DIGITAL TRANSFORMATIONS FOR HEALTH LAB

GOVERNING HEALTH FUTURES 2030

Harnessing data for smarter antimicrobial stewardship

A case study on data solidarity in action

Clare Kahuma Allelua, February 2026

This report has been made possible by financial contribution from Fondation Botnar, Switzerland, to the Project IMG-22-005 Digital Transformations of Health Lab (DTH-Lab). Their commitment to advancing global health is deeply appreciated, and this project would not have been possible without their contribution. DTH-Lab is hosted by Université de Genève (UNIGE), Switzerland. DTH-Lab is committed to ensuring and enabling Global Access. The knowledge and information gained from the Project will be promptly and broadly disseminated and its 'Funded Developments' will be made available and accessible free of costs. The Global Access Commitments will survive the term of the Project.

Acknowledgements: Louise Holly, Magdalena Eitenberger, Khalifan Muwonge, Hope Mackline, Michael Kateregga.

Suggested citation: Kahuma Allelua, C. (2026). Harnessing data for smarter antimicrobial stewardship: A case study of data solidarity in action. Geneva: Digital Transformations for Health Lab.

CONTENTS

ABBREVIATIONS

AI	Artificial intelligence
AMR	Antimicrobial resistance
AMS	Antimicrobial stewardship
AMU	Antimicrobial use
AMUC	Antimicrobial use and consumption
AST	Antimicrobial susceptibility testing
AWaRe	Access, Watch and Reserve (WHO antibiotic classification)
CAMO-Net	Centres for Antimicrobial Optimization Network
CDSS	Clinical decision support system
FAIR	Findable, Accessible, Interoperable, Reusable
GAP	Global Action Plan
GIS	Geographic information system
GLASS	Global Antimicrobial Resistance and Use Surveillance System
LIS	Laboratory information system
LMICs	Low- and middle-income countries
PPIE	Public and patient involvement and engagement
RTE	Ready-to-eat (foods)
STI	Sexually Transmitted Infection
VPN	Virtual private network
WHO	World Health Organization

ABSTRACT

Antimicrobial resistance (AMR) poses a global health challenge, disproportionately affecting low- and middle-income countries (LMICs) where diagnostic gaps and empirical prescribing accelerate resistance. While data-driven approaches offer opportunities to strengthen antimicrobial stewardship (AMS), ethical and governance concerns persist regarding how data are shared, who benefits and how risk is managed. This paper presents case studies on operationalizing data solidarity, a data governance approach that promotes collective benefit, mitigates shared risks and ensures that value generated from digital practice is distributed fairly across society.

Drawing on two distinct examples from CAMO-Net Uganda Hub, the study illustrates how health data can be mobilized to create significant public value. The first case examines the development of a national AMR Data Warehouse, which utilizes on-premise architecture and "analysis-ready" data sets to foster data sovereignty and evidence-based policy. The second case explores a community engagement strategy which utilizes the quad-stakeholder patient and public involvement and engagement (PPIE) strategy. This strategy bridges the gap between grass-roots awareness in informal settlements and high-level national policy, ensuring that AMS interventions are informed by both lived experience and rigorous surveillance.

Using a mixed-methods design, combining a scoping exercise and qualitative interviews with lead implementers, the analysis explores how solidarity-based principles, specifically those in the first pillar of the data solidarity framework, were applied to maximize public value while mitigating risks such as digital divide and algorithmic bias. The findings demonstrate that embedding data solidarity in AMS initiatives fosters trust, inclusivity and sustainability. This ensures that data benefits extend beyond institutional and academic boundaries to the communities that generate it. offering a practical model for LMICs seeking to leverage health data ethically and effectively in combating AMR.

1. INTRODUCTION

The last century has witnessed a significant increase in life expectancy, largely due to the introduction of effective antimicrobial treatments for infectious diseases (Mayito, Kibombo, et al., 2024). However, the emergence and rapid spread of drug resistant pathogens in recent years has complicated the management of these infections, posing one of the most pressing global health challenges today: antimicrobial resistance. AMR occurs when microorganisms such as bacteria, viruses, fungi, or protozoa evolve to resist the effects of antimicrobial agents, rendering previously effective treatments ineffective (Ampaire et al., 2016).

In LMICs, the inability to rapidly identify a specific pathogen at the point of care, combined with frequent misclassification of infections such as mistaking viral infections for bacterial infections, hinders accurate treatment decisions (Panda, 2025). This diagnostic gap often leads to the empirical use of broad-spectrum antibiotics which, while targeting a wide range of pathogens, inadvertently contributes to suboptimal use of antimicrobial therapy and accelerates the emergence of AMR. Without intervention, AMR is projected to cause up to 10 million deaths annually and incur an additional $1 trillion in global healthcare costs globally by 2050 (Bhatia, 2018).

In response to this growing threat, the world health assembly adopted the global action plan (GAP) on AMR in 2015, a plan that outlines five strategic objectives: improving awareness and understanding of AMR; strengthening surveillance and research; reducing the incidence of infection through hygiene and prevention; optimizing the use of antimicrobials in human and animal health; and investing in sustainable solutions, including new diagnostics, medicines and vaccines (Baekkeskov et al., 2020). Recognizing the disproportionate burden of AMR in LMICs, the GAP on AMR highlighted the urgent need for robust surveillance systems. In response, the Global Antimicrobial Resistance and Use Surveillance System (GLASS) was established to support LMICs in setting up sentinel sites for routine antimicrobial susceptibility testing (AST). These sites collect essential resistance data to inform national policy, guide clinical decision-making and support the design of targeted interventions (Hope et al., 2024). This data has been used for multiple purposes including generating insights that have aided in AMS (Kahuma et al., 2025; Hope et al., 2024).

However, while surveillance data are important for policy and clinical practice, its benefits often remain confined to institutional and academic spaces. This is where the concept of data solidarity becomes essential. Data solidarity is an emerging concept in data governance and ethics that emphasizes collective responsibility and mutual benefit in how data are collected, shared and used (El-Sayed et al., 2025). It prioritizes the intended use of data over its specific type, shifting the focus from individual ownership to collective benefit. It advocates for actively supporting data projects that create public value, strictly prohibiting or regulating uses that pose significant risk (El-Sayed et al., 2025). It moves beyond individual level control and fairness to include collective oversight and ownership, ensuring that risks and benefits of digital practices are shared fairly across communities (Braun & Hummel, 2022).

