AFRICA CDC
Centres for Disease Control and Prevention
Safeguarding Africa's Health

REGIONAL GUIDANCE FOR THE ESTABLISHMENT AND IMPLEMENTATION OF ANTIMICROBIAL STEWARDSHIP PROGRAMS

2nd Edition

Acknowledgement

This Second Edition of the Regional Guidance on the Establishment and Implementation of Antimicrobial Stewardship Programs has been a collaborative effort between the East Central and Southern Africa Health Community, the Africa Centers for Disease Control and Prevention, member states and partners. The review follows the successful adoption and implementation of the first edition developed through East African Public Health Laboratory Network project.

The authors of this regional guidance document for the establishment and implementation of Antimicrobial Stewardship programs would like to express their sincere thanks to the National Antimicrobial resistance (AMR) focal persons from the Ministries of Health of the African Union member states from Eastern and Southern African region ,key development and implementing Partners who have supported the detailed review and provided valuable inputs on this regional guidance document.

Funding provided by the World Bank, through the Strengthening Pandemic Preparedness (SPP) Project and the Health Emergency Preparedness Response and Resilience Program for the development of this second edition of the Regional Guidance on Establishing and Implementing Antimicrobial Stewardship Programs is gratefully acknowledged.

We achieved this together. God Bless you all.

Preface to the Second Edition

Since the publication of the first edition of the "Regional Guidance document for the development and implementation of Antimicrobial Stewardship Programs" the landscape of antimicrobial resistance (AMR) and the challenges facing healthcare systems in Africa in the process of implementing National Action Plans on AMR have continued to evolve. The initial guidance provided a vital foundation for setting up antimicrobial stewardship programs for many countries and healthcare facilities across the region, and the feedback received has been instrumental in shaping this second edition.

The second edition of this guidance comes at a critical time. The global health community has increasingly recognized the importance of addressing AMR as an urgent public health priority. In Africa, the dual burden of infectious diseases and AMR necessitates more robust and adaptable strategies to preserve the efficacy of antimicrobial agents and improve patient outcomes. This revised document aims to build upon the successes and lessons learned from the first edition while integrating new insights, data, a nd strategies to further strengthen antimicrobial stewardship (AMS) programs in the region.

Key enhancements in this second edition include:

1. **Enhanced Focus on Practical implementation, Sustainability and Integration:** Offering a clear step wise approach for ensuring practical implementation, monitoring and the long-term sustainability of AMS programs, including securing ongoing funding, integrating stewardship principles into the health system, healthcare culture and work flows.
2. **Regional Collaboration and Networking:** Emphasizing the importance of regional cooperation, to enhance south to south learning. This edition encourages the sharing of knowledge, resources, and best practices among countries to create a stronger collective response to AMR through context specific AMS programs

As we present this second edition, we remain committed to supporting countries, policymakers, and administrators in their efforts to combat AMR. The guidance provided herein is designed to be flexible and adaptable, allowing countries to contextualize and implement effective AMS programs regardless of their resources or starting point.

We extend our gratitude to all those who contributed to this revised edition and to the healthcare workers across Africa who continue to strive for excellence in antimicrobial stewardship. Your dedication is essential to safeguarding the health of our communities and ensuring the continued effectiveness of antimicrobial treatments.

We hope that this second edition will serve as an even more valuable resource, inspiring and guiding the next steps in our collective journey to combat antimicrobial resistance in Africa.

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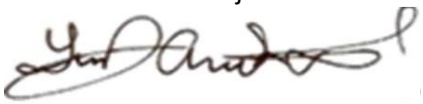
Foreword

Antimicrobial resistance (AMR) is not only a health issue causing significant morbidity and mortality, it is also an economic matter world over. Left unchecked, it will be responsible for 10 million people dying every year and a reduction of 2% to 3.5% in Gross Domestic Product (GDP) by 2050.
The Global Research on Antimicrobial Resistance (GRAM) study estimated that as many as 1·27 million of the 7·7 million estimated deaths attributable to bacterial infections could be caused by bacterial pathogens resistant to the antibiotics available to treat them and that 4·95 million deaths were associated with bacterial AMR in 2019. The situation gets worse in low and middle-income countries where the estimated all-age death rate attributable to resistance was highest in west Africa (27·3 deaths per 100000 people) including sub-Saharan Africa where the fragile health systems have low capacity to detect and manage the scourge. The higher cost of second-line antimicrobials forms an added burden to our weak economies. Overuse or inadequate therapies of antibiotics both play a role in the development of anti-microbial resistance. The reasons for this irrational use are vast and therefore need a focused and systematic approach to deal with the problem.

There is consensus that to stem the worsening situation of AMR, there is a need to initiate systemic and sustained effort to reduce irrational use of antimicrobials. Antimicrobial stewardship (AMS) is one of the key strategies to overcome resistance. It involves the careful and responsible management of antimicrobial use by a multi-professional effort. The success of a stewardship program in an organization needs to account for: motivation at all levels of the organization to improve outcomes for patients with infections, prevent avoidable harm related to antimicrobial prescribing and recognition of the potential and actual impact of antimicrobial resistance.

Many times, plans are proposed with unrealistic lift and shift approaches or little consideration of where and when to apply the suggested strategies. This obviously leads to failure. The guidance document provides a list of suggested interventions discussed by level of service and resources available for use with taking into consideration the health system building blocks. The East, Central and Southern Africa Health Community (ECSA-HC) is honored to have coordinated in collaboration with the Africa Centers for Disease Prevention and Control (Africa CDC) the review of this important document for the African Continent. This is in line with the mandate given to ECSA-HC by its Member States to implement programs aimed at encouraging efficiency and relevance of health services, towards the attainment of the highest standards of health for the populations in the region. It is also in line with the aspirations of the African Union Framework on Antimicrobial Resistance Control 2020-2025. This Second edition of AMS Guidance document covers human health aspects. The next edition will cover AMS in animal health.

ECSA-HC and the Africa CDC would like to wish all stakeholders involved in the implementation of this guidance document success. The fight against AMR requires tireless and committed involvement of all stakeholders and a joint effort.



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Abbreviations and acronyms

Africa CDC	Africa Centres for Disease Control and Prevention
AFENET	African Field Epidemiology Network
AMAs	Antimicrobial Agents
AMR	Antimicrobial Resistance
AMS	Antimicrobial stewardship
AMU	Antimicrobial Use
ASG	Antimicrobial Stewardship Guidance document
ASLM	African Society for Laboratory Medicine
ASM	American Society of Microbiology
AWaRe	Access, Watch and Reserve
CDC	United States Centres for Disease Control and Prevention
CMEs	Continuous Medical Education
CO	Clinical officer
CPD	Continuous professional development
DDD	Defined Daily Dose System
DHIS	District Health Information System
DJCC	ECSA-HC Director's Joint Consultative Committee
DOT	Days of Therapy
EAC-HSC	East African Community Health and Scientific Conference
ECSA-BPF	East, Central and Southern Africa Health Community, Best Practices Forum
ECSA-HC	East, Central and Southern Africa Health Community
ECSA-HC HMC	ECSA-HC Health Ministers Conference
GCLP	Good Clinical and Laboratory Practice
GDP	Gross Domestic Product
GHSA	Global Health Security Agenda
GMP	Good Manufacturing Practice
HMT	Health Management Team
ICAN	Infection Control Africa Network
ID physician	Infectious diseases physician
IPC	Infection Prevention and Control
KAPS	Knowledge attitude and practices survey
LIMS	Laboratory information management system
LQMS	Laboratory quality management systems
MDRO	Multidrug resistant organisms
MO	Medical Officer
MTCs	Medicines and therapeutics committees
NGOs	Non-governmental organizations
PDSA	Plan-Do-Study-Act
PPP	Public private partnership
PPS	Point prevalent surveys
QA Models	Quality Assurance Models
R&D	Research and Development
SLIPTA	Stepwise Laboratory Improvement Towards Accreditation
SSI	Surgical site infections
UNGASS	United National General Assembly
URTI	Upper respiratory tract infection
UTI	Urinary Tract Infection
WHA	World Health Assembly
WHO	World Health Organization

Glossary

Antimicrobial agents (AMAs): are agents that kills microorganisms or stops their growth. Antimicrobial medicines can be grouped according to the microorganisms they act primarily against. For example, antibiotics are used against bacteria, and antifungals are used against fungi.

Antimicrobial Resistance (AMR): is the ability of a microbe to resist the effects of medication that once could successfully treat the microbe.

Antimicrobial stewardship (AMS): is a coordinated program that promotes the appropriate use of antimicrobials (including antibiotics), improves patient outcomes, reduces microbial resistance, and decreases the spread of infections caused by multidrug-resistant organisms.

Antimicrobial Stewardship Guidance (ASG): is a guidance document for developing National Antimicrobial stewardship Guidelines, provides a framework for implementing strategies to control AMR.

"AWaRe": This is a WHO classification of antibiotics in its Essential Medicines List into Access, Watch and Reserve (AWaRe) groups. ***Access group*** - includes antibiotics that have activity against a wide range of commonly encountered susceptible pathogens while also showing lower resistance potential than antibiotics in the other groups. ***Watch group*** **-** includes antibiotics that have higher resistance potential and includes most of the highest priority agents among the Critically Important Antimicrobials for Human Medicine and/or antibiotics that are at relatively high risk of selection of bacterial resistance. ***Reserve group*** - includes antibiotics and antibiotic classes that should be reserved for treatment of confirmed or suspected infections due to multi-drug-resistant organisms.

Continuous Medical Education (CMEs): Refers to a specific form of continuing education (CE) that helps those in the medical field maintain competence and learn about new and developing areas of their field

Defined daily dose (DDD): is a statistical measure of drug consumption, defined by the World Health Organization (WHO) Collaborating Centre for Drug Statistics Methodology.

Global Health Security Agenda (GHSA): is a multi-partner and multi-country initiative that targets to reduce health threats from infectious diseases outbreaks through prevention, timely detection and response strategies.

Member States (MS): is a state/country that is a member of East African Community or the East, Central and Southern Africa Health Community.

Regional: East African Community and the East, Central and Southern Africa Health Community.

Executive Summary

This regional Guidance document for the development and implementation of Antimicrobial stewardship (AMS) Programs is intended to act as a blueprintt and provide a guide into the development of National AMS programs in the countries. The document provides a guide on the key 'what to do' and to 'how to' guiding actions on setting up AMS programs at the national, sub-national and community levels of health systems.

Effective antimicrobial agents are prerequisites for both preventive and curative measures, protecting patients from potentially fatal diseases and ensuring that complex procedures, such as surgery and chemotherapy, can be provided at low risk. Yet systematic misuse and overuse of these drugs in human medicine and food production have put every nation at risk. Without harmonized and immediate action on a global and regional scale, the world is heading towards a post-antibiotic era in which common infections could once again kill. Alert to this crisis, the May 2015 World Health Assembly adopted a global action plan on antimicrobial resistance.

At a regional level, monitoring the use of antimicrobial agents is critical to inform sustainable implementation of AMS programmes which heavily depend on stable systems, infrastructure, capacity, and interventions relevant for human and animal health and plant production. Strengthening the systems, infrastructure, capacity, and interventions span multiple levels for example at: global and continental level: how new antibiotics are introduced to the market, labelled, priced, distributed and used; national level: legislation, regulation and national treatment guidelines; hospital level: optimizing the use of antibiotics for patients in hospitals; and at community level: fostering access and appropriate use at health care access points and in animal health through awareness raising and targeted interventions. Establishing AMS programs in the countries will be critical to ensure rational and appropriate use of medicines.

Antimicrobial stewardship is a coordinated program that promotes the appropriate use of antimicrobials (including antibiotics), improves patient outcomes, reduces microbial resistance, and decreases the spread of infections caused by multidrug-resistant organisms. There is limited information and models that can demonstrate successful implementation of AMS in resource limited settings. Consequently, it is critical that the models proposed will be able to support a sustainable AMS program that evaluates, incorporates and strengthens the components in the framework for implementing AMS; research and development; regulation and manufacturing; selection; procurement, supply, and distribution; and diagnostic, prescribing medicine, dispensing and responsible use.

The document covers the following areas: -

Part 1 - Background: this section provides background on the burden of antimicrobial resistance globally, regionally and in each country and provides the rationale of setting up AMS programs within the countries.

Part 2 - Components of Stewardship: this section provides the foundational and infrastructural components for ensuring availability of medicines that are properly regulated, proper diagnostics and systems that are fundamental setting effective AMS programs. These components include: research and development, regulation and manufacturing, supply chain management covering drug selection, procurement, supply, and distribution and diagnostics, prescriptions, dispensing and appropriate use. In each of the components, the document has identified critical gaps in the systems, proposed strategies to address the gaps and taken stock of the available resources within the countries, regionally and internationally.

Part 3 - Elements of a Stewardship program: This section describes the essential elements for antimicrobial stewardship programs in the hospital settings, administrative levels (national and sub-national) and community settings. The document has identified the core elements accounting for needs

of the countries in the region. The core elements covered in this document are; leadership commitment, governance structure, accountability and drug expertise, reporting, education and training, communication, quality improvement. For each core element, this guidance has defined the core element, required actions and the roles and responsibilities for the various levels of leadership.

Part 4: Actions and effective interventions: This section documents the effeective interventions required to implement AMS programs. The document provides a description of actions to be taken at various levels of service delivery and administrative levels in order to effectively promote and implement a good AMS program. These interventions have further been structured by the technical areas of care including pharmacy driven interventions, infection and syndrome specific Interventions, diagnostic driven interventions and education.

Part 5: Monitoring and evaluation: The M&E framework outlines the indicators, outcomes/results following implementation of the actions and interventions proposed in the document. It outlines how the proposed strategies are expected to yield outcomes. The section is meant to monitor, evaluate and report on the progress of implementation of the interventions.

Part 6: Resource Mobilization: resource mobilization refers to all activities involved in securing new and additional resources. The section covers the suggested opportunities for resource mobilization for AMS Program through internal sources from the member states, external donor institutions and development partners. Stewardship activities can be incorporated within existing programs at the Ministry of health and other institutions. Many government programs may already have a stewardship element imbedded in their routine activities.

Part 7: Risk assessment and Management: Risk management involves identification, monitoring and managing potential risks in order to minimize the negative impact they may have on the implementation of AMS program. The document has identified a number of anticipated risks and risk mitigation strategies.

Part 1

Background

1

Background

Introduction

Over the years, antibiotics have reduced the burden of infectious diseases and have become critical in many medical interventions such as surgery and organ transplants making the development and widespread use of antimicrobial agents (AMAs) among the most important public health intervention over several years. Widespread use of AMAs in medicine has enhanced expression of human pathogens resistant to these agents resulting in increased selective pressure which has been seen as microorganisms rapidly develop resistance to AMAs[1].

