as such, there are gaps in understanding the concept of AMR in the environment, knowledge and practice, and the generation and dissemination of good-quality AMR data that can be used for evidence-based policy and response. Consequently, there is a dearth of AMR data from the EH sector, inadequate reporting and a non-existent system for reporting/dissemination of standardised AMR data. Antimicrobial resistance is a one health threat that cuts across various sectors and the EH sector must not be left behind.

Effective mitigation of AMR requires the use of environmental health interventions. The FMEnv has been supported by the Fleming Fund Country Grant II and other partners such as the FAO to develop AMR Surveillance Strategy, training of NESREA laboratory staff on WHONET, AMR active surveillance (field and lab diagnostic procedures) and Quality Management System (QMS).

## POLICY TAKEAWAYS

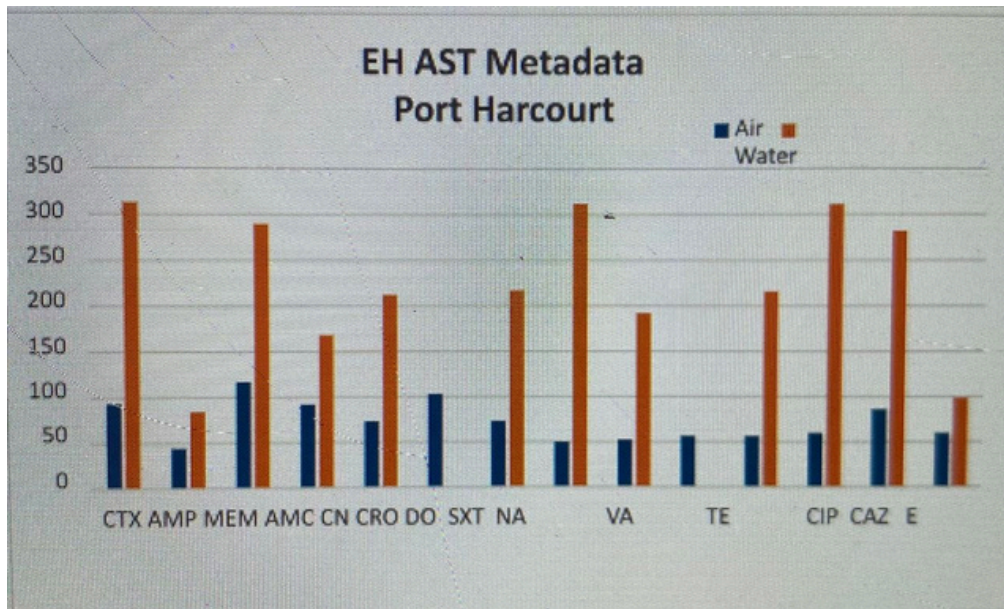
- i. Paucity of AMR data in the EH sector – This can be rectified through concerted and sustainable actions for generation of AMR surveillance (active and passive) data, standardized laboratory diagnostic procedures, analysis of data and reporting of findings
- ii. Major Environmental Drivers – Key contributors include pharmaceutical waste, agricultural runoff, inadequate wastewater treatment, soil contamination, and airborne spread of resistant bacteria. However, there is not much national information on these in the public space
- iii. Collaboration – AMR is a OH challenge and needs a multi-disciplinary and inter- sectoral collaboration
- iv. Policy Actions Needed – Strengthening pharmaceutical waste regulations, promoting sustainable farming, upgrading wastewater treatment, monitoring AMR hotspots, and raising public awareness are critical interventions which need evidence based data.

## METHODOLOGY

Activities were implemented using a participatory, multi-sectoral approach. The activities were:

- Validation workshops with document reviews, group work, and plenary presentations.
- Laboratory baselines assessments
- Hands-on training in water sampling, bacteriology and AST.
- WHONET software application training
- Pre- and post-evaluations to measure knowledge gain and training effectiveness.