This paper employs a broad scoping exercise across Sub-Saharan Africa to examine how AMR surveillance data has been utilized to design, implement and evaluate AMS interventions. While the research scope is regional, the specific case studies are centred in Uganda to identify practical examples of data use that generate significant public value. This aligns with pillar one of the data solidarity framework which seeks to ensure that data use yields high public value while maintaining acceptable risk levels (El-Sayed et al., 2025). By analysing two selected interventions in Uganda, this paper evaluates how surveillance data can be mobilized to optimize antimicrobial use (AMU), demonstrating how solidarity-based governance prioritizes collective health benefits in low-resource settings.

2. METHODOLOGY

2.1. Study design

This study employed a mixed-methods design, combining a scoping review of published and non-peer-reviewed literature with qualitative interviews. The aim was to explore AMR and AMS interventions in Uganda and the broader Sub-Saharan Africa, focusing on prescribing patterns, surveillance systems and the integration of diagnostic and digital tools across hospital, community and One Health settings. One health refers to an approach that links human, animal and environmental health.

2.2. Literature search

The scoping review was conducted using two major peer-reviewed databases, PubMed and Research4Life, to identify relevant studies published within the last ten years. The search strategy was guided by a query string:

("antimicrobial resistance" OR "AMR" OR "antibiotic resistance") AND ("Uganda" OR "East Africa" OR "Sub-Saharan Africa") AND ("antimicrobial stewardship" OR "AMS" OR "prescribing patterns" OR "antibiotic use" OR "self-medication") AND ("surveillance" OR "diagnostic tools" OR "point-of-care testing" OR "machine learning" OR "AI") AND ("hospital-based" OR "community pharmacies" OR "One Health" OR "livestock" OR "poultry")

This query was designed to capture studies addressing AMR and AMS interventions across human health and animal health domains, including hospital-based programmes, community pharmacy practices and livestock-related initiatives.

2.3. Additional sources

To ensure a comprehensive analysis, this study intentionally supplements peer-reviewed literature with gray literature such as technical reports, programme evaluations and institutional blogs. This approach was essential for three reasons: first, it addressed the publication gap in Sub-Saharan African AMR research, where formal documentation often lags behind field level activity; second, it provides operational insights into digital health tools harnessing AMR surveillance data; and third, it caters for the rapid iteration of digital health tools and the practical challenges of data-driven stewardship which are documented initially by local implementing partners and government agencies, yet remain and underrepresented in international journals. By integrating these sources, this study avoids the “data silence” that occurs when excluding non-academic evidence, ensuring that the case studies capture a culturally and operationally authentic picture of how data-driven interventions are tailored to Uganda’s healthcare infrastructure.

2.4. Eligibility criteria and selection

Studies were included if they provided empirical evidence of AMR-related interventions or health data applications in Sub-Saharan Africa. Papers focusing solely on theoretical discussions or profit-driven data use were excluded. All identified studies were imported into Zotero for reference management and screening. Titles and abstracts were reviewed for relevance, followed by full-text assessment of eligible papers.

2.5. Data extraction and analysis

After screening and selecting eligible studies, the full texts were reviewed and key information was manually extracted into a structured document. The extracted details included the type of intervention, the nature of data utilization (such as surveillance systems, point-of-care diagnostics, or machine learning applications), the implementation setting and any reported benefits or harms. This document served as the basis for identifying potential case examples.

To determine whether studies reflected a solidarity-based approach, additional criteria were applied. These included evidence of equitable benefit distribution, mechanisms for mitigating risks to vulnerable populations and alignment with public value principles outlined in pillar one of the data solidarity framework. Studies were prioritized that demonstrated transparency, risk-benefit assessment and stakeholder dissemination of insights. Two cases were selected for in-depth exploration because they illustrate health data uses with the potential to generate significant public value in low-resource settings. Each case was analysed to understand how data-driven strategies were applied, the benefits and risks these approaches brought and how they aligned with solidarity-based governance principles.

2.6. Qualitative interviews

To enrich these case studies, two in-depth qualitative interviews were conducted with key project leads of each selected project; the lead developer of the AMR Data warehouse and a lead specialist in community engagement for AMR behavioural change. Each interview lasted approximately 90 minutes and followed an open ended, semi-structured format. This approach allowed for flexible participant-driven dialogue that provided deep insights into the design and implementation of the interventions as well as perspectives on data governance and solidarity frameworks. The interview findings were integrated with the literature review to develop comprehensive case narratives. The interviews were analysed using thematic analysis. The process began with the transcription of recordings and multiple readings of the text to ensure data familiarization. Following this, an inductive coding process was applied to the key phrases and segments were labelled to capture recurring concepts related to data governance and solidarity. These codes were clustered into broader themes to identify cross-cutting insights between the two projects. This iterative approach ensured that the final case narratives were grounded directly in the practitioners' lived experiences.

2.7. Case study development

The final stage of the research involved synthesizing insights from the literature review and interviews to develop two case studies aligned with the objectives of the data solidarity framework. Particular attention was paid to whether the interventions facilitated public benefit without introducing unacceptable harm, consistent with Pillar One of the framework. Interviews with key implementers provided additional context on governance practices and perspectives on data solidarity, enriching the analysis beyond what was available in published sources.

3. TYPES OF DATA IN ANTIMICROBIAL STEWARDSHIP (AMS)

Effective AMS relies on diverse administrative and surveillance data sources to guide decision-making, monitor trends and evaluate interventions (Drees et al., 2016). This diversity of data is central to our goal of demonstrating data solidarity in health because it shows how integrating multiple data streams creates a shared foundation for collective action.

In the context of LMICs, data-driven approaches are increasingly recognized as essential for combating AMR. From tracking antibiotic consumption and resistance patterns, to understanding behavioural drivers and systemic barriers, each data type contributes unique insights that shape stewardship strategies. Designing and evaluating AMS interventions in this region requires a wide range of data types, each offering insights into patterns of AMU, AMR and the contextual factors that shape them.

This section explores the various forms of data used in AMS and highlights how they inform clinical practice, public health policy and community-level interventions. By examining these six data types, we can better appreciate the multifaceted nature of AMS and the importance of integrated, context-sensitive approaches to safeguarding antibiotic effectiveness.

3.1. Antimicrobial use (AMU) data

AMU data inform a foundational understanding of how antibiotics are prescribed, dispensed and consumed across various settings, including health facilities, pharmacies and communities. For instance, a study utilizing national import data successfully estimated the AMU trends in Uganda, which revealed spikes in the use of “Watch” antibiotics during the COVID-19 pandemic and the high level of reliance on injectable antimicrobials (Murungi et al., 2023). Similarly, research conducted in hospitals across Ghana, Uganda, Zambia and Tanzania demonstrated that point prevalence surveys can identify prescribing patterns and drive stewardship interventions such as training, guideline development and the formation of AMS committees at hospital level (D’Arcy et al., 2021). These studies show how surveillance can inform both national and facility-level actions, emphasizing the need for repeated surveys and broader participation in order to strengthen AMS and monitor progress over time.