The loss of efficacy of AMAs against common pathogens has not only led to a shift towards more expensive antimicrobial agents but also to increased morbidity and mortality in low-income and middle-income countries, where affordability of second-line drugs restricts their use. The intensity of the emergence of resistance is driven by a population's volume of consumption of AMAs, whether use is appropriate or not. Access to effective antibiotics is further dependent on drug development, regulatory approval processes, health system capacity, availability, affordability, and stewardship and in many countries even existing antibiotics are not available or accessible to patients.[2]
It is estimated that in 2009, more than 3 million kilograms of antimicrobials were administered to human patients in the United States. While the life-saving benefits of antimicrobials are indisputable, the consequences of use and misuse must also be considered. Major concerns related to the use of antimicrobials are increasing resistance, increased healthcare costs and higher incidence of infection (*Clostridium difficile*). While much of the discussion focuses on overuse, there is also evidence of adverse outcomes associated with inadequate antimicrobial therapy. Continued rise in resistance could lead to 10 million people dying every year and a reduction of 2% to 3.5% in Gross Domestic Product (GDP) by 2050, and this would cost the world up to 100 trillion USD[3].

The Global Research on Antimicrobial Resistance study estimated that 4·95 million deaths were associated with bacterial AMR in 2019, including 1·27 million deaths attributable to bacterial AMR putting the global burden of AMR in sharper focus. In 2019, an estimated 7·7 million people died of infections associated with 33 bacterial pathogens, both resistant and susceptible to antibiotics. Of the estimated 1·27 million deaths attributed to AMR in 2019, 1·12 million were in low-income and middle-income countries (LMICs). These deaths included more than 253 000 children younger than 5 years in LMICs and a total of 255 000 people in sub-Saharan Africa.[4]

The Africa Union prioritized the need to increase the proportion of physicians and other human health providers adhering to antimicrobial use guidelines[5]. Promoting prudent antimicrobial use is particularly

[1] Laxminarayan R, Duse A, Wattal C, Zaidi AKM, Wertheim HFL, Sumpradit N, et al. Antibiotic resistance-the need for global solutions. Lancet Infect Dis. 2013; 13:1057–1098. doi: 10.1016/S1473-3099(13)70318-9.
[2] World Health Organization. Global action plan on antimicrobial resistance [Internet]. Geneva: World Health Organization; 2015. https://www.who.int/publications/i/item/9789241509763.
[3] Jim O'Neill. Antimicrobial Resistance: Tackling a crisis for the health and wealth of nations. The Review on Antimicrobial Resistance, 2014.

[4] Global Burden of Disease: a systematic analysis. Lancet. 2022. https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(21)02724-0/fulltext.
[5] African Union Framework for Antimicrobial Resistance Control 2020–2025. https://africacdc.org/download/african-union-framework-for-antimicrobial-resistance-control-2020-2025/.

challenging in Africa, due to poor diagnostic capacity, lack of standard treatment[6] guidelines, implementing structural changes and driving behavioral modification amongst physicians. However, major ethical dilemma is finding the balance antimicrobial access versus excess while addressing issues of falsified and substandard antimicrobials.

To better describe the burden of AMR and challenges in Africa, the Mapping Antimicrobial Resistance and Antimicrobial Use Partnership (MAAP) consortium published a multi-year, multi-country study highlighting stark insights on the under-reported depth of the antimicrobial resistance (AMR) crisis across 14 African countries. The report drawn from records spanning 2016-2019 from 205 laboratories and 327 hospital and community pharmacies and 16 national-level AMC datasets. The data indicated that most laboratories across Africa lacked capacity for AMR testing with only 1.3% of the 50,000 medical laboratories from the member states conducting bacteriology testing indicating weak capacity to support AMR surveillance and inform policy and practice. On access to diagnostics, 80% of the assessed laboratories performed less than 1,000 Antimicrobial Susceptibility Tests per year with only 5 of 15 antibiotic-resistant pathogens prioritized by the WHO causing the greatest threat to human health were consistently tested in most countries. The report further showed that in eight of the 14 countries, more than half of the population cannot access any bacteriology laboratory. Most laboratories had manual laboratory information systems creating gaps in effective linkage of laboratory, clinical and treatment data, further complicating patient management and stewardship efforts. There was limited data on use of antimicrobial medicines in human health or in agriculture and food production systems. Sixty seven percent of antibiotics used in healthcare settings were skewed towards four drugs only with at least 80% of total drug consumption, represented by Access drugs in most countries as per WHO recommendations.[7]

Improving use of antibiotics through people centered approaches in antibiotic stewardship is one of the key interventions necessary to curb the further emergence and spread of antimicrobial resistance (AMR). It is also important for ensuring appropriate treatment.[8]

Antimicrobial Stewardship (AMS) programs are key approaches in National Action Plans on AMR and are aimed at promoting rational use of antimicrobials to reduce the risk of AMR. With diversities in health systems across countries lifting and shifting AMS interventions from one region, setting or country to another can be ineffective, with the AMS programs being relatively new in some countries in the African region and varied levels of preparedness. For effective implementation, there is need for contextual understanding to support implementation of country-specific, practical, AMS programs. Since sustainable implementation depends on functional health systems, a whole-systems approach is required[9].

Effective Antimicrobial Stewardship programs promote rational use of antimicrobials to help promote patient safety, reduce health care costs through shorter hospital stays, reduced expenditure on antimicrobials and ultimately lowering the risk of AMR.[10]

[6] Craig J, Hiban K, Frost I, Kapoor G, Alimi Y, Varma JK. Comparison of national antimicrobial treatment guidelines, African Union. Bull World Health Organ. 2022 Jan 1;100(1):50-59. doi: 10.2471/BLT.21.286689.
[7] Incomplete Antimicrobial Resistance Data in Africa: The Crisis Within The Crisis. Mapping Antimicrobial Resistance and Antimicrobial Use Partnership 2022. https://aslm.org/wp-content/uploads/2022/09/ASLM_MAAP-Policy-Brief_Embargoed-until-15-Sept-6AM-GMT.pdf?x69286.
[8] People-centred approach to addressing antimicrobial resistance in human health: WHO core package of interventions to support national action plans. Geneva: World Health Organization; 2023. https://www.who.int/publications/i/item/9789240082496.
[9] Shamas N, Stokle E, Ashiru-Oredope D, Wesangula E. Challenges of implementing antimicrobial stewardship tools in Low to Middle Income Countries (LMICs). Infect Prev Pract. 2023 Nov 14;5(4):100315. doi: 10.1016/j.infpip.2023.100315.
[10] Nathwani D. British Society for Antimicrobial Chemotherapy. Antimicrobial Stewardship from Principle to Practice. 2018. https://www.bsac.org.uk/antimicrobialstewardshipebook/BSAC-AntimicrobialStewardship-FromPrinciplestoPractice-eBook.pdf

Several barriers to implementation of AMS in LMICs have been identified health system, supply chain and regulation, professional capacity and capability, health facilities infrastructure, and cross sectorial collaborations. This in LMICs is further complicated by presence of political strife, conflict and health emergencies which results in destabilisation of health systems, healthcare worker (HCW) migration and forceful displacement of populations internally and externally. This significantly compromises the implementation of AMS programs. It is important to consider implementation strategies considering the overall impact of resource-limited health systems in implementing effective and sustainable AMS Programs.

There is limited information and models that can demonstrate successful implementation of antimicrobial stewardship in resource limited settings. Consequently, it is critical that the models proposed will be able to support an antimicrobial stewardship program that evaluates, incorporates and strengthens the components in the framework for products development from manufacturing to consumption (research and development; regulation and manufacturing; selection; procurement, supply, and distribution; and diagnostic, prescribing medicine, dispensing and responsible use) strengthening the health systems and foundational components of implementing antimicrobial stewardship WHO (figure 1.1)[11, 12].

At a regional and national level, monitoring the use of antimicrobial agents is critical to inform policy and practice which heavily depend on stable systems, infrastructure, capacity, and interventions relevant for human and animal health and plant production. Strengthening the systems, infrastructure, capacity, and interventions span multiple levels for example at: global and regional level: how new antibiotics are introduced to the market, labelled, priced, distributed and used; national level: legislation, regulation and national treatment guidelines; hospital level: optimizing the use of antibiotics for patients in hospitals; and at community level: fostering access and appropriate use at health care access points and in animal health through awareness raising and targeted interventions.

[11] Kiggundu R, Lusaya E, Seni J, Waswa JP, Kakooza F, Tjipura D, Kikule K, Muiva C, Joshi MP, Stergachis A, Kitutu FE, Konduri N. Identifying and addressing challenges to antimicrobial use surveillance in the human health sector in low- and middle-income countries: experiences and lessons learned from Tanzania and Uganda. Antimicrob Resist Infect Control. 2023 Feb 9;12(1):9. doi: 10.1186/s13756-023-01213-3.
[12] Global Framework for Development & Stewardship to Combat Antimicrobial Resistance. WHO/EMP/IAU/2017.08 (revised 19 October 2017). https://www.who.int/publications/m/item/global-framework-for-development-stewardship-to-combat-antimicrobial-resistance-draft-roadmap

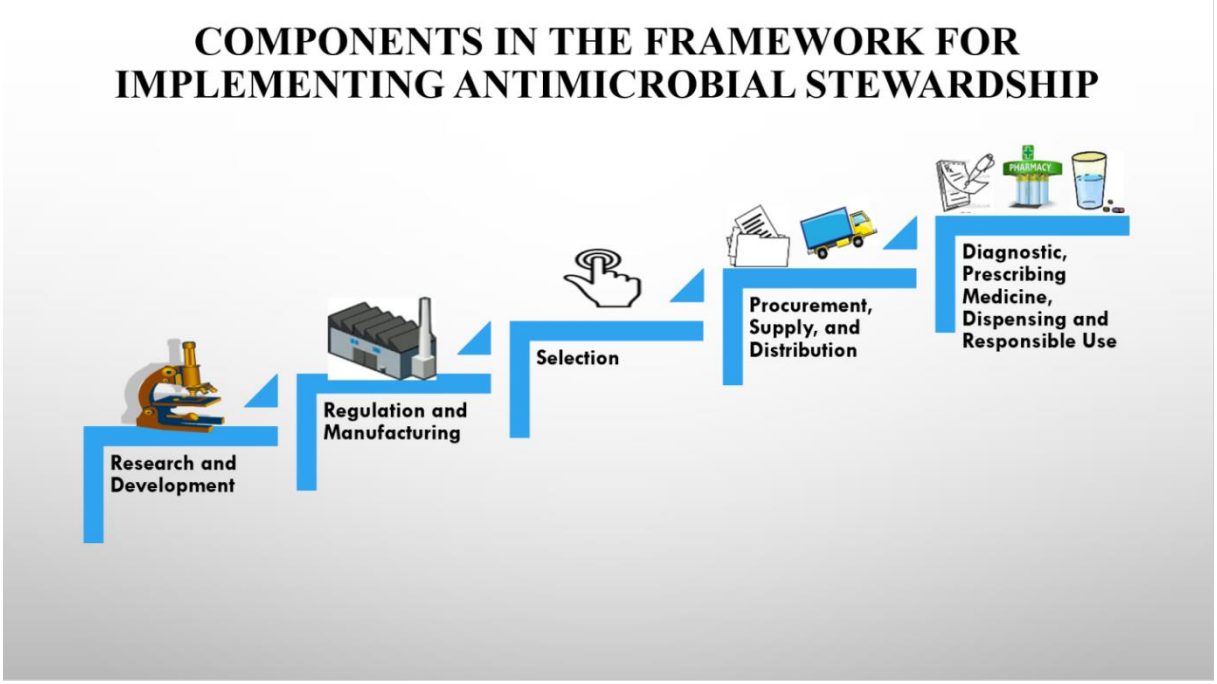

Figure 1.1. Products lifecycle and linkage to Antimicrobial stewardship (source: WHO/EMP/IAU/2017.08)

This regional guidance document for the Establishment and Implementation of Antimicrobial Stewardship Programs in Health Care Settings is intended to act as a guide into the development of National Antimicrobial Stewardship programs in the countries within the region. The document provides considerations on the key 'what to do' and to 'how to' guiding actions on setting up AMS programs at the National, sub-national and community levels of health systems. The basis of the document is on the pillars highlighted above on product lifecycle (below referred to as components) and the core-elements of AMS as prescribed by the World Health Organization[13],[14].

[13] Antimicrobial stewardship programmes in health-care facilities in low- and middle-income countries. A practical toolkit. Geneva: World Health Organization; 2019. https://www.who.int/publications/i/item/9789241515481.

[14] World Health Organization. (2021). WHO policy guidance on integrated antimicrobial stewardship activities. https://cdn.who.int/media/docs/default-source/antimicrobial-resistance/report-of-emro-regional-workshop-on-who-policy-guidance-on-ams-final.pdf?sfvrsn=24309eed_1&download=true

Part 2

Components of Antimicrobial Stewardship

2 Components of Antimicrobial Stewardship

This section provides the foundational and infrastructural components for ensuring availability of medicines that are properly regulated, proper diagnostics and systems that are fundamental setting effective antimicrobial stewardship programs. The section links the products lifecycle and antimicrobial stewardship to include the following components include: research and development, regulation and manufacturing, supply chain management covering drug selection, procurement, supply, and distribution and diagnostics, prescriptions, dispensing and appropriate use.

Component 1: Research and Development

The concept of Research and Development (R&D) involves the development of new antimicrobial medicines, diagnostic tools, vaccines and other interventions for detecting, preventing and controlling antimicrobial resistance. Research and development fundamentally support the access pillar in antimicrobial stewardship by promoting the availability of innovative means of preventing and controlling anti-microbial resistance. The World Health Organization (WHO) set up a new product development partnership with the Global Antibiotic Research and Development Partnership to develop new antibiotic treatments while endeavouring to ensure sustainable access.

While the development of new drugs is important to ensure sustained therapy choices, development of new therapies has been affected negative by several factors that hinder new investments in drug development. These include limited funding for basic research, government commitment to research, lack of motivation to new molecules discovery, regulatory issues, and problems with drug safety that lead to product withdrawals among others. Navigating novel products or technologies through the existing regulatory pathways with evolving regulatory environment as scientific discovery advances. Investors are not motivated to develop new drugs owing to uncertainty of the regulatory process unless there is clear evidence of the products safety and effectiveness.[15] WHO published a list of antibiotic-resistant priority pathogens containing 12 families of bacteria that pose the greatest threat to human health. This was drawn to guide and promote research and development (R&D) of new antibiotics, as part of WHO's efforts to address growing global resistance to antimicrobial medicines[16].