## ACHIEVEMENTS

- **Environmental Health Sector Strategy:** An AMR Surveillance Strategy and Protocol was developed, reviewed and validated by stakeholders.
  - **Plant Agriculture Strategy:** A plant health focused AMU/AMR surveillance strategy was also developed and validated by stakeholders.
  - **Laboratory Baseline Assessment:** The strengths and gaps in the processes and procedures for diagnosis and QMS were identified.
  - **NESREA Laboratory Capacity:** Basic and follow-up trainings were conducted for NESREA staff in four zones, covering AST, bacteriology, and WHONET integration.
  - **Generation of AMR Data:** Canal water and environmental samples were collected in Port Harcourt and analyzed at NESREA laboratory in Port Harcourt, revealing resistance to antibiotics such as Erythromycin, Vancomycin, Cefoxitin, and Colistin.
- This marked the first wave of environment-specific AMR data under the national strategy.
- **WHONET Integration and Data Flow:** WHONET software was installed and applied across four NESREA laboratories (Abuja, Lagos, Kano, Port Harcourt) to facilitate standardized AMR data entry, analysis, and submission. Pre- and post-training evaluations confirmed increased staff proficiency.
  - **Surveillance System Integration Efforts:** Steps were taken to align NESREA laboratories with national AMR reporting structures, including training on the Integrated National Environmental Health Surveillance System (INEHSS).
  - **Active Surveillance Training:** Conducted in Port Harcourt for 31 Environmental Health officers and laboratory staff, covering sampling, transport, identification, and data reporting for AMR pathogens.



Figure 3: Field Sampling Exercise



Figure 4: Lab diagnostic procedures

- **QMS and ISO 17025 Training:** Focused on quality assurance, SOP development, equipment calibration, and risk assessment, boosting lab data reliability and international compliance for NESREA laboratory staff in Port Harcourt, Kano, Lagos, Abuja and FMEEnv. Action plans were developed per laboratory to ensure alignment with ISO 17025 and QMS standards

- **AMR Mitigation for EHOs:** Environmental Health Officers (EHOs) and federal officers from 12 high-burden states were trained on AMR mitigation, WASH, waste management, and data integration into the INEHSS.

## IMPLICATIONS & RECOMMENDATIONS

The import of quality data generation is for evidence-based practice, decisions and policy development. This is predicated on the appropriate sample collection, packaging and transportation; standardized laboratory sample analysis; reporting of results and dissemination of findings to stakeholders.

### Recommendations under this brief are:

1. Institutionalization of the INEHSS for visibility and accessibility of reported EH AMR data
2. Enhanced creation of awareness for AMR issues in the EH sector at all tiers of government
3. Selection of an EH AMR Reference Laboratory that will be able to mentor other EH labs in the near future
4. Monitoring of the mentoring of the NESREA Port Harcourt lab to ensure the gaps identified from the lab assessments are targeted for a progressive improvement.

## CONCLUSION

A multi-sectoral strategy that incorporates strict regulations, technological advancements, and public awareness is required to mitigate the risks associated with environmental AMR and protect global health.

Environmental health policies are essential in preventing the spread of resistant bacteria through contaminated ecosystems, which is how environmental health policies help curb AMR. Thus, when good quality and robust data are aggregated for the country, then policies and enforcements concerning wastewater treatment, regulation of pharmaceutical effluent disposal and livestock farm and abattoir waste disposal can be developed, stakeholders sensitized and regulations enforced. These data can also inform practice.

The INEHSS is expected to be linked to the AMR Information System (AMRIS), which is the national AMR information portal for all the key agencies to report to.

## REFERENCES

1. FAO & MSH Technical Reports and Workshop Outputs
2. Federal Ministry of Environment Reports, 2024–2025
3. ISO/IEC 17025:2017 Standard Documentation
4. Memorandum of Understanding between FAO, WOAHA, WHO and UNEP.  
<https://openknowledge.fao.org/>
5. Nigeria National Action Plan on AMR (NAP 2.0), 2024-2028
6. WHONET software documentation (WHO Collaborating Center for Surveillance of Antimicrobial Resistance)

## CONTACT

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