3.2. Antimicrobial resistance (AMR) surveillance data

AMR surveillance data are essential for identifying resistance trends and informing treatment guidelines. A study done in tertiary hospitals in Uganda analysed routine surveillance data, highlighting alarming resistance levels to commonly used antibiotics (Hope et al., 2024; Mayito, Kibombo, et al., 2024). Building on these findings, a follow-up study applied data-driven approaches to optimize antibiotic use and combat antimicrobial-resistant infections in Uganda. This initiative aimed: to establish an integrated AMR and antimicrobial use and consumption (AMUC) data warehouse to support AMR research and evaluate AMR and Antibiotic usage trends at these hospitals; to develop a machine learning model to predict the clinical outcomes of patients with bacterial infectious; and to evaluate the economic burden of AMR in Uganda (Kahuma et al., 2025; Mayito, Tumwine, et al., 2024; Nuwamanya, 2024). Collectively, these efforts generate evidence that informs the design, implementation and evaluation of AMR interventions and policy, which ultimately strengthens the national response to AMR (Kahuma et al., 2025).

3.3. Diagnostic and laboratory data

Diagnostic capacity directly influences prescribing behaviour. In settings with limited access to diagnostics, empirical treatment with broad-spectrum antibiotics is common (Om et al., 2016). An overview of trials in Sub-Saharan Africa showed that integrating point-of-care diagnostics with clinical decision-making algorithms and patient communication strategies could reduce unnecessary antibiotic use in outpatient settings across Uganda, Ghana and Burkina Faso (Olliaro et al., 2023). However, studies evaluating blood culture testing outcomes among non-malarial febrile children at AMR sites, as well as a review of AMR surveillance data from Mulago Hospital's microbiology laboratory over a six-month period, reveal persistent gaps in laboratory capacity and documentation of AST (Chaplain et al., 2022; Kisame et al., 2021).

3.4. Behavioural and qualitative data

Understanding the behaviours, perceptions and motivations of healthcare providers, patients and the community in which they operate is important for designing effective AMS interventions. Research done in Wakiso District in Uganda demonstrated that education, community engagement and institutional support can shift data-informed behaviours around AMU. Similarly, a qualitative assessment of a training and communication intervention looking at antibiotic prescription practices among health workers and outpatients at public health facilities in Uganda found that tailored communication tools can support responsible antibiotic use (Musoke, Lubega, Obeng, et al., 2023). On the other hand, a qualitative study done in the regional referral hospitals in Mbale and Soroti shows that prescribing decisions were shaped by clinical judgment, drug availability and cost, prior experience and sometimes trial and error (Kaawa-Mafigiri et al., 2023). Patients often requested specific antibiotics or opted for cheaper alternatives, while systemic issues – such as strained health systems, pharmaceutical influence and weak lab support – further complicated rational prescribing. Although clinicians recognized AMR as a problem, they tended to externalize responsibility, citing systemic and patient-level barriers. The study highlighted the need for a multisectoral response that addresses these intersecting drivers and fosters behavioural change (Kagoya et al., 2021).

3.5. Policy and guideline adherence data

Data on adherence to national and international treatment guidelines help identify gaps in clinical practice. Obakiro et al. (2022) found that over 80 per cent of prescriptions in Eastern Uganda did not align with national guidelines, pointing to the need for decision support tools and continuous medical education.

3.6. Socioeconomic and contextual data

Structural and socioeconomic factors – such as access to healthcare, affordability of medicines and health system capacity – also shape AMU. This is supported by the data collected on the socioeconomic context, which highlights key drivers for drug resistance. Research illustrates how financial constraints and health system inefficiencies drive self-medication and inappropriate antibiotic use, particularly in vulnerable populations (Green et al., 2023; Kamiab Hesari et al., 2024).

4. THE ROLE OF DATA IN AMS

Data are the backbone of effective AMS, particularly in LMICs, where resources are limited and empirical prescribing is common. By leveraging data-driven approaches, health systems can move from reactive prescribing to more targeted and sustainable guidelines (Ampaire et al., 2016). However, the utility of data depends on its quality and the frameworks used to interpret it. Standardized frameworks, such as WHO's AWaRe classification, are essential in this regard in providing a universal language for antibiotic use, enabling diverse healthcare systems to share, compare and act on prescribing data collectively (Hsia et al., 2019).

The AWaRe classification groups antibiotics into three categories: Access (widely available first line treatments); Watch (prioritized for monitoring due to resistance potential) and Reserve (last-resort options for multi-drug resistant infections) (Hsia et al., 2019). Beyond clinical utility, the adoption of AWaRe in resource-constrained settings represents an act of data solidarity. It harmonizes fragmented data sets into a cohesive global narrative, enabling countries to identify cross-border trends and coordinate a unified response to AMR. Ultimately, data transforms tackling AMS from an isolated facility-level effort into a transparent, accountable and equitable global movement.

Understanding the multifaceted role of data in AMS allows one to appreciate how the subsequent case studies move beyond theoretical frameworks, demonstrating that diverse, high-quality data are required to implement and sustain solidarity-based intervention in practice.

4.1. Informing intervention design

Surveillance data on AMU and AMR are foundational, in terms of identifying priority areas and tailoring the necessary interventions. For example, D'Arcy et al. (2021) leveraged point prevalence survey data from hospitals in Uganda and other African countries to identify widespread use of broad-spectrum antibiotics This also helped to catalyse the formation of AMS committees, training programmes and the updating of prescribing guidelines. Similarly, Murungi et al. (2023) used national import data to highlight spikes in the use of 'Watch' antibiotics, prompting targeted stewardship measures.

In the food sector, a scoping review of 40 studies on AMR in ready-to-eat (RTE) foods across Africa highlighted the presence of drug-resistant pathogens. These findings indicated the need to strengthen surveillance systems and regulatory frameworks to prevent AMR transmission through food sources (Onohuean et al., 2025). This is similarly illustrated by the study on commercial layer farms in Mukono District, which revealed high levels of multidrug-resistant E. coli and risky antibiotic practices, including the sale of sick birds for slaughter (S. Kakooza et al., 2023). Findings from this study reinforced the need for design AMR interventions around food systems surveillance and regulation.