[15] Institute of Medicine (US) Forum on Drug Discovery, Development, and Translation. Breakthrough Business Models: Drug Development for Rare and Neglected Diseases and Individualized Therapies: Workshop Summary. Washington (DC): National Academies Press (US); 2009. 2, Current Model for Financing Drug Development: From Concept Through Approval. Available from: https://www.ncbi.nlm.nih.gov/books/NBK50972/. Accessed on 20th May 2019

[16] WHO bacterial priority pathogens list, 2024: Bacterial pathogens of public health importance to guide research, development and strategies to prevent and control antimicrobial resistance. https://www.who.int/publications-detail redirect/9789240093461

Countries require a nationally driven R& D that includes: - Research on vaccines, diagnostics and production as well as alternative medicines.

Table 2.1 below shows gaps in research and development, proposed strategies, roles and responsibilities (regional leadership, national leadership, sub-national leadership, healthcare institution and community leadership), and available resource to be leveraged.

Table 2.1: Gaps and strategies: Research and development

Gaps	Strategies and Solutions	Leadership Responsibilities	Resources Available
Limited investment in research and development	▪ Advocacy for Buy-in and ownership on research agenda. ▪ Develop a national research agenda for the country for AMR/U	National Regional, International, National, County and Hospital, Communities	Continental organization, Africa CDC, WHO AFRO, Regional organization (EAC Health Research Commission; ECSA, Academic institutions, Research Institutions
	▪ Develop Country guidelines on advocacy and communication strategy on antimicrobial resistance	National	National Council of Science and Technology. Academia and Research institutions.
Lack of Motivation for New Molecules development	▪ Incentivising drug developers including patenting	National	Availability of regulatory bodies
Limited analytical capacity	▪ Build analytical capacity in data analysis interpretation of results, and design of data collection tools through training programs. ▪ Establish the use of existing systems with analytical capabilities	Regional, International, National, Sub-national and County	Regional and national research institutions WHONET system has analytical capabilities
Translation of research findings to actionable policies and practices	▪ Engage communication experts to translate technical research finding into policy briefs and recommendations	Regional, International, National, Sub-national and County	Engage health communication experts at the regional, national and county level
Lack of data on alternative medicine treatment options	▪ Support research on alternative treatment options and foster collaboration between researchers and alternative medicine community	Regional and National	Engage regional research institutions who support alternative medicine
Absence of strong research background in undergraduate and postgraduate professional training	▪ Cultivate inclusion of research in the curriculum of training programs	Regional and National	Academic institutions to incorporate programs form research into training programs
Lack of policies on generated data use and dissemination. Limited data sharing between various disciplines on research findings	▪ Develop protocols for reporting and dissemination of data locally. ▪ Establish interphase that connects data generators and the users. ▪ Foster collaboration between researcher's, program managers and policy makers.	National Regional, International, National, County and Hospitals	IRBs International meetings – UNGASS,AU summit, CPHIA WHA, ICAN, Regional Conference, (ECSA-BPF, DJCC/HMC; EAC-HSC), and National For a
Lack of robust monitoring and evaluation system	▪ Establish indicators for monitoring stewardship interventions and design a system for AMR stewardship	Regional and National	Surveillance system Health Management Information systems

Component 2: Regulation and Manufacturing

Regulation entails efforts to enforce policies that determine whether new medicines can be approved and how they are used in the treatment and prevention of human disease. In developed world, drug development is legislated and implemented by the regulating bodies such as the Federal Drug Agency in the United States and European Medicine Agency in Europe.[17] Pharmaceutical manufacturing processes can contribute to antimicrobial resistance through the following key routes:

- Releasing antibiotics into the environment in wastewaters,
- Irrational use in humans and in the livestock industry when used for prophylaxis and feed boosters; and
- Manufacturing antibiotics with insufficient levels of the active antibiotic ingredient.

Regulation and manufacturing fundamentally support the access pillar in antimicrobial stewardship because they serve as the gatekeeper for the influx of new antimicrobial. Excessive and stringent regulations and guidelines implemented by regulatory bodies for clinical trials can impede the availability of new drugs in the process of safeguarding the public from harm. Contrary to manufacturing that needs to be monitored as the emission to the environment and wastewater can contribute to the increase in antimicrobial resistance. Recommend enforcement of good manufacturing practices and post market surveillance of antimicrobial agents.

Table 2.2 below shows gaps in regulation and manufacturing, proposed strategies, roles and responsibilities (regional leadership, national leadership, sub-national leadership, healthcare institution and community leadership), and available resource to be leveraged.

Table 2.2: Gaps and strategies in regulation and manufacturing

Gaps	Strategies and Solutions	Leadership responsibilities	Resources Available
Weak regulation on practices related to drugs administration	▪ Enhance inspection of antimicrobial dispensing units and pharmacies ▪ Develop harmonized tools for assessing compliance to regulatory standards ▪ Engaging in PPP to enhance enforcement and reduce malpractices ▪ Public education and awareness of the public on risks associated with purchase of medicine without a prescription ▪ Conduct operational/implementation research e.g. Knowledge attitudes and Practices (KAP) studies, point prevalence studies (PPS) etc.	Regional and National	Regional and international accreditation organizations Rebate programs e.g. National Health Insurance Fund National regulatory bodies Guidelines for harmonization of regulation of medicine-Africa Medicines Agency AMA, EAC
International trade barriers that restrict full	▪ Country level engagements into rational decisions on international trade barriers	Regional and National	Regional organizations to which countries subscribe

[17] Global Framework for Development & Stewardship to Combat Antimicrobial Resistance. http://www.who.int/phi/implementation/ research/ WHA_BackgroundPaper-AGlobalFrameworkDevelopmentStewardship.pdf

country level participation			that may negotiate to address trade barriers
Excessive and stringent regulations and guidelines impending on availability of new drugs	▪ Stringent but friendly regulatory frameworks and approval processes for new drugs and clinical trials	National	Regional and international accreditation organizations Rebate programs e.g. National Health Insurance Fund National regulatory bodies
Lack of effective enforcements of policies and guidelines for Good Manufacturing Practices (GMP)	▪ Adopting and harmonizing the guidelines for GMP per country	National	National regulatory bodies Guidelines for harmonization of regulation of medicine-EAC
Inadequate enforcement quality assurance and monitoring programs for rational use	▪ Carry out monitoring activities for compliance to stewardship standards. ▪ Standardized guidelines to support stewardship including QA models ▪ Champion hospital accreditation programs Accreditation and certification of hospitals to enforce compliance to standards ▪ Licensing and re-licensure of the health facilities	National, Sub-national, and Hospitals	Accreditation bodies and programs; regulatory bodies
Inadequate enforcement regulations to control waste management of pharmaceuticals	▪ Develop and strengthen policies to regulation of waste disposal ▪ Establish safe disposal programs at sub-national levels to support hospitals and community health units ▪ Advocate for safe disposal of antimicrobial agents in the community	Regional and National	Community health structures Pharmaceutical waste disposal structures

QA models - quality assurance models

Component 3: Supply Chain Management

Selection, procurement, supply, and distribution

Antimicrobial stewardship program cannot succeed without improvement of supply chain for antimicrobials, reagents and related supplies. An ineffective supply chain can lead to a shortage of supplies which is linked to disease outbreaks inappropriate use, anti-microbial resistance and contributes to the circulation of counterfeit or substandard products. The primary objective of an efficient supply chain should be to ensure that the right medicine is given to the right patient, at the right time and the right price.

There are three broad strategies that experts and stakeholders such as non-governmental organizations (NGOs), governments, academics, and industry representatives expect pharmaceutical companies to use to improve the effectiveness and efficiency of supply chains in low to middle-income countries. These strategies include: -

- demand planning;
- ensuring sufficient, uninterrupted supply; and
- strengthening the distribution chain

The management of supply chain is therefore organized around selection, quantification, procurement and distribution.

Medicines selection is a critical factor in the successful implementation of access to antimicrobials which has implications for antimicrobial stewardship. Medicines selection should include assessment of the evidence-base for the medicine choice and pharmacoeconomic evaluations. Decisions around the selection of medicine for inclusion on a formulary or medicines list should also consider issues such as access and implementation. Governments must guarantee uninterrupted access to essential medicines of assured quality.

Forecasting and quantification information should form the basis of antimicrobial procurement. Accurate quantification requires data from various sources including antimicrobial consumption and prescription patterns. Also, in order to maintain the quality of antimicrobials, all stakeholders in the supply chain must comply with the applicable legislation and regulations. All activities in the supply chain must comply with Good distribution and Good Storage Practices.

Ensuring a strong supply chain of reliable diagnostic tests, reagents, and consumables is one of the key factors for creating a sustainable, strong system on AMR surveillance and antimicrobial use. Hence, efficient systems for managing **drug procurement and distribution** should be put in place to avoid interruptions in supply or wastage.

Table 2.3 below shows gaps in selection, procurement, supply, and distribution proposed strategies, roles and responsibilities (regional leadership, national leadership, sub-national leadership, healthcare institution and community leadership), and available resource to be leveraged.

Table 2.3: Gaps and strategies in supply chain management

Gaps	Strategies and Solutions	Leadership Responsibilities	Resources Available
▪ Lack of evidence at regional level that guide inclusion of the antimicrobials on the essential medicine list	▪ Strengthen AMR surveillance to guide selection of antimicrobials	Regional/National	Structures for AMR Surveillance
▪ Stockout/shortage of laboratory reagents and consumables	▪ Strengthen the supply chain	National/Sub national	National drug management authorities in each country
▪ Counterfeit or substandard antimicrobials in the supply chain	▪ Ensure pre and post market surveillance for antimicrobials in the country is conducted	Regional/National	Regulatory bodies for drugs
▪ Inaccurate forecasting and quantification of antimicrobial requirements due to lack of accurate data	▪ Develop a national database on antimicrobial consumptions	National/Sub national	Training programs on supply chain management
▪ Lack of updated essential medicines list and formularies	▪ Update the essential medicines list based on efficacy, safety, quality and cost effectiveness	National	Essential drug list available
▪ Inadequate communication between the end users and the procurement department	▪ Improve communication between the end users and the procurement department	National/Sub national	Medicines and therapeutic committees available in countries to guide essential medicines list
▪ Inadequate technical capacity for the supply chain management	▪ Capacity building on supply chain management	National	Training programs on supply chain management

Component 4: Diagnostic, prescribing dispensing and responsible use of medicine

Diagnostics: One of the critical elements for improving antimicrobial stewardship and drug development is the rapid and accurate identification of the pathogens, as well as rapid and accurate antimicrobial susceptibility testing. Effective antimicrobial stewardship is closely linked with the ability to make correct diagnoses. Incorrect diagnoses can lead not only to overuse or misuse of antibiotics, particularly the critical broad-spectrum antibiotics, but also to poor outcomes for patients resulting from failure to treat the actual disease present. Therefore, investments in laboratory quality management systems and aggregated patient information management systems will ensure quality assured testing. Lack of laboratory reagents and consumables, which makes proper testing, diagnosis, and treatment difficult or impossible, even when appropriate laboratory equipment is available.

Physicians then face the hard decision of treating patients using antimicrobial agents to the best of their knowledge rather than based on an accurate diagnosis from test results. The speed of diagnostic testing is a critical factor in effective antimicrobial stewardship. Typical turnaround time using traditional microbiological testing methods is 48 to 96 hours for pathogen identification, followed by an additional 48 to 72 hours for antimicrobial drug-susceptibility testing. The cost for the diagnostic test and weak sample referral systems can be barriers to access leading to un-informed prescription by clinicians. Initial treatment decisions may be made empirically before diagnostic testing results are available.

Critical goals of antimicrobial stewardship can be achieved through faster and more accurate diagnostic testing reducing time to appropriate antibiotics, reducing unnecessary use of antibiotics, and informing decisions regarding antibiotic de-escalation or discontinuation. Addressing this gap in the supply chain of diagnostic tests can make the difference between the appropriate use of antibiotics and overuse or inappropriate use. Additionally, more significant investment in rapid quality assured diagnostics and their integration into clinical practice as one of the key strategies. Integration of diagnostics with other stewardship interventions, to provide fast, accurate identification and susceptibility testing will achieve better clinical outcomes and timely streamlining and de-escalating of empiric broad-spectrum antibiotics in severely ill patients.

Inadequate staffing, insufficient training in microbiology skills and supervision of health personnel, lack of access to rapid diagnostic facilities to support treatment decisions. There is need for continuous interaction between the laboratory, clinicians and patients on availability of diagnostic tests and establishment of facility level structures like Medicines and Therapeutics Committees (MTC) stewardship committees to guide diagnostic and prescribing patterns and requirements

Prescribing, dispensing and responsible use: Pharmacies should operate under a license and the full-time management and supervision of a registered pharmacist. Pharmacists and pharmacy technicians should play a central role in community education and advising patients on the correct use of medicines. Only licensed practitioners may prescribe and dispense antibiotics. A prescription or verbal instructions of an authorized prescriber known to the managing pharmacist are necessary to purchase antibiotics from a hospital or private pharmacy, and unregulated over-the-counter sales are not the primary concern of national antibiotic stewardship.

Local incentive structures should be examined to identify factors influencing prescription practices. Methods of payment and reimbursement should be in line with standard treatment guidelines to discourage irrational use. Promotional activities by pharmaceutical companies should be regulated and monitored to prevent the industry from misinforming patients and from offering financial incentives to providers.

National standard treatment guidelines should incorporate proper training and supervision of health personnel and for mechanisms to make diagnostic support available. Hospitals should have prescribing guidelines for treatment and prophylaxis for common infections relevant to the patient population, the local antimicrobial resistance profile and the surgical procedures performed in the institution. Africa CDC launched the first edition of African treatment guidelines for common bacterial infections and syndromes to strengthen prescribing practices in AU member states. [18]

Community health workers and volunteers that bridge the gap of access in the remote and rural community health centers, server as prescribers without any credentials or treatment guidelines for prescribing and dispensing antimicrobials. In situations where, medical practitioners are not available, nurses are further permitted to diagnose patients; symptomatic diagnosis and treatment guidelines should be provided as a guide for an area without the capacity for laboratory diagnostics and medical practitioner.