4.2. Shaping behaviour and practice

Behavioural and qualitative data are essential for designing interventions that address the underlying drivers of inappropriate antibiotic use. Research in Uganda demonstrated how community engagement, health worker training and the establishment of hospital-based AMS committees, guided by local data, led to improved hygiene practices and reduced unnecessary prescriptions in Wakiso district, Uganda (Musoke et al., 2020; Musoke, Lubega, Obeng, et al., 2023). Kaawa-Mafigiri et al (2023) further showed that training and communication interventions, informed by pre-trial qualitative assessments, improved adherence to prescribing guidelines and patient compliance. These examples showcase the potential of AMR data in creating behavioural change.

4.3. Integrating diagnostics and surveillance

Diagnostic and laboratory data play a pivotal role in guiding empirical therapy and monitoring intervention outcomes. Olliaro et al. (2023) found that integrating point-of-care diagnostics with clinical decision algorithms reduced unnecessary antibiotic use in outpatient settings. However, studies such as Kisame et al. (2021) and Chaplain et al. (2022) highlight persistent gaps in both laboratory capacity and data quality, underscoring the need for continued investment in diagnostic infrastructure.

4.4. Evaluating impact and scaling interventions

Routine surveillance and data analytics are vital for evaluating the effectiveness of AMS interventions and informing scale-up. Mayito, Tumwine et al. (2024) describe the development of a national AMR and AMU data warehouse in Uganda, which integrates surveillance data from multiple hospitals and applies machine learning to predict clinical outcomes and estimate the economic burden of AMR. Such data-driven platforms support evidence-based policymaking and continuous improvement of stewardship efforts.

Beyond identifying patterns, the operationalization of data in LMICs increasingly relies on sophisticated technical and social mechanisms to drive real change. The integration of clinical, microbiological pharmacy and behavioural data enables more targeted evidence-based approaches to managing AMU and combating resistance. In designing AMS interventions, data are used to identify patterns of AMU, resistance hotspots and high-risk patient groups. For instance, machine learning models have been developed to predict resistance patterns based on patient demographics and clinical history. Risk stratification tools, often embedded in electronic health records (EHRs), use demographic and clinical data to guide antibiotic selection based on patient-specific risk factors. In some LMIC settings, clinical decision support systems (CDSS) have been integrated into digital prescribing platforms to provide real-time guidance to clinicians, thus reducing inappropriate prescriptions and improving adherence to treatment guidelines.

Evaluation of AMS interventions also relies heavily on data. Pre- and post-intervention comparisons, using prescribing rates, resistance profiles and patient outcomes, help assess the effectiveness of stewardship strategies (Ross et al., 2024). Ross et al. (2024) also found that behavioural interventions in five Ugandan hospitals increased compliance with national antimicrobial prescription guidelines from 27 per cent to 50 per cent after the intervention. In Kenya, for example, a hospital-based point prevalence survey was used to monitor prescribing behaviour, identify targets for AMS interventions and evaluate the effectiveness of stewardship protocols through repeated assessments (Momanyi et al., 2019; Okoth et al., 2018). Dashboards and real-time analytics have been deployed in several LMICs to visualize antibiotic consumption and resistance data, enabling rapid feedback to clinicians and facility managers (Opiyo et al., 2024).

Feedback loops are an important component of data-driven AMS. In Uganda, data from Regional Referral Hospitals (RRHs) collected through the CAMO-Net initiative has been used to inform local stewardship efforts (Mayito, Kibombo, et al., 2024; Mayito, Tumwine, et al., 2024). AST results and prescribing data are shared with clinicians to reinforce appropriate prescribing practices and to highlight emerging resistance threats (Kahuma et al., 2025). Community-level data, including surveys and digital health tools, have also been used to evaluate public awareness and behaviour change following AMS campaigns (Kiragga et al., 2023; Musoke, Lubega, Obeng, et al., 2023).

Overall, the use of data in AMS interventions enhances precision, accountability and responsiveness (Alhassan & Abdallah, 2024). It enables health systems to move beyond blanket policies, towards context-specific strategies that reflect local resistance patterns and prescribing behaviours. However, the success of these interventions depends on the quality, completeness and accessibility of data, as well as the capacity of health workers to interpret and act on data insights.

5. CASE EXAMPLES

Building on the role of data in AMS, this section presents specific case examples to illustrate the practical mobilization of AMR data. By examining these cases through the lens of data solidarity, it becomes evident how the collective pooling and analysis of data – across regional, clinical and community levels – moves beyond academic exercise to inform national policy, optimize resource allocation and improve patient care in resource-constrained environments.

5.1. Data use to shape regional and national interventions

Across East Africa and other LMICs, data has been instrumental in shaping AMS interventions. In Uganda, studies such as those by Mayito et al. (2024) have demonstrated how routine surveillance data from regional referral hospitals can be curated and integrated into national data warehouses, thereby enhancing the country's capacity for evidence-based AMS (Mayito, Tumwine, et al., 2024). This centralized data has been used in a cost analysis study that estimated the economic burden of AMR in Uganda, supporting evidence-based policy and stewardship planning (Nuwamanya, 2024). The findings from this study were disseminated to the parliament of Uganda by the CAMO-net Uganda hub team, providing policymakers with evidence to support the development of sustainable AMS policies and efficient resource allocation (Kahuma, 2025). These efforts are proof of the importance of data-driven approaches in AMS in resource-constrained settings.

In Kenya, Kiiru et al. (2023) used laboratory data to assess resistance patterns in urinary tract infections, revealing high levels of multidrug resistance to particular antibiotics whose usability was attributed to their affordability and accessibility. These findings informed local prescribing guidelines and highlighted the social-economic factors that drive AMR. Similarly, another study in Kenya, which has informed local veterinary AMS efforts, documented AMU in peri-urban poultry farms and identified poor adherence to withdrawal periods and widespread self-administration of antibiotics (Mutua et al., 2023).

5.2. Data use to shape health centre and community-level interventions

In Uganda data has played a pivotal role in shaping AMS interventions that are both context-specific and behaviourally informed. For instance, local behavioural data was used to design and evaluate a training and communication (T&C) intervention aimed at improving antibiotic prescribing practices in public health facilities (Kaawa-Mafigiri et al., 2023). A pre-trial qualitative assessment informed the development of the intervention, which was then evaluated through in-depth interviews. The data revealed drug availability, provider-patient communication and patients' access to medication as being key influences on adherence. As a result, the study reported improved prescribing behaviour and patient compliance, demonstrating how context-specific data can guide effective stewardship strategies (Kaawa-Mafigiri et al., 2023). Similarly, a One Health AMS programme implemented a combined training for health practitioners, school pupils and community health workers in Wakiso District and set up an online community of practice for continued engagement. Post-implementation evaluation showed improved hygiene and reduced unnecessary prescriptions (Musoke, Lubega, Obeng, et al., 2023). In Bwaise slum, Kampala, survey data was used to assess knowledge, attitudes and practices around antibiotic use. The findings revealed significant gaps in awareness and behaviour, prompting calls for targeted community education and stewardship programmes (Ndagire et al., 2025).