Table 2.4 below shows gaps , proposed strategies, roles and responsibilities and resources available

Table 2.4: Gaps and strategies in Diagnostic, prescribing medicine, dispensing and responsible use

Gaps	Strategies and Solutions	Leadership Responsibilities	Resource Available
▪ Inadequate laboratory capacity and resources staffing, infrastructure and data management ▪ Lack of diagnostic guidelines, diagnostic stewardship and non-compliance to testing algorithms at health facilities ▪ Inadequate prioritization of diagnostics ▪ Lack of confidence in laboratory services by the clinicians ▪ Long turnaround time for receipt of laboratory culture results ▪ Inadequate sharing and utilization of AMR data	▪ Strengthen laboratory capacity (including LIMS), staffing, infrastructure and data management. ▪ Develop, customize, and disseminate guidelines and algorithms ▪ Conduct diagnostic stewardship training for clinicians (include diagnostic stewardship in the training package for AMR ▪ Sensitize patients about the importance of diagnosis before treatment ▪ Task shift to enable nurses and phlebotomists to collect specimens ▪ Improve laboratory clinician communication ▪ Promote laboratory quality systems improvement and or/ accreditation including accreditation of microbiology services ▪ Promote use of newer, simpler, and faster technologies ▪ Promote sharing and use of AMR data ▪ Promote performance-based financing (PBF) for services	Regional, International, National, Sub-national, and County	Ongoing efforts to strengthen laboratory capacity and surveillance Lessons from Performance Based Financing programs in Rwanda and Burundi

[18] Craig J, Frost I, Sriram A, Nuttall J, Kapoor G, Alimi Y, Varma JK. Development of the first edition of African treatment guidelines for common bacterial infections and syndromes. J Public Health Afr. 2022 Jan 13;12(2):2009. doi: 10.4081/jphia.2021.2009. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8791021/

▪ Prescribing antimicrobial agents without laboratory diagnostic	▪ Adherence of standard treatment guidelines, program treatment protocols ▪ Ensure laboratory antimicrobial sensitivity test results shall be mandatory	Regional/National	Regulatory bodies for drugs Africa CDC
▪ Selling antimicrobial agents without prescriptions	▪ Strengthens enforcement for the sale of antimicrobial agents	Regional/National	Regulatory bodies for drugs
▪ Knowledge gap on AMR and AMU	▪ Increase intervention for responsible use of antimicrobial agents to the community	Regional/National	Regulatory bodies for drugs

Part 3

Core Elements for Antimicrobial Stewardship Program

3 Core Elements for Antimicrobial Stewardship Program

An antimicrobial stewardship program is a systematic approach to implement a range of activities to achieve a goal. The activities can be basic, or complex considering available resources and should engage a range of leader, professionals, and stakeholders. The success of a stewardship program in an organisation needs to account for; motivation at all levels of the organization to improve outcomes for patients with infections, prevent avoidable harm related to antimicrobial prescribing and a recognition of the potential and actual impact of antimicrobial resistance.

A stewardship program needs clear lines of accountability and a structure within the organization that allows the implementation of interventions, support the scheme, monitor performance and account for performance on outcome measures. Lastly, it is essential that an education component is incorporated into the program to ensure participants buy in and knowledge of the goals. In 2019, the World Health Organization[13] and the United States Centres for Disease Control and Prevention (CDC) published the Core Elements of Hospital Antibiotic Stewardship Programs, which outlines essential components for antimicrobial stewardship programs in the hospital setting[19]. There are variations to the Core elements in other acute care settings but very limited guidance on the community setting. The antimicrobial stewardship guidance document will focus on elements in the health care setting, administrative levels as well as the community setting. Listed are the core elements with modifications to account for needs of the East African region; leadership commitment, governance structure, accountability and drug expertise, reporting, monitoring and evaluation, education and training, communication, quality improvement, and action. For each core element, the ASG will define the core element and establish roles and responsibilities for levels of leadership.

Among the critical components of a stewardship program, are leadership commitment and culture of antimicrobial use. Leadership commitment comprises of dedicating necessary human (designating a multidisciplinary team) resources, financial allocation, and information technology resources. Leadership support can take several forms and should include but not limited to the aspects described below.

- Evidence of leadership commitment may take the form of a **formal statement or policy** indicating that the organization (Continent, Regional, National, Sub-National, and Healthcare facility) supports efforts to improve and monitor antimicrobial use.
- Formal statements carry more weight with staff than informal communications such as newsletters and e-mail. It is recommended that the formal statement should include **stewardship-related positions or collateral duties**.
- Subsequently, stewardship related positions should undoubtedly include **job descriptions and annual performance reviews**. This ensures that individuals with the assigned duties are given sufficient time to contribute to stewardship activities.
- Lastly, leadership commitment should reflect allocated time and resources to support **training and education**.

[13] Antimicrobial stewardship programmes in health-care facilities in low- and middle-income countries. A practical toolkit. Geneva: World Health Organization; 2019. https://www.who.int/publications/i/item/9789241515481

[19] Core Elements of Hospital Antibiotic Stewardship Programs. https://www.cdc.gov/antibiotic-use/core-elements/hospital.html

As a part of the commitment, leadership should define where the organization needs to go with regards to stewardship using quantitative data on antimicrobial use to establish organizational outcomes. Members of the organization can then implement the vision and direction. Table 3.1 below describes actions of leadership commitment element, the corresponding level of leadership responsible for implementing the action and expertise needed.

Table 3.1: Leadership commitment in Antimicrobial Stewardship

Actions	Level	Role/ Responsibility
Formal or written statement to support stewardship activities to improve and monitor antimicrobial use	National and subnational	Senior leadership
Mobilize resources and budget for financial support to antimicrobial stewardship activities	National, Sub-national and institutional	Senior leadership
Designate a multidisciplinary stewardship team	National, Sub-national and institutional	Senior leadership
Establish stewardship-related duties in job descriptions and annual performance reviews for AMS team	National, Sub-national and institutional	Multidisciplinary stewardship team
Establish clear communication structures/ lines of authority on antimicrobial stewardship programs.	National, Sub-national and institutional	Senior leadership
Allocate time to participate in stewardship activities including training and education	National, Sub-national and institutional	Multidisciplinary stewardship team
Stewardship program performance review	National, Sub-national and institutional	Multidisciplinary stewardship team
Call to action for stewardship support	Regional	Regional organizations

Organizational structure for AMS

Following an organization's declared commitment to antimicrobial stewardship, the leadership needs to establish the governance structure for the stewardship program. The governance structure is key to sustainment of the program since it serves as the decision-making chain, authority, and oversight. Antimicrobial stewardship program governance structure covers the combination of individuals filling executive and management roles, program oversight functions and structure and policies that define management principles and decision making.

The governance structure at the **national level** would differ slightly based on how each country is structured. However, the general premise on governance should be through the lead Ministry of Health tasked with the responsibility on the AMR National Action Plan, mission and directing the country-specific outcomes. The national level is also responsible for ensuring a collaborative, integrated approach to animal and human antimicrobial stewardship interventions. The antimicrobial stewardship program committee at the national level comprises of a multidisciplinary team with clear terms of reference and defined lines of communication, reporting, and accountability. Subcommittees could also be designated to investigate and report on the antimicrobial stewardship plan.

At the **sub-national level**, organizations within the provinces/regions, counties, districts/sub-counties, and healthcare centres establishments play a vital role in operational oversight of antimicrobial stewardship program in support of national governance. The governance structure at the sub-national

level should be responsible for taking the national strategic objectives and standards and adapting them to suit operational model and governance structures at the local level. They ensure budgets are set up to support stewardship activities; conduct situational analysis, prioritize and implement antimicrobial stewardship interventions and provide monitoring and evaluation functions to determine progress. The antimicrobial stewardship governance committee at the sub-national level consist of a multidisciplinary team of about 7-10 members depending on the local set up and availability of various expertise.

- Governance of antimicrobial stewardship typically falls within the **clinical leadership** functions of the heads of provincial/regions, counties and district/sub-counties departments of health as the case may be.
- Depending on resources and capacity, governance functions could include pharmaceutical and therapeutic monitoring, diagnostic stewardship, infection prevention and control monitoring in addition to antimicrobial stewardship.
- To leverage resources, organizations should consider using governance structures already in place that can accommodate antimicrobial stewardship activities.
- Successful stewardship programs in the healthcare facility have typically placed the antimicrobial stewardship governance within the Medicines and therapeutics committees (MTCs), infection prevention and control committees, hospital quality improvement team or patient safety governance structure and included within the hospital's quality and safety strategic plan.

The responsibility for implementing and managing the antimicrobial stewardship program resides with a multidisciplinary antimicrobial stewardship (AMS) team or committee. An example of a governance structure with reporting framework for an AMS team that could be adapted to the different hospital structures is shown in figure 3.1. It is important to have formal links established between AMS team, hospital executive (or equivalent), director of clinical services (or equivalent), drug and therapeutics committee (or equivalent), infection prevention and control committee (or equivalent). It is critical that the highest-ranking member of each department or committee represents the hospital on the AST to ensure translation of policy into action.

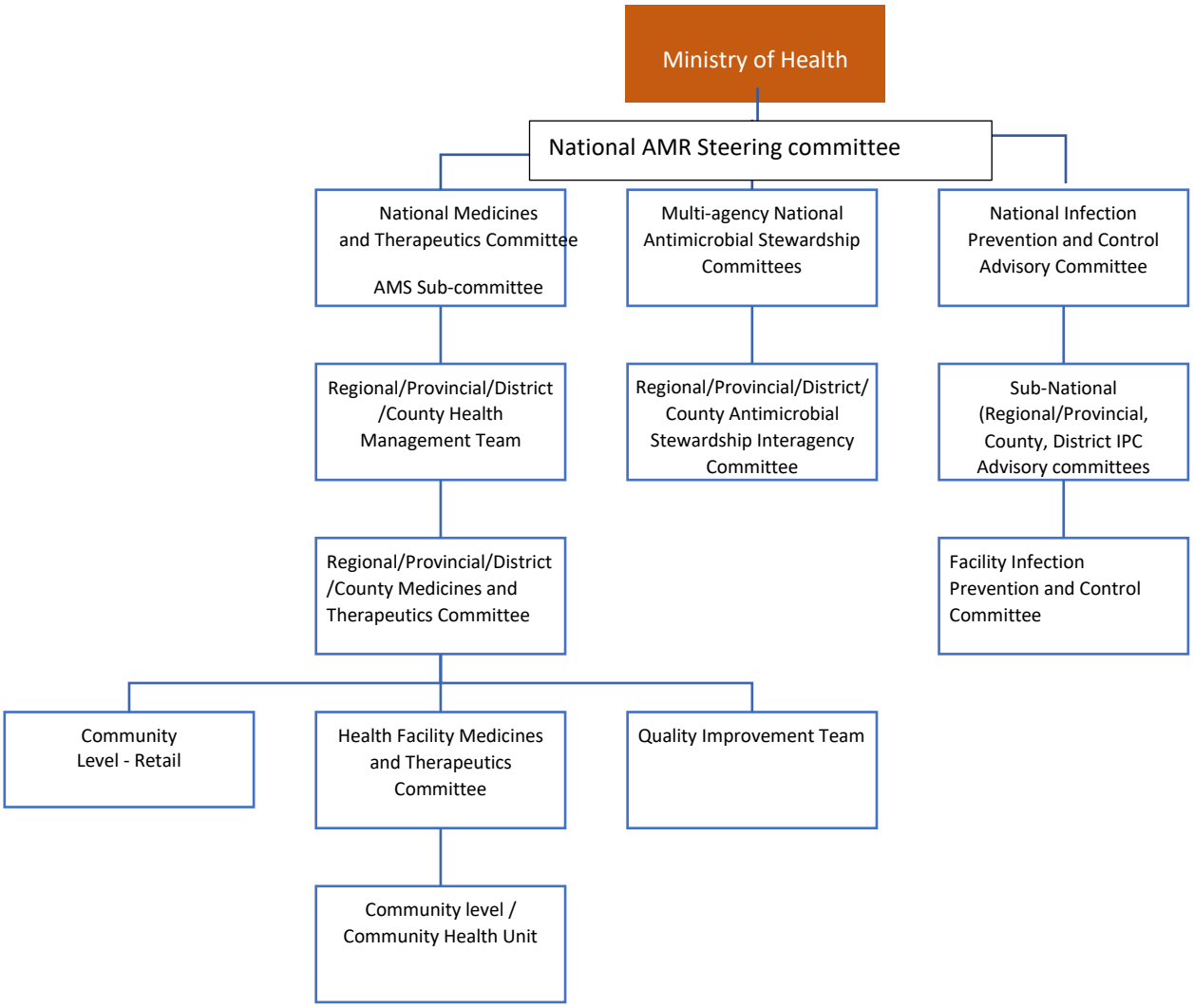

Figure 3.1(a): Antimicrobial Stewardship program governance structure for the administrative and community levels

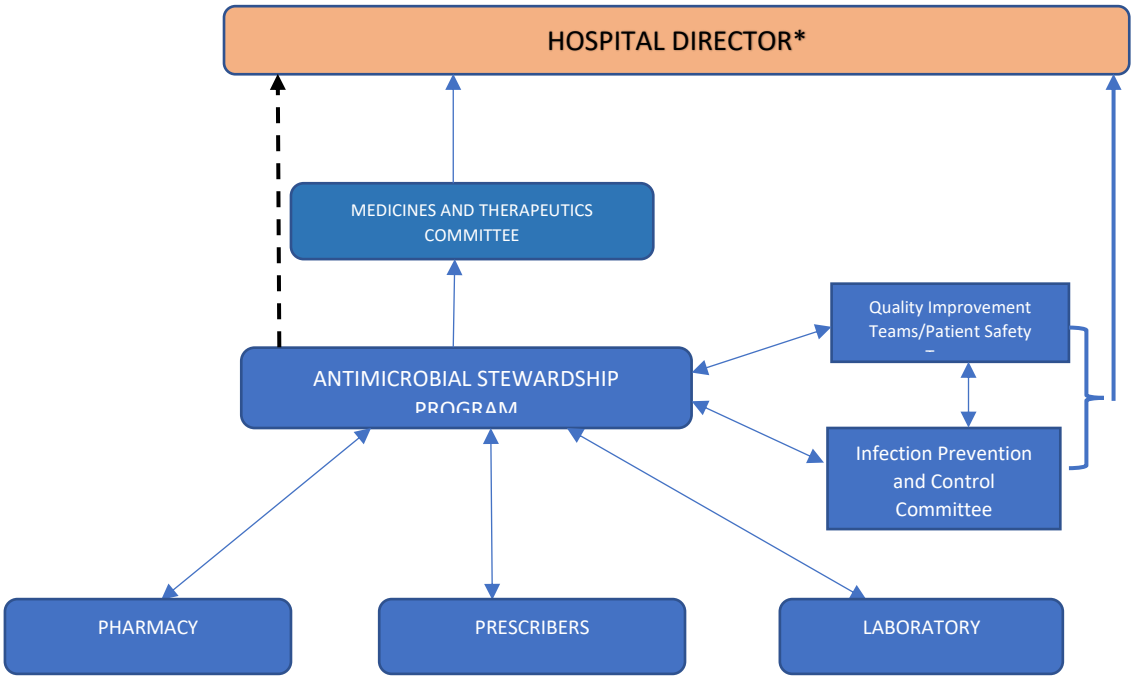

Figure 3.1(b): Facility level Governance structure for the antimicrobial stewardship program (service delivery level). **Hospital director, Medical superintendent, Chief/Executive Director (hospital), Medical Officer in-charge*

Composition of AMS team

The recommended membership of the AMS team should ideally include a clinician, clinical microbiologist, clinical pharmacist, nurses (experienced in infectious diseases), patient safety manager, a laboratory technologist and information technologist (IT). As a minimum, the AMS team should include an appropriate clinician (a clinical microbiologist or infectious disease physician, if available), a pharmacist (clinical pharmacist with infectious disease training, if possible) and a microbiologist as core team members. The membership should be between 7 to 10 members. Where on-site infectious diseases (ID) physicians or clinical microbiologists are not available, the AMS team should be led by an interested clinician with a pharmacist. Where resources are scarce, and the above-described expertise is not available, facilities may negotiate appropriate external specialist advice (e.g. from the higher-level health facility) to support the local AMS team or appointed focal person **(Table 3.2)**.

Table 3.2: Proposed composition of antimicrobial stewardship committees at various levels of administration and service delivery

Committee members	Level of Care					
	National AMS Committee/ TWG	National Referral	Regional/Province/ Regional referral	Sub-regional/ District	Primary Health Care Setting 1	Primary Health Care Setting 2
Clinical Microbiologist	✓	✓	+/-	-	-	-
Microbiologist	✓	✓	+/-	-	-	-
Lab technologist/ scientist	✓	✓		+/-	✓	-
ID Physician/ physician	✓	✓	✓	+/-	-	-
Medical Officer-MO	-	-	+/-	✓	✓	-
IPC focal person	✓	✓	✓	+/-		+/-
Clinical pharmacist/ Pharmacist	✓	✓	✓	-	-	-
Pharmacy technician/ assistant	-	-	-	+/-	+/-	+/-
Nursing Officer	✓	✓	✓			
Clinical team (surgeon, paediatrician)	+/-	+/-	+/-	+/-	-	-
Clinical Officer CO/Assistant Medical Officer-AMO	-	-	-	+/-	✓	+/-
Epidemiologist	✓	✓	+/-	-	-	-
Management representative	✓	✓	✓	-	-	-
Animal health experts	✓					
Best fit		Under IPC/MTC/ Standalone	Under IPC/MTC/ Standalone	Under IPC/MTC/ Standalone	Under IPC/MTC/	-

ID-infectious diseases; MO- Medical officer (doctor); IPC – infection Prevention and Control; +/- the expertise may/may not be available at this level; CO- clinical officer; AMO – Assistant Medical Officer; Other specialists may be incorporated from time to time as needed and based on the countries' settings

Roles and responsibilities of AMS committee core members

As the prescribers of antibiotics, it is vital that clinicians are fully engaged in and supportive of efforts to improve antibiotic use in hospitals. Laboratory staff should guide the proper use of tests and the flow of results. They can also guide empiric therapy by creating and interpreting a facility cumulative antibiotic resistance (antibiogram). Information technology staff are critical to integrating stewardship protocols into existing workflow. For example, embedding relevant information and protocols at the point of care such as immediate access to facility-specific guidelines at the point of prescribing; implementing clinical

decision support for antibiotic use; creating prompts for action to review antibiotics in key situations and facilitating the collection and reporting of antibiotic use data.

Nurses should assure that specimen for cultures are taken before initiating the patient on new course of treatment with antibiotics. Besides, nurses review medications as part of their routine duties and can prompt discussions of antibiotic treatment, indication, and duration. Additionally, the pharmacists, infection preventionists/infection control experts and hospital epidemiologists should assist with prescriptions auditing, analysing, monitoring and reporting of resistance trends, educate staff on the importance of appropriate antibiotic use, and implement strategies to optimize the use of antibiotics. There is no consensus on staffing recommendations; however, hospitals with existing programs suggest that for every 100 acute beds, at least 10 hours of a senior pharmacist and 3.5 hours of lead clinician time per week should be dedicated to AMS team activities.

Table 3.3: Roles of different members of the Antimicrobial Stewardship team

Designation	Responsibilities
Management	• Formal constitution of AMS Team • Budget and plan for AMR • Advocate for the utilisation of laboratory services
Physician/ Clinicians (prescribers)	• Improve antibiotic prescription and use • Educate the patient and staff about AMR • Leadership role of AMS team • Review medications as part of their routine duties
Pharmacist/ dispensers	• Educate patients and staff on the importance of appropriate antibiotic use • Implement strategies to optimize the use of antibiotics • Auditing of prescription • Secretary of AMS team • Review medications as part of their routine duties • Managing antimicrobial supply chain (ensuring availability of antimicrobials) • Appropriate dispensing of medicines and advising on proper use • Communicate with prescribers on available medicines, dosages etc • Keeping documentation of antimicrobials consumptions
Laboratory technologist	• Guide the proper use of tests, timing & quality of specimen collection and the flow of results • Generate an appropriate antibiogram • Observe quality standards in the laboratory including timely provision of results to guide on patient's management • Ensure timely communication of laboratory results
Information communication officers/health information/Record officer	• Integrating stewardship protocols into existing systems. • Creating prompts for action to review antibiotics in key situations in the information management system • Facilitating the collection and reporting of antibiotic use by creating an appropriate communication platform
Clinical microbiologist	• Championing laboratory service utilisation by clinician including ensuring that cultures are performed before starting antibiotics • A facility cumulative antibiotic resistance (antibiogram) to guide treatment • Educating patients and staff on appropriate use of antibiotics • Review medications as part of their routine duties

Nurse	• Prompting medication review • Ensuring appropriate administration of antibiotics • Enhancing communication with other relevant departments e.g. laboratory teams, pharmacy teams and clinicians • Prompt specimen collection for culture prior to administration of antimicrobials • Health education on antimicrobial use and infections prevention
Epidemiologist/ Biostastician	• Analysing, interpreting and monitoring of resistance trends • Checking data quality

Successful programs have shown that accountability and drug expertise are critical for a successful stewardship program. The recommendation is to appoint a single leader who will be responsible for the stewardship program outcomes. Experience with successful programs shows that a physician leader is effective. To co-lead the program, a pharmacist responsible for improving antibiotic use is needed. Formal training in infectious diseases and antimicrobial stewardship would benefit stewardship program leaders. Locations with available resources and capacity have achieved success by hiring full-time staff to develop and manage stewardship programs; however, with limited resources options include the use of part-time and off-site expertise from other hospitals. The pharmacy and therapeutics committee should not be considered the stewardship team within a hospital if only performing its traditional duties of managing the formulary and monitoring drug-related patient safety, though in some smaller facilities the pharmacy and therapeutics committee may be expand its role to assess and improve antimicrobial use.

The stewardship leader and co-lead should be incorporated into the AMS governance structure and linked to the AMS program. The leader and co-lead should work with a team identified at the co-element two in order to enhance the stewardship program. There needs to be clear lines of accountability between the AMS program governance structure and other existing governance structures; such as the clinical governance, drug, and therapeutics committee, infection prevention, and control committees.
The table below describes actions of accountability and drug expertise element, the corresponding level of leadership responsible for implementing the action and expertise needed.

Table 3.4: Actions on Accountability and Drug Expertise

Actions	Level	Expertise	Alternative expertise
Designate a leader to be accountable to the leadership for meeting established goals or targets	National, subnational and healthcare facilities	Infectious disease physician and pharmacist	In absence of either, identify an appropriate champion for the program
Training of appointed AMS team on antimicrobial stewardship	National, Sub-national and institutional	Leadership skill and AMS training	
Appoint Pharmacy co-lead to improve the use of antibiotics within the facility	Health facilities	Clinical Pharmacist/ Pharmacist	Appropriate champion
Set the practice standards for assessing, monitoring and communicating patient outcomes	National, subnational and healthcare facilities	Multidisciplinary	
Establish an antimicrobial stewardship team	National, subnational and healthcare facilities	Multidisciplinary	

Reporting information collected on antibiotic use and resistance patterns to doctors, nurses and relevant staff on a regular basis serves as a reminder of why antimicrobial stewardship activities are essential. Regular reporting* can occur within the organization but also reporting to external leadership levels who have responsibility for antimicrobial stewardship is encouraged. Ideally, reporting elements should focus: -

- On patient outcomes to assess the impact of interventions, identify potential areas for improvement, and provide feedback to clinicians.
- Antimicrobial resistance profiles (antibiograms)
- Documented treatment indications by prescribers
- Adherence to facility-specific treatment guidelines,
- Diagnostic tests(microbiological) and antibiotic susceptibility tests done
- Modified antibiotic choices to microbiological findings
- Monitoring resistance at the patient level (i.e., what percent of patients develop resistant super-infections)
- Monitor and evaluate clinical outcomes

***Reporting could be done on weekly basis or regularly during the AMS committee meeting**

Responsibilities associated with stewardship program reporting actions differs at different levels of leadership. The table below describes actions of reporting element, the corresponding level of leadership responsible for implementing the action and expertise needed.

Table 3.5: Reporting actions

Action	Level	Expertise	Alternate Expertise
Harmonize the reporting system to ensure flow of information from Health Facilities to National and Regional	Regional, National and Health facilities	Clinician, Clinical Microbiologist	Pharmacists
Disseminate antibiogram and consumption information (antimicrobial agents used) by specific community within the country	National and Sub-national	Clinical Microbiologist, Pharmacists Infectious diseases specialists Laboratory professionals *Qualified Clinicians	Pharmacists Laboratory professionals *Qualified Clinicians
Provide guidelines to standardize antibiogram development	Regional National and Sub-national	Clinician, Clinical Microbiologist and Pharmacists	
Share AMR information (feedback) with all healthcare providers as well as leadership and any other stakeholders	Regional and National and Sub-National	Clinical Microbiologist, Pharmacists Laboratory professionals *Qualified Clinicians	Pharmacists Laboratory professionals *Qualified Clinicians
Develop/adopt standardized tools such as those for drug use evaluations or antibiotic audit forms for reviews	National and Sub-National	Clinical Microbiologist, Pharmacists *Qualified Clinicians	Laboratory professionals

***Qualified** - clinicians with training and experience in interpretation of antimicrobial susceptibility tests

Retrospective charts reviews could also be used based on pharmacy records or discharge diagnoses. It is also important to document interventions, provide feedback and track responses to feedback. Measure antibiotic use as either days of therapy (DOT) or defined daily dose (DDD).

While education alone is not sufficient, it is vital to any successful antimicrobial stewardship program. Continued antimicrobial stewardship education should be provided to laboratory staff, physicians, pharmacists, nurses, other relevant staff, patients and communities. The tailored education and training should focus on microbiology skills, antibiotics resistance, antibiotic use and prescribing practice, Infection control. Educational programs can provide a foundation of knowledge that will work to enhance and increase acceptance of stewardship strategies. Tools such as the CDC Get Smart tool can be used to educate patients and family members

There are many options for providing education on antibiotic use such as:

- Educational presentations which can be done in formal and informal settings; in person and virtual approach ,
- Messaging through posters, fact-sheets, flyers and newsletters or electronic communication to staff groups.
- Reviewing de-identified cases with providers where changes in antibiotic therapy could have been made is another useful approach.
- Community engagements through local leadership using electronic and print media like community radios, television (TV), health talks and participation in community gatherings

A variety of web-based educational resources are available that can help facilities develop educational content. Tailored education has been found to be most effective when paired with corresponding interventions and measurement of outcomes.

Table 3.6 below describes actions of reporting element, the corresponding level of leadership responsible for implementing the action and expertise needed.

Table 3.6: Education and training actions in Antimicrobial Stewardship programs

Action	Level	Expertise
Develop, implement and integrate a training course on AMS within the existing training programs (pre- and in-service training)	Regional, National and Health facilities	Multidisciplinary team
Provide continuous professional development training	Regional, National and Health facilities	Multidisciplinary team
Establish AMS training program for communities that can be delivered by community health volunteers and health workers, media etc	Regional, National and Health facilities	Multidisciplinary team
Incorporate AMS elements into orientation package for new medical staff	Regional, National and Health facilities	Multidisciplinary team
Measure impact/effectiveness of training and education programs	Regional, National and Health facilities	Technical experts, M&E Specialists

Communication is a vital component of the success of an antimicrobial stewardship program. There is evidence that shows that effective communication campaigns contribute towards promoting the rational use of antibiotics by prescribers and patients, as well as within the agriculture and food industries. Communication framework should contain: -

- Clear, straightforward communication that shows the vision and the benefits of the program, core clinical messages and mechanism for internal and external communication with stakeholders
- Additionally, certain design elements are recommended in a communication campaign to ensure effectiveness and impact; these include multi-pronged communication plans (Desk top job aides, Information, Education and Communication materials involving a mix of media channels, audience segmenting and audience-centric messaging, targeted messaging, the timing of campaign activities,) where possible, available in local languages
- Involvement of key opinion leaders and policy makers
- Phase-wise evaluation (formative, process, and summative evaluation) of the campaigns.

Clinical messages could be targeted to clinicians, prescribers, and patients (community). Identify and communicate to prescribers' specific situations where antibiotics should be withheld and guidance concerning the duration of antibiotic use, which is often an area of misuse. Face-to-face meetings with Medicine Therapeutic Committees (MTC) platforms for prescribers, where there is an opportunity for reflection about their prescribing practices, or attending multidisciplinary teams, virtual conferences, toll free call centres (telemedicine) are all critical in promoting learning about prudent prescribing. Table 3.7 below describes actions of the communication element, the corresponding level of leadership responsible for implementing the actions and expertise needed.

Table 3.7: Communication actions

Action	Level	Expertise
Develop, implement and sustain an awareness campaign, communication messaging and targeted messaging on AMS	Continental , regional and National, Sub-National	Technical experts, Health promotion experts; Risk communication experts, Media, opinion leaders and policy makers
Create and champion a sustainable system for knowledge management including capacity building	Continental , regional and National, Sub-National	Technical experts, Health promotion experts; Risk communication experts
Disseminate evidence based best practice within and from different countries	Continental , regional and National, Sub-National	Technical experts (Researchers, Academia etc), Health promotion experts; Risk communication experts
Develop a system with capability for early warning, alerts and notification within the antimicrobial stewardship process including cross-border communication	Continental , regional and National, Sub-National	Technical experts (Public Health Specialist, Health Economist; Risk communication experts; ICT experts

Quality improvement is an additional tool that can be incorporated into a stewardship program for interventions are continuously improved, and efforts sustained. There are several means of identifying areas of improvements that can be used at national or facility level. At the onset of AMS program, a baseline assessment and risk assessments can identify areas of improvement whose implementation progress can be monitored regularly. Review of the AMS M&E Framework is another source for identification of areas of improvement. Client feedback platforms should be established at facility levels to track satisfaction levels. A system for measuring impact of interventions must be established.