5.3. Data use for surveillance and diagnostic innovation

The WHO's Enhanced Gonococcal Antimicrobial Surveillance Programme (EGASP), implemented in Kampala demonstrated the feasibility of standardized, quality-assured surveillance (F. Kakooza et al., 2021). Over 1,000 men with urethral discharge were tested, revealing near-universal resistance to ciprofloxacin and high susceptibility to ceftriaxone and azithromycin. This surveillance data has the potential to inform national sexually transmitted infection (STI) treatment guidelines and can be used to develop population-level interventions.

In a separate study aimed at improving access to diagnostic tools, essential for universal health coverage and AMR prevention, data were used to evaluate the impact of combining point-of-care diagnostics with clinical decision-making algorithms and patient communication strategies. Conducted across outpatient settings in Uganda, Ghana and Burkina Faso, the study assessed whether this integrated approach could reduce unnecessary antibiotic use for febrile illnesses (Olliaro et al., 2023). Data collected from both patients and health workers during implementation guided the evaluation of the innovation. In-depth interviews with health workers explored behavioural factors influencing the uptake of diagnostics, as well as adherence to test results and the use of decision-support tools.

5.4. Livestock and environmental surveillance

A study on AMU in livestock embedded targeted questions into Uganda's annual agricultural survey, generating nationally representative data from 6,000 livestock-keeping households (Mikecz et al., 2020). This innovative approach enabled the collection of surveillance data that informed targeted interventions and policy reforms. Approximately 2 million households reported using at least one antibiotic in their livestock over the past year, for either preventive or curative purposes. The data collection aimed to support monitoring progress in the implementation of Uganda's National Action Plan on Antimicrobial Resistance (AMR) and the One Health Strategic Plan (Mikecz et al., 2020). Additionally, a complementary study conducted in poultry farms gathered data that facilitated integrated surveillance across human and animal health systems (S. Kakooza et al., 2021). These findings contribute to the development of comprehensive One Health strategies that address AMR across sectors.

5.5. Digital tools and predictive analytics

A study aiming to empower the global AMR research community developed an interactive geographic information system using data collected in LMICs (Opiyo et al, 2024). In Uganda, this included interactive GIS dashboards for AMR data analysis that enhance the accessibility and interpretability of resistance trends. These tools support real-time decision-making and allow users to explore geographic and temporal trends in AMR data.

Machine learning models have been trained on genomic data to predict resistance across Uganda, Nigeria and Tanzania (Babirye et al., 2024; Nsubuga et al., 2024). The models showed promising accuracy, demonstrating the potential of artificial intelligence (AI) to enhance AMR surveillance and to guide empirical therapy in resource-limited settings.

6. POTENTIAL BENEFITS AND HARMS OF DATA USE IN AMS

The mobilization of AMR data carries profound implications for both individual patients and the health systems that serve them. The ethical use of information is defined by the delicate balance of maximising public value while ensuring that associated risks remain at an acceptable and manageable level. However, without robust governance and structured support, the same data can lead to systemic biases, privacy breaches or the marginalization of vulnerable groups. This section evaluates the dual nature of data, exploring how it serves as a catalyst for progress while identifying the critical guardrails necessary to prevent harm.

6.1. Potential benefits

The use of data in AMS has significantly enhanced the precision, accountability and effectiveness of interventions in LMICs (Abo et al., 2022; El-Sokkary & Asaad, 2020; Kerr et al., 2021). The implementation of WHO's Global Antimicrobial Resistance and Use Surveillance System (GLASS) has advanced sustainable AMR surveillance through data consistency which supports innovation of tools for data collection, analysis, and reporting, as well as building laboratory and surveillance capacity (Kusuma et al., 2025). Insights from this surveillance data, such as that collected through GLASS sentinel sites and national AMR platforms, enables clinicians to align treatment with local resistance patterns, reducing reliance on empirical therapy (Hope et al., 2024; Kisame et al., 2021; Kusuma et al., 2025; Mayito, Kibombo, et al., 2024; Mayito, Tumwine, et al., 2024).

Data also support evaluation of interventions, particularly in assessing their impact on prescribing practices. For example, in Uganda and Ghana, trials involving point-of-care diagnostics combined with treatment algorithms collected data to compare prescribing behaviour both with the intervention and without (Obakiro et al., 2022). These evaluations demonstrated how clinical decision support tools can reduce empirical prescribing, especially in resource-limited settings.

Innovative, data-driven tools and dashboards are transforming AMS by enhancing the understandability, utility and interpretability of AMR data. These platforms facilitate real-time decision-making, enable the tracking of resistance trends and support the identification of emerging patterns. For instance, studies leveraging AMR surveillance data have shown how national data warehouses can monitor resistance dynamics and predict clinical outcomes, thereby informing timely policy responses (Babirye et al., 2024;

Mayito, Tumwine, et al., 2024). Similarly, GIS-based dashboards have improved the accessibility and usability of AMR data, empowering stakeholders to make informed decisions in real time (Opiyo et al., 2024).

Data use also facilitates better resource allocation. Studies that analyse pharmacy and import data help identify overused antibiotic classes and inform procurement and distribution strategies (Murungi et al., 2023, 2025). In the veterinary sector, data have been collected through various techniques to inform the relevant stakeholder about the AMR burden, give insights and enable more targeted interventions (S. Kakooza et al., 2021, 2023; Mikecz et al., 2020; Murungi et al., 2023; Musoke et al., 2020).

The prevalence of data on AMU and AMR collected at community and point-of-care levels provides valuable behavioural and contextual insights. Insights from analysis of this data support the design of tailored education and communication interventions that address local drivers of misuse (Kaawa-Mafigiri et al., 2023; Musoke, Lubega, Obeng, et al., 2023; Ndagire et al., 2025). These context-specific strategies have been shown to improve antibiotic adherence and reduce inappropriate use, contributing to more effective AMS.

6.2. Potential harms

Despite the benefits, the use of data in AMS is not without risks, for example a major challenge lies in data quality and completeness. Studies have highlighted persistent gaps in laboratory capacity, inconsistent AST practices and incomplete health records. These issues compromise the reliability of surveillance data and can lead to misguided interventions. In some healthcare facilities, limited resources and infrastructure result in under-documentation, which in turn leads to underestimation of the true burden of AMR (Moirongo et al., 2022; Odhiambo et al., 2014).