Quality improvement should include but not limited to laboratory, clinical practice, prescription, dispensing and patient care. It should be clear on what is to be measured, the frequency of measurement and how the findings and improvements will be communicated. Standard tools should be used to measure and track quality improvement in the areas of quality management systems, timely and appropriate use of antibiotics, appropriate administration and de-escalation, data monitoring and stewardship infrastructure and availability of expertise at point of care.

Where new changes are proposed, it is recommended that they should be tested using experiential learning method, such as the Plan-Do-Study-Act (PDSA) cycle *(Figure 3.2).* Testing in quality improvement allows unforeseen problems to be resolved, and interventions to be evaluated and refined before full implementation into day-to-day operations. Each PDSA sequence should increase in scope and scale, and be analysed, allowing subsequent actions to be refined. Where change is proposed it is critical to outline the quality improvement steps; -

- Clearly establish the aim – What are you are trying to accomplish
- Establish a measure – How will we know that a change is an improvement
- Plan to improve – What changes can we make that will result in improvement
- A specific test of changes – Perform the PDSA cycle

Testing in quality improvement work allows unforeseen problems to be resolved, and interventions to be evaluated and refined before full implementation into widespread day-to-day operations. In general, testing should follow a sequence of Plan-Do-Study-Act (PDSA) cycles (Figure 3.2).

Each sequence should increase in scope and scale, and be analysed, allowing subsequent tests to be refined. For example, a hospital AMS team decides to introduce a restricted antimicrobial formulary, with required prior phone approval from an ID physician before selected agents are dispensed. They would be wise to initially test the approval and dispensing process in a range of conditions. For example, they could work with one cooperative prescriber to see if the process works well at different times of the day, on weekends, and when different dispensing pharmacists or infectious diseases (ID) physicians are on duty. After making any necessary refinements, the team could then plan on including all respiratory patients, then all medical patients and so on.

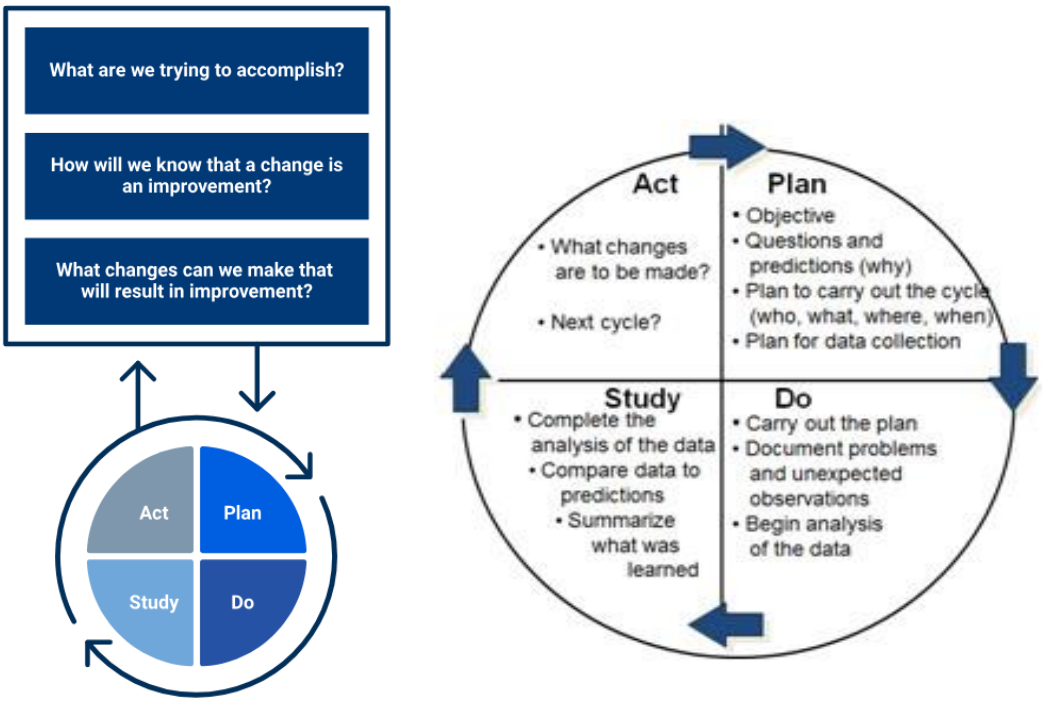

Figure 3.2. PDSA model for Improvement

In addition to the PDSA, there are other available tools in quality improvement used to identify problems, resolve and measure if change has been achieved including process mapping, pareto diagrams, cause and effect diagrams (i.e fishbone). In all cases, the improvement process must be clearly documented as to what problem was identified and how it was improved as a source for preventative actions.

Table 3.8: Quality Improvement

Action	Level	Expertise
Develop/customize an M&E Framework for the AMS	Regional and National, Sub-National	Technical experts, M&E Experts
Conduct risk assessment/AMS audits to identify and prioritize areas of improvement		
Develop and implement standard tools for measuring and tracking Quality Improvement/continuous assessment	Regional and National, Sub-National	Technical experts, M&E Experts
Establish Quality Improvement Teams to implement and monitor identified improvement projects within the health facilities	Regional and National, Sub-National	
Establish client feedback mechanisms (suggestion box, surveys, hotlines) with results reviewed, improvements identified, implemented and communicated to users.	Facility	Technical experts

Part 4

Stewardship program actions and interventions

4 Stewardship program actions and interventions

Implementation of AMS requires actions at various levels of service delivery. The summary below provides a description of actions to be taken at various levels of service delivery and administrative levels in order to effectively promote and implement a good AMS program.

Continental/ Regional level

Resources required	Interventions
Limited resources	▪ Promote the creation of regional AMR committees and technical working group with clear terms of reference ▪ Develop regional antimicrobial stewardship action plans ▪ Coordinate regional antimicrobial awareness campaigns ▪ Resource mobilization for AMR activities ▪ Promote regional research and development
Moderate resources including *resources for planning and dedicated staff*	▪ Support inclusion of antimicrobial stewardship training in pre-service curriculums and develop and implement stand-alone courses ▪ Support south to south sharing of knowledge, resources, and best practices among countries
Resource intensive and may ***require establishment of a formal program with trained staff and dedicated resources***	▪ Track antibiotic use within the region and set regional targets for improvement ▪ Describe resistance patterns across the region to improve treatment guidelines and identify priority pathogens ▪ Develop systems for accreditation and certification to support adherence to standards ▪ Harmonization of regional GMP requirements ▪ Promote monitoring of antibiotic quality (pharmacovigilance, Post market surveillance) ▪ Conduct research and development in AMR

National level

Resources required	Interventions
Limited resources	▪ Develop national action plan for AMR ▪ Establish multi-sectorial National AMR committees with clear terms of reference ▪ Develop a national AMR research agenda ▪ Mobilize resources for AMR ▪ Establish technical working group for AMS ▪ Coordinate national antimicrobial awareness campaigns ▪ Dissemination of research results, surveillance reports and AMS program reports. ▪ Promote research and development
Moderate resources *including resources for planning and dedicated staff*	▪ Develop and ensure access to updated and evidence based national medicines formulary, standard treatment guidelines and essential medicines list ▪ Develop national guidelines for antimicrobial stewardship ▪ Conduct AMS program annual review ▪ Implement national infection prevention control guidelines

	▪ Promote compliance to treatment guidelines ▪ Develop and strengthen policies and procedures on regulation of access to reserve antimicrobials ▪ Promote diagnostic stewardship ▪ Inclusion of antimicrobial stewardship training course into the pre-service curriculums and develop stand-alone courses
Resource intensive and may require establishment of a formal program with trained staff and dedicated resources	▪ Build laboratory capacity to strengthen AMS activities ▪ Build pharmaceutical sector capacity ▪ Enforce regulatory authority policies to promote prescription and dispensing ▪ Develop a national research agenda on AMR and conduct research ▪ Track antibiotic use and consumption to asses appropriateness and set national targets for improvement ▪ Monitoring national resistance patterns to improve treatment guidelines and identify priority pathogens ▪ Monitor antibiotic quality ▪ Identify and address drivers of inappropriate prescribing behavior

Sub-national level* (Regional/Provincial/County, sub-county administrative levels)

Resources required	Interventions
Limited resources	▪ Establish multi-sectorial subnational AMR committees with clear terms of reference ▪ Establish linkages with the medicines and therapeutics committee and infection prevention control ▪ Organize sub-national antimicrobial awareness campaigns
Moderate resources *including resources for planning and dedicated staff*	▪ Ensure access and monitor compliance to national medicines formulary, standard treatment guidelines and essential medicines list ▪ Promote diagnostic stewardship
Resource intensive and may require establishment of a formal program with trained staff and dedicated resources	▪ Implement national action plan for AMR ▪ Implement national guidelines for antimicrobial stewardship ▪ Conduct operational research on AMR. ▪ Implement national infection prevention control guidelines ▪ Build diagnostic capacity to strengthen AMS activities ▪ Build pharmaceutical sector capacity to ensure access to quality affordable and efficacious medicines and pharmaceutical care services ▪ Comply with regulatory authority requirements to promote appropriate prescription and dispensing practices ▪ Track and report sub national antibiotic use and consumption ▪ Monitoring and reporting sub national resistance patterns to improve treatment guidelines and identify priority pathogens ▪ Conduct in service antimicrobial stewardship training ▪ Monitor and report antibiotic quality (pharmacovigilance and post market surveillance) ▪ Identify and address drivers of inappropriate prescribing behavior

****Administrative levels depending of country structures***

Policies that support optimal use

Hospital

- Make sure they obtain the updated National clinical treatment guidelines derived from local data
- Make sure they obtain the National essential medicine list
- Make sure they obtain the National AMS guidelines (if available), or the regional or global Guidance for AMS Programs
- Make sure they comply to National medicines therapeutic committee guidelines
- Develop a hospital formulary with restrictions and pre-authorizations if possible
- Develop surgical prophylaxis guidelines which adhere to appropriate antimicrobial use based on local data
- Make sure the empirical treatment is regularly reviewed based on local data from their setting or aligned with the Africa CDC treatment guidelines [20].
- Ensure efficient procurement based on hospital formulary to promote consistent availability
- Make sure they fully comply with National IPC policy

Community

- Include appropriate use of antimicrobials in public education campaigns of the community health strategies
- Sensitize the community on the importance of hygiene and vaccination
- Community healthcare workers should not dispense antimicrobials

Implementing specific antimicrobial interventions

Level of care	Interventions
Hospital settings	
Broad interventions	▪ Formally establish and support antimicrobial stewardship committee with clear terms of reference ▪ Establish antimicrobial stewardship rounds which include infectious disease specialist, clinical microbiologist and clinical pharmacist or pharmacist ▪ Enhance communication and teamwork among stakeholders e.g. laboratory personnel vs. clinicians, pharmacists vs. clinicians
Pharmacy driven interventions	▪ Regular prescriptions audits (minimum twice a year) and provide feedback to prescribers ▪ Enforce antimicrobial restrictions and pre-authorization as per hospital formulary and National medicine guidelines ▪ Regularly conducts Drug use audits and provides feedback to stakeholders ▪ Ensure antimicrobial expenditure analysis is done and the reports are shared to HMT meetings ▪ Ensure antibiotic timeouts i.e. regular prompts to the clinicians to re-evaluate intravenous antibiotics every 48 to 72 hours especially among in-patients ▪ Ensure regular prompts to clinicians on IV to oral conversion and dose adjustments ▪ Ensure review of antibiotics based on culture and AST results ▪ Strict compliance to surgical prophylaxis guidelines ▪ Ensure compliance with treatment guidelines in terms of duration of treatment ▪ Perform medication reviews by pharmacists for in- and outpatients ▪ Ensure proper medication use counselling while dispensing
Infection and Syndrome Specific Interventions	▪ Develop and incorporate guidelines for management of high-risk infections and outbreaks such as multidrug resistant organisms (MDRO) and C. difficile into the standard treatment guidelines ▪ Ensure harmonization of IPC and AMS teams towards comprehensive management of high-risk infections and outbreaks such as MDRO and C. difficile

[20] Africa CDC. African Antibiotic Treatment Guidelines for Common Bacterial Infections and Syndromes https://africacdc.org/african-antibiotic-treatment-guidelines-for-common-bacterial-infections-and-syndromes/

Diagnostic driven interventions	▪ Capacitate the laboratory (staff, equipment, reagents, ICT) to offer correct and timely results to clinicians ▪ Ensure uninterrupted provision of laboratory services ▪ Enhance quality of laboratory services and adherence to laboratory standards ▪ Generate hospital-specific antibiograms and laboratory utilization data every 3 to 6 months (depending on the flow of samples), and provide feedback to stakeholders for interventions
Education	▪ Train hospital staff on AMS using National AMS program/ curriculum ▪ Induct students/interns/new staff on AMS practices ▪ Conduct infection-specific CMEs e.g. UTI, SSI, URTI on AMS ▪ Awareness creation among clinicians on conditions that often do not require antimicrobials ▪ Provision of teaching materials/job aids e.g. algorithms
Community Settings	
Broad Interventions	▪ Public education on appropriate antimicrobial use ▪ Provision of IEC materials about AMS e.g. posters, brochures, multimedia etc ▪
Pharmacy Driven Interventions	▪ Public sensitization on the danger of self-medication i.e. buying antimicrobials without prescription
Infection and Syndrome Specific Interventions	▪ Provision of education on the importance of special interventions such as isolation of patients with high-risk/contiguous infection

Part 5

Stepwise Approach to implementing AMS Programs

5 Stepwise approach to establishing a stewardship program at a healthcare facility

Establishing an antimicrobial stewardship (AMS)program at a healthcare facility requires a systematic and stepwise approach to ensure its successful implementation and sustainability. The implementation of an AMS program helps optimize antimicrobial use, reduce the emergence and reemergence of antimicrobial-resistant organisms, and minimize adverse effects associated with antimicrobial use. This chapter outlines the steps involved in establishing a robust stewardship program. This should be adapted to country and facility context.

Step 1: Initial Baseline Assessment and Goal Setting

The first step in establishing a stewardship program at any level of care begins with a comprehensive initial assessment current status and capacity to establish an antimicrobial stewardship program and sustainably implement interventions (See Annex 1 WHO Checklist for assessing healthcare facility core elements for the implementation of AMS programs). During this phase, data on current antimicrobial use, processes, structures, resistance patterns, and infection rates should be collected and analyzed. This involves evaluating current practices, identifying areas for improvement, and understanding the gaps and unique needs of the facility. Key stakeholders, including healthcare providers, administrators, and infection control experts, should be involved in this process.

This baseline data will be useful in advocating for leadership support, inform the development of context specific, measurable goals for the stewardship program.

Step 2 : Securing Leadership Support

For a stewardship program to succeed, it is crucial to secure the support of the facility's leadership. Presenting the findings from the initial assessment, along with the proposed goals, can help garner this support. Evidence based requests facilitates leadership endorsement often translates into the necessary resources and authority to implement the program (ASP) at a healthcare facility. Some key strategies to obtain leadership support for the program are highlighted below:

1. **Raise Awareness:** Using locally generated data educate hospital administrators and key decision-makers about the significance of antimicrobial resistance and its impact on patient safety, patient outcomes, healthcare costs, and public health. Present the data and evidence demonstrating the need for an AMS program to address this critical issue amplifying the following aspects:
    a **Patient Safety:** Emphasize the importance of patient safety, adverse events, treatment failures, increased healthcare associated infections and potential risks and consequences of antimicrobial resistance for patients within the facility.
    b **Cost Savings:** Showcase the economic benefits (reducing the length of hospital stays, minimizing unnecessary diagnostic tests, and reducing the need for un necessary antimicrobial agents) of implementing AMS interventions.

c **Demonstrate Success Stories:** Share local success stories and examples of effective AMS programs from other local that have improved patient outcomes, reduced antimicrobial resistance rates, and enhanced the overall quality of care.

2. **Present Regulatory and Policy level Requirements:** Highlight any regulatory or Policy level requirements related to antimicrobial stewardship such as those prescribe din National Action Plans on AMR or implementation of AMS as part of national accreditation or quality improvement initiatives.
3. **Engage the facility health care providers:** Involve all healthcare professionals who are engaged in patient management. Their input and support will strengthen the case for establishing an AMS program and help address any concerns or misconceptions that leadership may have.
4. **Develop a Comprehensive Proposal:** Develop a comprehensive proposal that outlines the goals, objectives, strategies and resource needs of the proposed AMS program with clear Terms of reference for Consideration.
5. **Engage in Ongoing Communication and relationship building with leadership:** Maintain open lines of communication with hospital administrators throughout the process. Keep them informed about the progress of the program, share updates on emerging resistance trends, and regularly report on the impact and outcomes of the AMS and tailor your messaging to align with the organization's goals and priorities

Step 2b: Forming a Multidisciplinary Team:

Once leadership support is secured, a multidisciplinary stewardship team should be formed with diverse representation and clear responsibilities and terms of reference. This team typically includes administrators, infectious disease physicians, clinical pharmacists, microbiologists, infection control professionals, nurses, and IT specialists. The team's role is to develop, implement, and oversee the stewardship interventions.

Developing a facility-specific action plan.

According to the baseline assessment conducted and after conducting a SWOT analysis, develop a context specific costed AMS action plan to ensure, prioritization of activities, accountability and measure progress. The action plan will include identification of **Core-elements including AMS interventions to be implemented. Clear coordination and governance mechanisms** with leadership involvement and endorsement and supervision create an AMS committee (either newly formed or integrated into an existing structure), identify **AMS activities/ interventions p**inpointing areas that require attention, execute AMS interventions oversee progress and evaluation, and communicate outcomes and feedback. During the process

- **Ensure Health-care facility-wide engagement:** Promote participation from all areas of the facility in the AMS program
- **Conducting regular Education and training** through an AMS education and training plan for to enhance knowledge, skill and competence.
- **Budget:** Prepare a comprehensive AMS program budget, covering the necessary human and financial resources for the program's daily operations, including education and training of the AMS team and healthcare professionals to be approved by the leadership

Step 3: Develop and implement Program Policies and Guidelines:

With a team in place, the next step is to develop clear policies, evidence-based guidelines and treatment algorithms for antimicrobial use considering local resistance patterns. These should be evidence-based and aligned with national standards. It is important to involve front-line healthcare providers in the development of these guidelines to ensure they are practical and feasible. Targeted training and education programs should be developed to ensure all staff are aware of and understand the new policies.

Step 4: Implementing Interventions

After policies and guidelines have been developed and established, the next phase involves implementing targeted interventions based on prioritization following the baseline assessment and action plan developed. These can include prospective audit and feedback, where antimicrobial prescriptions are reviewed, and feedback is provided to prescribers. Other interventions might include formulary restrictions, pre-authorization requirements, and implementing IV to Oral switches to minimize the use of parenteral formulations. To ensure the success of these interventions, ongoing education and training should be provided. This includes regular updates on resistance through generation of hospital antibiograms and use patterns, new antimicrobial agents, and changes in guidelines.

Step 5: Monitoring and Evaluating

Monitoring and evaluation are critical components of a successful stewardship program. Key performance indicators (KPIs) should be established to measure the impact of the interventions. These might include metrics such as antimicrobial usage rates, resistance rates, and clinical outcomes.

Develop Surveillance and Data Collection systems to support data driven Monitoring and Evaluation Processes. Surveillance helps monitor antimicrobial usage patterns, identify trends in antimicrobial resistance, and assess the impact of stewardship interventions. The following are key considerations in developing the system;

- Definitions,
- Surveillance objectives,
- Determination of data elements to collect,
- Identification and selection of data sources;
- Designing and developing data collection tools;
- Establishing data management processes,
- Implementation of data collection and entry,
- Monitoring of data quality;
- Analysing, interpretation and utilization of data for decision making Data,
- Feedback and Reporting mechanisms to create awareness, support decision making, and drive continuous quality improvement initiatives.

There is need to schedule regular audits and feedback sessions to assess compliance with guidelines and the effectiveness of interventions. The stewardship team should analyze this data to identify trends, behavior change among professionals' successes, and areas for improvement.

Step 6: Continuous Quality Improvement

A stewardship program is constantly changing; it requires continuous improvement based on the findings from monitoring and evaluation. The stewardship team should regularly review the program's goals, policies, and interventions to ensure they remain relevant and effective and work on target setting. Feedback from front-line staff should be sought to identify any barriers to implementation and areas where additional support is needed.

- Embed Continuous Quality Improvement into the implementation process
- Continuously evaluate and refine the interventions based on feedback from prescribers, outcomes data, and changing antimicrobial resistance patterns for sustainability.
- Develop Surveillance and Data Collection and reporting systems

Engaging in ongoing education using the latest data from the local facility, ongoing research and guidelines in antimicrobial stewardship is crucial. This continuous learning helps the program adapt to new challenges, promote behaviour change and improve patient care.

Step 7: Sustaining the Program

The final step is to ensure the sustainability of the stewardship program. This involves maintaining strong leadership support, securing ongoing funding, and embedding stewardship principles into the facility's culture and work flow. Celebrating successes and recognizing the contributions of the stewardship team and healthcare providers can help maintain motivation and commitment and influence behavior change.

By following this stepwise approach (Illustrated in figure 5.1), healthcare facilities can establish a robust antimicrobial stewardship program that improves patient outcomes, reduces resistance, and promotes the responsible use of antimicrobials.

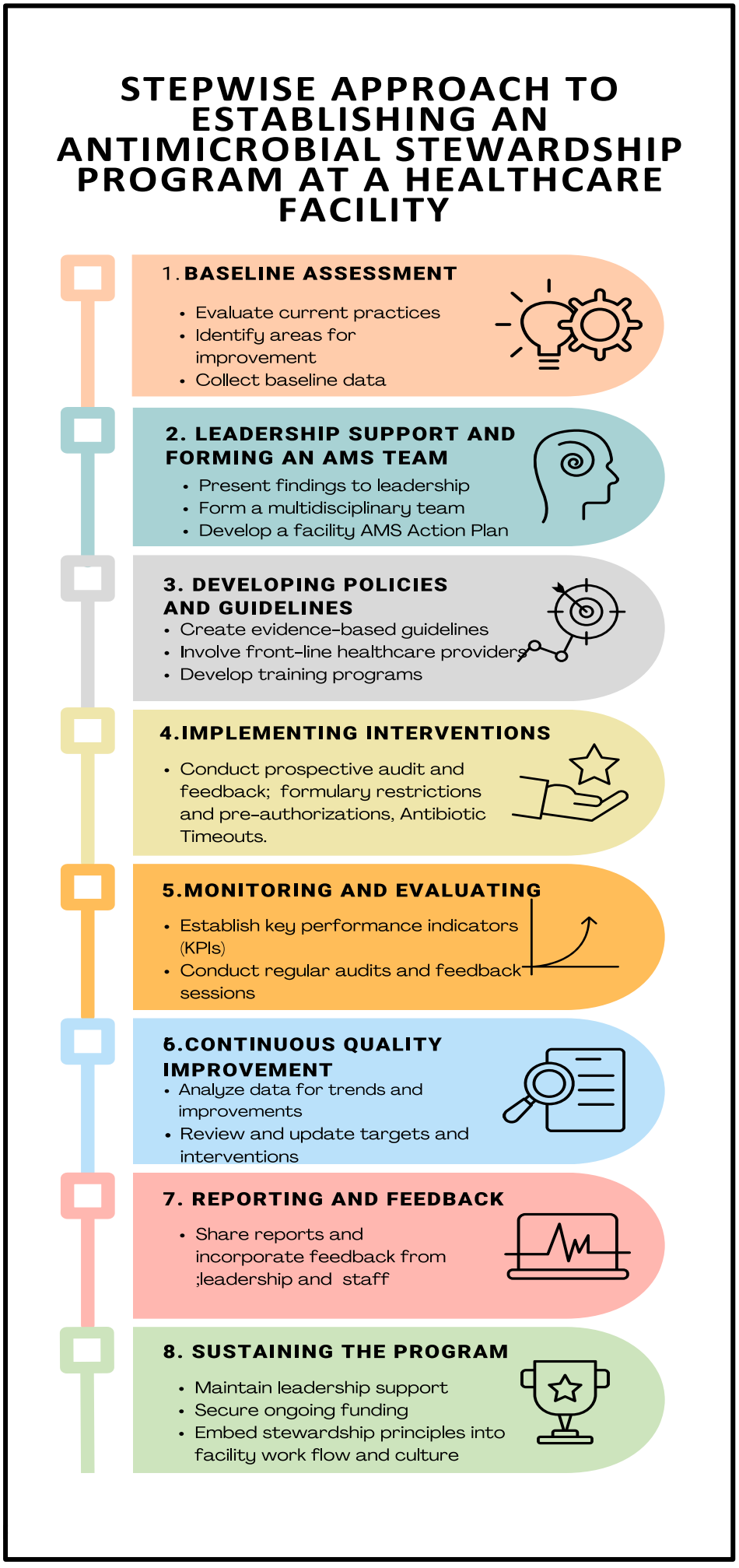

Figure 5.1. Stepwise Approach to implementing AMS Programs

Part 6

Monitoring and Evaluation

6

Monitoring and Evaluation Plan for AMS Programs

The M&E plan is the framework which outlines the indicators to be used to monitor, evaluate and report on the progress of project Implementation. It outlines how the proposed strategies are expected to yield outcomes.

COMPONENTS	STRATEGIES	KEY OUTCOMES/RESULTS	INDICATORS
Research and Development	Build analytical capacity in data analysis interpretation of results, and design of data collection tools through training programs	Improved capacity in AMR data analysis and interpretation of results	# of health personnel trained in AMR data analysis interpretation of results
	Develop National AMR Research Agenda for the country	Relevant Research agenda developed and implemented to influence policy reforms	Availability of National AMR research Agenda
	Develop country guidelines on advocacy and communication on AMR	Improved advocacy and communications on AMR	Availability of AMR Communication guidelines
	Engage communication experts to translate technical research findings into policy briefs and recommendations	Increased utilization of research findings to inform programmatic improvements	# of policy guidelines produced and disseminated
	Foster collaboration between researchers, program managers and policy makers		
	Support research on alternative treatment options and foster collaboration between researchers and alternative medicine community	Increased availability of alternative treatment options from alternative medicine community	# of research studies on alternative treatment options supported
			# of Countries supporting researches on alternative treatment options
	Cultivate inclusion of research in the curriculum of training programs	Improved research capacities	# of countries with research curriculum on training programs
	Develop protocols for reporting and dissemination of data locally		
	Establish indicators for monitoring stewardship interventions and design a system for AMR Stewardship	Improved AMR Stewardship	# of countries with designed system for AMR stewardship program
	Facilitate voluntary participation in operational research (OR)		

Regulation and Manufacturing	Enhance inspection of pharmacies and antibiotics selling outlets	Inspection of pharmacies and antibiotics selling outlets enhanced	% of pharmacies inspected per country
			% of pharmacies complying with National Antibiotic Regulation
	Develop harmonized tools for assessing compliance to regulatory standards	Harmonized tools for assessing compliance to regulatory standards developed	# of countries complying with harmonized regulatory standards
	Engaging in PPP to enhance enforcement and reduce malpractices	Enhanced enforcement and reduce malpractices through public private partnership (PPP)	# of malpractices reported per year
	Public education and awareness of the public on risks associated with purchase of medicine without a prescription	Increased public awareness on risks associated with purchase of medicine without a prescription	# Education and awareness campaigns conducted
	Develop and strengthen policies to regulation of waste disposal	Policies on regulation of antimicrobial waste disposal strengthened	# of countries with Policies on regulation of antimicrobial waste disposal
	Establish safe disposal programs at sub-national levels to support hospitals and community health units	Antimicrobial safe disposal programs established	# of countries with Antimicrobial safe disposal programs
	Advocate for safe disposal of antimicrobial agents in the community		
	Conduct OR (KAPS, PPS)	Improved knowledge on AMR	# of operational research (OR) studies conducted
	Formulate stringent but friendly regulatory frameworks and approval processes	Regulatory frameworks established	# of facilities with Regulatory frameworks established
	Adopting harmonizing the guidelines for Good Manufacturing Practices per country	Harmonized the guidelines for Good Manufacturing Practices per country	# countries with harmonized guidelines for Good Manufacturing Practices
Supply Chain: Selection, Procurement, Supply, and Distribution	Involve required committed and motivated expertise	Enforced categorizing antibiotics according to WHO list of access, watch and reserve	# of countries with enforced categorization of antibiotics according to WHO list of access, watch and reserve
	Strengthen AMR surveillance to guide selection of antimicrobials	Strengthened AMR surveillance	# of countries with Strengthened AMR surveillance
	Capacity building on proper quantifications and forecasting	Improved capacity on proper quantifications and forecasting	# of countries with Improved capacity for quantifications and forecasting
	Strengthen the supply chain	Strengthened the supply chain	# of countries with strengthened the supply chain

Diagnostic, prescribing medicine, dispensing and responsible use (Access & Stewardship Pillar)	Ensure pre and post market surveillance for antimicrobials in the country is conducted	Improved pre and post market surveillance for antimicrobials	# of countries conducting pre and post market surveillance
	Conduct surveys on availability, access and use of antimicrobials	Surveys on availability, access and use of antimicrobials	Availability of surveys reports on availability, access and use of antimicrobials
	Capacity building on supply chain management	Improved capacity on supply chain management	# of staff trained on supply chain management
	Update the essential medicines list based on efficacy, quality and cost effectiveness	Essential medicines list updated based on efficacy, quality and cost	# of countries with updated essential medicines list
	Education and Training on Medicines selection		
	Increase investment in diagnostics including reagents and supplies, laboratory quality management systems	Increased investment in diagnostics including reagents and supplies	# of stockouts of reagents and supplies
	Promote laboratory accreditation including microbiology	Increased number of laboratories accredited	# of laboratories accredited
	Conduct diagnostic stewardship training for clinicians (include diagnostic stewardship in the training package for AMR	Increased awareness on diagnostic stewardship among clinicians	# of clinicians trained on diagnostic stewardship
	Strengthen laboratory capacity (including LIMS), staffing, infrastructure and data management.	Laboratory capacity (including LIMS, staffing, infrastructure and data management strengthened)	# of laboratories with approved staffing norms
			# of laboratories with adequate infrastructure for AMR Surveillance
			# of laboratories with 3 stars and above* under the SLIPTA scheme
	Develop, customize, and disseminate guidelines and algorithms	Guidelines customized and disseminated	# of Guidelines customized and disseminated
	Develop Treatment guidelines to reflect the AWaRe categorization of antibiotics[21]	Treatment guidelines reflecting the AWaRe categorization of antibiotics developed	

[21] The WHO AWaRe (Access, Watch, Reserve) antibiotic book. Geneva: World Health Organization; 2022. https://www.who.int/publications/i/item/9789240062382.