Additionally, fragmented data systems and lack of interoperability between platforms hinder the integration of surveillance data across regions and levels of care (Bosco et al., 2021; Carter et al., 2024).

Ethical concerns around data privacy and governance also pose challenges, especially when data are collected without informed consent, or where patient-level data are used without robust safeguards, or in ways that could stigmatize communities (Adeniyi, O. A., et al., 2024; Ahmed et al., 2025). For example, studies involving forcibly displaced populations, or residents of informal settlements, raise critical questions about how insights derived from their data are shared and whether the benefits of research are equitably returned to the communities involved (Kamiab Hesari et al., 2024; Ndagire et al., 2025). The lack of community engagement in data governance processes can erode trust and perpetuate power imbalances, especially when data are used to inform policies that affect vulnerable groups. Furthermore, the absence of clear data-sharing protocols and accountability mechanisms increases the risk of misuse, reinforcing the need for ethical frameworks that prioritize transparency, equity and community benefit in AMR data initiatives (Van Panhuis et al., 2014).

Another risk is over-reliance on algorithms and digital tools. While machine learning models and CDSS can enhance decision-making, they may also produce inaccurate or biased recommendations, if trained on incomplete or non-representative data. Machine learning studies caution that predictive models must be locally validated to avoid harmful clinical decisions (Nsubuga et al., 2024).

Infrastructure and capacity limitations remain a persistent barrier. Many LMICs lack the digital infrastructure, trained personnel and financial resources needed to sustain high-quality data systems (Thomas et al., 2016). As highlighted by prior research, even well-designed surveillance programmes can falter without long-term investment and systemic support (Kiggundu et al., 2023).

Lastly, misinterpretation or misuse of data can lead to unintended consequences. For instance, if resistance data are not contextualized with prescribing practices or patient behaviour, it may result in overly restrictive policies or clinician distrust. This highlights the need for multidisciplinary interpretation and stakeholder engagement in data use. Without addressing these systemic issues, data-driven AMS efforts risk reinforcing existing inequities and missing critical resistance patterns.

7. CASE STUDIES

While the preceding sections established the theoretical necessity of data solidarity in AMS, the following case studies provide a granular examination of these principles that are translated into practice within low- and middle- income country context. By focusing on two distinct but complementary interventions in Uganda, one centred on national digital infrastructure and the other on community-level behavioural change, this section illustrates the operationalization of the data solidarity framework's first pillar.

These case studies demonstrate the public value generated when data are curated, shared and governed with a commitment to collective benefit. Through a combination of literature review and first hand insights from lead implementers, these examples highlight the successes, technical hurdles and ethical negotiations required to build an equitable AMR response in resource-limited settings.

7.1. Case study 1: The Development of Uganda's AMR Data Warehouse

Description of the initiative

The misuse of antibiotics, coupled with limited surveillance systems, has accelerated resistance patterns, threatening effective treatment and patient safety. Recognizing this gap, the CAMO-Net Uganda Hub, with support from Wellcome Trust, developed the AMR data warehouse (https://amrdb.idi.co.ug/) as a centralized platform to consolidate and manage AMR data collected from across the country (Kambugu, 2025). The purpose of this initiative was to strengthen evidence-based decision-making and to ensure that data governance reflects principles of fairness, transparency and collective benefit. This approach aligns with the first pillar of the data solidarity framework, which calls for facilitating data use that creates significant public value while safeguarding ethical standards. Insights for this case were obtained through a qualitative interview with the lead developer of the AMR Data warehouse in October 2025.

The AMR data warehouse serves as a secure, on-premise system that integrates clean and standardized AMR data sets from multiple healthcare institutions in Uganda. Unlike many global platforms that rely on cloud storage, this system is hosted on servers within Uganda to maintain data sovereignty and security. Hosting the data on local servers mitigates cross-border risks and reinforces Uganda's control over its health information. Prior studies show that this approach addresses growing concerns about data privacy, regulatory compliance and protection against unauthorized access, making local server hosting an efficient strategy for organizations prioritizing data sovereignty (Solanke, 2024).

The platform offers functionalities for data visualization, trend analysis and predictive modeling, which will enable users – such as hospital stewardship teams and national policymakers – to explore resistance patterns and forecast potential risks in real time (Kambugu, 2025). In its design, the warehouse adheres to the FAIR principles, which make data findable through indexed metadata, accessible under controlled conditions, interoperable through standardized formats and reusable with clear documentation for secondary research.

Public value created

The development of the AMR data warehouse presents significant opportunities to strengthen Uganda's response to AMR. Analysis of the interview data indicates that the most significant advantage of the AMR data warehouse is the provision of analysis-ready AMR data. The lead developer of the platform emphasized that by providing cleaned and structured data sets, the platform "lowers the barrier to entry" for local researchers who previously lacked the tools to process complex surveillance data. This integration allows the platform to minimize urban-rural bias and support equitable decision-making.

Beyond raw data access, the AMR-DB (a portal for data access from the data warehouse) offers advanced functionalities, such as predictive models that support trend forecasting and risk assessment. Clinicians could use these models to guide more accurate prescribing and reduce inappropriate antibiotic use. Policymakers have the chance to draw on aggregated national data to design evidence-based strategies, prioritize high-risk areas and allocate resources more effectively. By making publicly accessible the publications, reports and predictive models generated using this data, the system facilitates knowledge sharing and provides contextual insights that strengthen understanding of Uganda's AMR landscape. The system is built with a simple, intuitive user interface, complemented by a user guide that appears, upon first access, to enhance usability.

The architecture of the system separates the application and its storage, connecting them securely via a virtual private network (VPN). This design choice fosters trust among data contributors, with the lead developer noting that this security-first approach was essential for participation: *"In a digital landscape where data security is a concern, on-premise hosting and secure authentication are our 'trust-builders.' It ensures that the hospitals contributing the data remain its primary beneficiaries."* This commitment to "knowledge reciprocity" is further evidenced by the platform's dissemination strategy. By sharing links and reports back to the regional referral hospitals where the data originated, the initiative ensures that those on the front lines of the AMR response are not just "data donors" but active participants in the collective benefit (Kahuma et al., 2025).

While the system accepts open data contributions to reduce geographic and institutional bias, these submissions are not automatically integrated. During the interview, the lead developer highlighted the rigorous vetting process required to maintain the system’s integrity, stating: *"We cannot sacrifice quality for quantity; every submission undergoes a screening layer to ensure that the metadata is complete and the AST results are standardized before they ever reach the public-facing warehouse."* This ensures that researchers seeking access are working with high-fidelity data, provided they meet ethical requirements, such as Research Ethics Committee (REC) approvals and approved data use plans.

The AMR data warehouse is being widely disseminated across the country to ensure public benefit from the tool. It has been showcased at multiple health exhibitions and featured on national health platforms and at conferences, reinforcing its role as a key innovation in Uganda’s AMR response. The link to the portal is publicly available and has been shared through official institutional websites, social media channels and directly within regional referral hospitals where the initial data sets were collected, ensuring that all stakeholders, especially those that contributed data, benefit from access to the insights contained there. These measures collectively uphold transparency, security and ethical standards while promoting responsible data use. This initiative exemplifies the first pillar of data solidarity by facilitating data use that yields public value with minimal risk, moving beyond mere individual data control to create a collective instrument of oversight that empowers communities to utilize data for their own direct benefit (Prainsack & Kickbusch, 2024).

Potential risks

The use of an AMR data warehouse is not without risk. Despite safeguards, research shows that ensuring long-term functionality and trust in such a system, as well as managing the challenges of balancing openness with security and sustaining infrastructure costs, requires continuous attention and investment (Shatat et al., 2024). For the platform to remain relevant and impactful, it requires a continuous flow of high-quality data. This means establishing mechanisms for routine data entry by hospital staff, integrating contributions from ongoing and future research projects and fostering collaborations that ensure diverse, representative data sets. During the interview, the lead developer expressed concern over this long-term engagement, stating: *"The biggest technical risk isn't the code; it’s the human pipeline. If the health workers at the regional level don't see the immediate utility of inputting data, the warehouse becomes a museum of old resistance patterns rather than a live surveillance tool."* Without sustained data input, the system risks becoming static and losing its value for real-time surveillance, decision-making and policy formulation.

Another major risk is the potential to widen the existing inequities caused by limited education and language barriers, as the platform is currently only available in English. This limits accessibility for non-English speakers and contradicts the principle of inclusivity central to data solidarity. Another risk is misinterpretation of analytical outputs, which could lead to misguided decisions by health workers and policymakers. This highlights the need for capacity strengthening and continuous training to ensure users can interpret data insights responsibly.

There is also the risk of over-reliance on predictive models and dashboards. For example, a model predicting antibiotic resistance trends might fail to account for regional prescribing behaviours or sudden outbreaks, leading to inappropriate policy decisions or clinical guidelines. Limited infrastructure and technical capacity in some regions could hinder equitable participation in data sharing and benefit realization, creating a digital divide that conflicts with solidarity principles. The lead developer emphasized the need for human-in-the-loop oversight: *"Data is a guide, not a dictator. We worry that users might take a dashboard at face value without understanding the local context behind the numbers. Capacity building isn't just about teaching people how to click buttons; it's about teaching data literacy and utility to prevent harmful clinical decisions."* Without clear governance and accountability mechanisms, there is a risk of data misuse or the exclusion of key stakeholders, which could erode trust and undermine the collective benefit that the system aims to achieve.

By proactively addressing these structural and technical risks through local governance and capacity building, the AMR data warehouse exemplifies the first pillar of data solidarity, which seeks to facilitate data uses with high public value while ensuring risks like digital divide and algorithmic bias remain at a collectively acceptable level.

Lessons learnt

The development and deployment of the AMR data warehouse offers valuable lessons for other LMICs. First, on-premise architecture strengthens data sovereignty but requires investment in local technical capacity and infrastructure. Second, combining FAIR principles with solidarity-based governance ensures that data sharing serves public interest without compromising privacy. Third, transparency and benefit-sharing through open models, publications and community engagement are critical for building trust and fostering participation. As Uganda continues to refine this platform, its experience provides a replicable model for scaling AMR surveillance systems in resource-limited settings while promoting equity and collective responsibility in data governance.

7.2. Case study 2: Leveraging AMR data to inform behavioural change interventions through community engagement

Description of the initiative

AMR has significance which extends beyond a healthcare challenge; it is a societal issue that demands multi-stakeholder interventions, including active participation from community members (Musoke et al., 2023; Thornber & Pitchforth, 2021). Behavioural change is central to addressing AMR and this can be achieved through data-driven community engagement. In Uganda, communities face significant barriers such as low literacy levels, widespread self-medication and reliance on unlicensed local drug shops, which are key drivers of AMR at the grassroots level (Makeri et al., 2025; Musoke, Lubega, Gbadesire, et al., 2023; Yantzi et al., 2019). While data collected from these communities are analysed to generate insights, these findings are often published and disseminated at corporate health seminars, international conferences, or published in English-only formats, limiting accessibility for the very communities that contributed the data. Researchers rarely follow up with localized communication campaigns due to funder requirements or budget constraints, creating an ethical gap between data collection and community benefit. A commitment to the principles of data solidarity prioritizes closing this gap by ensuring that data collected from communities is translated into actionable knowledge that they can understand and apply.

To operationalize this principle, the Infectious Diseases Institute developed an innovative Quad-Stakeholder PPIE Strategy (Public and Patient Involvement and Engagement), which brings together four key groups: (1) Policymakers and regulatory bodies; (2) Community, comprising Village Health Teams (VHTs, the first line of community health workers), local leaders and community members; (3) Academic and research institutions, including primary and secondary schools, universities and other relevant institutions and (4) Ministries, Departments and Agencies responsible for health and agriculture (Clare Kahuma et al., 2025).

Using insights derived from AMR and AMU data, the team translated research findings into tailored formats for different audiences. Policy briefs informed decision-makers at parliament, while community messages were delivered through skits, songs and cultural dances (Infectious Diseases Institute, 2024; Kahumaet al., 2025; Nuwamanya, 2024). Educational materials and training courses were developed for students and technical highlights, briefs and manuscripts were targeted at researchers and professionals (Chris Deputy et al., 2025a; Infectious Diseases Institute, 2025). VHTs were trained to lead community dialogues and follow up on school programmes within their areas (Chris Deputy et al., 2025b). Drama groups performed in public spaces, such as markets and healthcare facilities, to raise awareness among patients and caregivers. Additionally, analytic outcomes showcasing AMR and AMU trends were shared with regional referral hospitals to inform stewardship practices.

By grounding engagement activities in locally relevant data, this community engagement intervention promotes inclusivity and accountability, enabling communities to access and apply insights derived from their own data, thereby fostering behavioural change and strengthening Uganda's response to AMR.

Public value created

Disseminating evidence-based information enhances awareness and promotes behavioural change, reducing inappropriate AMU. In turn, this improves individual health outcomes and strengthens community resilience against AMR. Translating complex AMR information into simple and culturally relevant messages enables the team to educate households effectively (Infectious Diseases Institute, 2024; Kahuma et al., 2024.). Engaging school-age children from as early as primary level helps ensure that information reaches a wide range of age groups and builds a foundation for responsible AMU in future generations (Infectious Diseases Institute, 2025). Dissemination of study insights at the healthcare centres where the data was collected allows the workers at these centres to meditate on their prescribing practices. It also helps them recognize potential institutional economic loss due to AMR thus motivating the adoption of corrective stewardship practices.

Furthermore, the initiative fosters trust between health authorities and communities by ensuring transparency and inclusivity in data sharing. Communities see the value of their participation when findings are returned in accessible formats such as radio programmes, community dialogues and other accessible material. This approach closes the ethical gap where data collected from communities often ends up in academic publications that members of the communities cannot access or understand. By making insights available and useful to those who provide the data, the initiative promotes fairness and accountability. Ultimately, these efforts contribute to national health security and global AMR containment goals, aligning with Uganda's commitment in the National Action Plan. Overall this strategy is an all-rounder that completes the AMR cycle in human health.

Potential risks

There is a risk of misinterpretation of data at the community level, which could lead to misinformation or resistance to recommended practices. Uganda is a multilingual country with more than 40 languages spoken, yet translation of AMR information into all these languages has not been achieved. This creates the risk that some communities will receive incomplete or inaccurate information, or none at all, undermining the principle of inclusivity and data solidarity. Limited literacy and health knowledge among community members exacerbates this risk.

Another challenge is that the current strategy implementation is largely focused on human health, while evidence from studies such as the one conducted in Mukono district, Uganda calls for a One Health approach that integrates human, animal and environmental health. Limiting interventions to human health creates a fragmented response and fails to address the full picture of AMR drivers. Data solidarity requires that insights from all sectors be shared and acted upon collectively, ensuring that communities understand the interconnected nature of AMR and that interventions reflect this complexity.

Additional risks include inadequate infrastructure for sustained engagement, such as poor access to digital platforms and limited resources for continuous training of all Village Health Teams. There is also the risk of stakeholder fatigue if engagement activities are not well-coordinated or if communities do not see tangible benefits from their participation. Privacy concerns and the potential stigmatization of communities with high AMR prevalence must be managed carefully to maintain trust.

To mitigate these risks, the initiative emphasizes clear and culturally appropriate communication, capacity-building for VHTs and continuous monitoring to ensure interventions remain evidence-based and sensitive to local contexts. Ethical guidelines should be followed to protect data privacy and prevent misuse of information. Expanding the strategy to embrace a One Health approach – and investing in multilingual communication – will strengthen solidarity and ensure that no community is left behind.

Lessons learnt

Several lessons have emerged from the implementation of this initiative. First, returning data insights to communities in accessible formats significantly strengthens trust and ownership. Communities respond better when presented with localized evidence that reflects their realities rather than generic messages. This reinforces the principle of data solidarity, which calls for equitable sharing of knowledge with those who provide the data.

Second, involving trusted intermediaries such as Village Health Teams and local leaders is important for acceptance and sustainability. These actors bridge the gap between technical information and community understanding, especially in settings with low literacy levels. Future interventions must prioritize language inclusivity to ensure that no group is excluded from the benefits of the data they helped to generate.

Third, targeting school-age children from primary level upwards creates long-term impact by embedding AMR awareness early in life. This approach ensures that knowledge is shared across generations and contributes to sustained behavioural change.

Community engagement initiatives can operationalize solidarity by ensuring that communities contributing data receive clear, culturally relevant information derived from that data. This involves translating AMR insights into local languages, using trusted channels such as Village Health Teams, schools and radio programmes and tailoring messages to address local practices like self-medication. Solidarity also calls for expanding engagement beyond human health to include animal and environmental health actors, reflecting a One Health approach. By embedding these principles, community interventions move beyond awareness campaigns to empower informed decision-making, reduce misuse of antimicrobials and create sustainable behavioural change in low-resource settings.

8. RECOMMENDATIONS

To align with the first pillar of data solidarity, which seeks to facilitate data use that creates significant public value, the following recommendations are structured to bridge the gap between technical infrastructure and ethical governance.

1. Investments are needed to improve the quality, completeness and accessibility of AMS-related data to ensure that data use promises to bring significant benefits. This includes upgrading laboratory information systems (LIS), electronic health records (EHRs) and national surveillance platforms to ensure seamless data flow across facilities and sectors. Interoperability between human, animal and environmental health data systems should be prioritized to support a One Health approach.

2. Healthcare workers, data managers and policymakers require training in data interpretation, visualization and application to AMS. Capacity-building initiatives on digital tools, machine learning and ethical data use enable communities and professionals to exercise meaningful control over how data are used. Embedding data literacy into medical and pharmacy curricula can also help ensure that the people providing the data can interpret and benefit from it.

3. To mitigate ethical risks, it is essential to ensure that existing guidelines on patient confidentiality and informed consent are consistently followed in the implementation of AMS data initiatives. Special attention should be given to vulnerable populations to avoid stigmatization or misuse of data that occur when data are used without collective scrutiny. Ethical review processes should be integrated into all AMS data initiatives to ensure that even when risks cannot be entirely avoided, strategies are in place to support those affected.

9. CONCLUSION

AMR is no longer a distant threat, it's a growing reality, especially in LMICs where diagnostic gaps, empirical prescribing and limited surveillance infrastructure exist. However, the growing availability and reliability of data offers an opportunity to strengthen AMS efforts in the region.

These case studies have illustrated how diverse data sources have been harnessed to design, implement and evaluate AMS interventions. To fully attain the potential of data-driven AMS, stakeholders must make sustained investment in infrastructure, capacity building, ethical governance and cross-sectoral collaboration. As countries continue to scale up surveillance and stewardship programmes, it is essential to ensure that data strategies are context specific, inclusive and responsive to the needs of both health systems and the population they serve.

By centring these efforts on the needs of the community and the public good, these strategies operationalize data solidarity to create collective instruments of control that ensure the benefits of digital health are shared equitably across society.

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About DTH-Lab

DTH-Lab is a global consortium of partners working to drive implementation of The Lancet and Financial Times Commission on Governing Health Futures 2030's recommendations for value-based digital transformations for health co-created with young people. DTH-Lab operates through a distributive governance model, led by three core partners: Ashoka University (India), DTH-Lab (hosted by the University of Geneva, Switzerland) and PharmAccess (Nigeria).

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DIGITAL TRANSFORMATIONS FOR HEALTH LAB

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