	Strengthen the pharmaceutical supply chain to ensure uninterrupted supply of essential medicines	Strengthened the pharmaceutical supply chain	# of stockouts supplies of essential medicines
	Conduct diagnostic stewardship training for clinicians (include diagnostic stewardship in the training package for AMR	Improved knowledge and skills on diagnostic stewardship	# of countries with training programs on diagnostic stewardship
			# of clinician trained on diagnostic stewardship
	Ensure access and availability to high quality and effective drugs for all patients needing them.	Improved access to high quality and effective drugs for all patients needing them.	# of stockouts of drugs
	Sensitize patients about the importance of diagnosis before treatment	Increased awareness on the importance of diagnosis before treatment	# of countries with patients' sensitization programs on the importance of diagnosis before treatment
	Improve laboratory clinician communication		# of laboratories utilizing newer, simpler, and faster technologies
	Promote laboratory accreditation including microbiology		
	Promote use of newer, simpler, and faster technologies		# of countries utilizing newer, simpler, and faster technologies
	Promote sharing and use of AMR data		# of countries sharing AMR Surveillance Data
	Promote performance-based financing (PBF) for services		

3 stars and above includes laboratories that have been accreditation using international standards (ISO15189; College of American Pathologists, CAP etc)

Core Element 1 - Leadership Commitment		
ACTIONS	**KEY OUTCOMES/RESULTS**	**INDICATORS**
Mobilize resources and budget for financial support to antimicrobial stewardship activities	Improved implementation of Antimicrobial Stewardship activities	Availability of written statement to support stewardship activities
		# of Antimicrobial stewardship activities implemented

Designate a multidisciplinary stewardship team	Established multidisciplinary stewardship team	# Personnel's constituting a multidisciplinary stewardship team
Establish stewardship-related duties in job descriptions and annual performance reviews for AMS team	Stewardship-related duties included in job descriptions	# of health facilities with Stewardship-related duties included in staff's job descriptions
Establish clear communication structures/ lines of authority on antimicrobial stewardship programs.	Communication structures established	Availability of clear communication structures/ lines of authority on antimicrobial stewardship programs.
Allocate time to participate in stewardship activities including training and education	Improved participation in stewardship activities	
Stewardship programme performance review	Improved implementation of the Stewardship programme	# of performance reviews conducted for the stewardship programme
Advocate for support for stewardship activities at countries and regional level	Call to action for stewardship support	Formal or written statement to support stewardship activities to improve and monitor antimicrobial use Availability of resources to support
Core Element 2 –Governance Structures		
ACTIONS	**KEY OUTCOMES/RESULTS**	**INDICATORS**
Formal constitution of AMS Team within the Member States	AMS team constituted	# of countries with AMS team constituted # of countries with AMS governance structure
Improve antibiotic prescription and use	Improved antibiotic prescription and use	# of facilities with improved antibiotic prescription and use
Educate patients and staff on the importance of appropriate antibiotic use	Increased awareness on appropriate antibiotic use	# of patients/staff trained on the importance of appropriate antibiotic use
Auditing of prescription	Improved prescription	# of facilities with proper audit systems for prescription

Managing antimicrobial supply chain (ensuring availability of antimicrobials)		# of facilities with stock out of antimicrobials
Communicate with prescribers on available medicines, dosages etc Keeping documentation of antimicrobials consumptions	Improved communications on available medicines, dosages	# of facilities with regular reports on available medicines, dosages
Generate an appropriate antibiograms	Appropriate antibiograms generated	# of facilities with appropriate antibiograms
Ensure timely communication of laboratory results	Improved turn around time for laboratory results	Average turn around time
Review medications as part of their routine duties	List of medications reviewed	# of facilities with list of medications reviewed
Enhancing communication with other relevant departments e.g. laboratory teams, pharmacy teams and clinicians	Enhanced communication with other relevant departments e.g. laboratory teams, pharmacy teams and clinicians	# of facilities with enhanced communication with other relevant departments
Analysing, interpreting and monitoring of resistance trends	Improved AMR surveillance	# of facilities with routine systems for AMR surveillance
Core Element 3 – Accountability and Drug Expertise		
ACTIONS	**KEY OUTCOMES/RESULTS**	**INDICATORS**
Designate a leader and co-leader to be accountable to the leadership for meeting established goals or targets	Leader and co-leader designated	# of facilities with Leaders and co-leader designated
Training of AMR team leadership in antibiotic stewardship	Improved capacity in antibiotic stewardship	# of personnel trained in antibiotic stewardship
Appoint Pharmacy co-lead to improve the use of antibiotics within the facility	Pharmacy co-lead appointed to improve the use of antibiotics within the facility	# of facilities with Pharmacy co-lead appointed
Set the practice standards for assessing, monitoring and communicating patient outcomes	Improved patients' outcomes	# of facilities with standards for assessing, monitoring and communicating patient outcomes
Core Element 4 – Reporting		
ACTIONS	**KEY OUTCOMES/RESULTS**	**INDICATORS**

Harmonize the reporting system to ensure flow of information from Health Facilities to National and Regional	Enhanced flow of information from Health Facilities to National and Regional	Availability of harmonized reporting tools from Health Facilities to National and Regional
Disseminate antibiograms and consumption information (antimicrobial agents used) by specific community within the country	Antibiograms and consumption information by specific community disseminated	# Health facilities with defined antibiograms # Health facilities with antibiotic consumption information
Provide guidelines to standardize antibiograms development	Standardized Antibiograms Guideline developed	Availability of the standardized guideline for Antibiograms development
Share AMR information (feedback) with all healthcare providers as well as leadership and any other stakeholders	AMR information shared	# of multisectoral data sharing meetings convened # of publications made on AMR
Develop/adopt standardized tools such as those for drug use evaluations or antibiotic audit forms for reviews	Standardized tools for drug use evaluations developed	Availability of standardized tools for drug evaluations
Core Element 5 – Education and Training		
ACTIONS	**KEY OUTCOMES/RESULTS**	**INDICATORS**
Develop, implement and integrate a training course on AMS within the existing training programs (pre and in-service training)	Improved capacity on AMS	# of pre-service with integrated course on AMS # of in-service with integrated course on AMS
		# of CPD sessions conduct
Establish AMS training program for communities that can be delivered by community health volunteers and health workers, media etc	Increased awareness on AMR	# of communities trained on AMS
Incorporate AMS elements into orientation package for new medical staff		# of new medical staff oriented on AMS
Measure impact/effectiveness of training and education programs	Impact/effectiveness of training and education programs documented	Availability of Impact/effectiveness Report
Core Element 6 – Communication		
ACTIONS	**KEY OUTCOMES/RESULTS**	**INDICATORS**
Develop, implement and sustain an awareness campaign, communication messaging and targeted messaging on AMS	Increased awareness on AMS	# of countries with active AMS awareness campaigns conducted
Create and champion a sustainable system for knowledge management including capacity building		
Disseminate evidence based best practice within and from different countries	Improved dissemination of evidence based best practice within and from different countries	# of fora convened to disseminate evidence based best practices

Develop a system with capability for early warning, alerts and notification within the antimicrobial stewardship process including cross-border communication	Improved capacity for early warning, alerts and notification within the antimicrobial stewardship process	# of early warnings and alerts received per quarter
Core Element 7 – Quality Improvement		
ACTIONS	**KEY OUTCOMES/RESULTS**	**INDICATORS**
Conduct risk assessment/AMS audits to identify and prioritize areas of improvement	Risk assessment conducted	# of countries conducted Risk assessment
Develop and implement standard tools for measuring and tracking Quality Improvement/continuous assessment	Tools for measuring and tracking Quality Improvement developed	Availability of tools for measuring and tracking Quality Improvement
Establish Quality Improvement Teams to implement and monitor identified improvement projects	Improved quality	# of Quality Improvement Teams established
Establish client feedback mechanisms (suggestion box, surveys, hotlines) with results reviewed, improvements identified, implemented and communicated to users.	Improved customer care	# of health facilities with established client feedback mechanisms

Part 7

Resource Mobilization

7

Resource Mobilization

Resource mobilization refers to all activities involved in securing new and additional resources. It also involves better utilization of, and maximizing, existing resources. Resource mobilization for the AMS Program involves getting stewardship activities into plans and budgets of the member state governments, institutions and agencies and development partners at different levels. Stewardship activities can be incorporated within existing programs at the Ministry of health and other institutions. Many government programs already have a stewardship element imbedded in their routine activities.

To be funded from the government fiscus or development partners, AMS should be included in relevant national policies and strategic plans. Member states should engage private institutions using PPP models to finance AMS

The key stakeholders who should be engaged to mobilize resources for the stewardship program are as follows:

- Regional and Continental Institutions
- The Ministry of Health as the national stewardship focal point for all collaborative efforts.
- Disease surveillance, emergency preparedness and response programs
- Infection Prevention and Control Programs
- The national programs including the TB, HIV/AIDS and malaria control programs
- The National Medicines Regulatory Authority
- Professional councils for doctors, nurses, pharmacists etc
- Private and public health facilities
- Community based organizations and Civil Society Organizations
- Institutions of Higher learning (including Public and Private Universities)
- Pharmaceutical, diagnostic and medical distributors
- Research organizations

Government funding can be utilized to support some stewardship activities if they are budgeted and planned for especially those that require limited and moderate resources. For resource intensive activities, additional funding could be sought for from different stakeholders.

Table 6.1: Roles of the different stakeholders

Level	Organization	Activities
Continental and Regional level	EAC, ECSA-HC and Africa CDC secretariat	• Provide a linkage between member states and donors. • Provide technical assistance on how countries can increase resources for stewardship activities (domestic and external).
National level	Ministry of health, Government programs, National Medicine Regulatory Agency	• Plan and budget for stewardship activities • Increase domestic fund allocation to stewardship programs • Define pathways for private sector financing in the implementation of stewardship activities • Raise resources for stewardship activities by advocating for funds from potential donors
Health facility level	Hospitals, health centres, Laboratories, pharmacies,	• Ensure transparency and accountability of funds • Plan and budget for stewardship activities. • Advocate for funds for stewardship activities.

Part 8

Risk Management

8 Risk Management

Risk management involves identification, monitoring and managing potential risks in order to minimize the negative impact they may have on the implementation of AMS program. The identified risks are analysed, risk mitigation strategies identified, implemented and monitored for their effectiveness.

Similarly, for the proposed AMS program to realize its full potential, there are risks that have to be anticipated and mitigation measures implemented to maximize its benefits. The Table below list some of the identified risks and proposed mitigation measures.

Table 7.1: Potential risks and mitigation measures

Potential Risk	Mitigation Measures
Inadequate budget to perform AMS activities	Mobilise resource and Budget for Antimicrobial Stewardship (AMS) activities
Lack of National AMR research Agenda	Develop a National AMR research agenda
Inadequate Human resource (laboratory, Pharmacy, clinicians, nurses etc) s	Employ/deploy required human resources to perform AMS activities
Frequent stock out of laboratory reagents, essential equipment and antimicrobials	Strengthen supply chain systems to ensure accurate quantifications, optimum procurement and timely distribution of laboratory reagents, essential equipment and antimicrobials
Existence of sub-standard medicines and diagnostics in the market	Build capacity in GMP within the local Pharmaceutical Industries Establishing mechanism for monitoring compliance to GMP using structures like the National Drug Authority
Poor quality of Diagnostic services	Build capacity in laboratory quality management systems (LQMS) Enroll Laboratories in LQMS programs (accreditation, SLIPTA, GCLP)
Outdated treatment guidelines, protocols, policies and formulary list	Review, and update based on evidence and train relevant staff on treatment guidelines, policies, protocols, and formulary list
Infiltration of market with counterfeit, falsified and unregulated medicines	Enforcement of regulation and enhance pre-and post-market surveillance
Lack of data on antimicrobial use and consumption	Conduct and disseminate findings of Regional/National surveys on antimicrobial use and consumption
Access to antibiotics without prescription	Regulatory enforcement policies requiring prescription
Poor intersectoral collaborations	Fostering intersectoral collaborations with various stakeholders including incorporation of members from other relevant sectors into AMS committees
Inadequate infrastructure	In collaboration with other partners advocate for improved infrastructure where need
Poor water and sanitation	Through multisectoral collaboration enhance provision of safe water and sanitation facilities to citizens
Inappropriate disposal of unused medication	Educate the public and health care workers on proper disposal of unused medicine (remaining after change of treatment)
	Provide collection boxes in health facilities and pharmacies for disposing unused medicine

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General Information			
County:	***Healthcare Facility Name:***		**# of beds:**
Details of respondent: (*Kindly fill below)*		**Details of person administering the questionnaire** *(Kindly fill below)*	
Name:		**Name:**	
Title/position:		***Title/position:***	
Institution:		***Institution:***	
E-mail:		***E-mail:***	
Phone:		***Phone #:***	
Mode of assessment: ☐ ***Interview*** ☐ ***Self-Assessment***		***Start time*:**	***End time:***
Date of assessment (dd/mm/yyyy):	**Date of previous assessment (dd/mm/yyyy**):	**Previous assessment score, if any:**	
Ownership (public/private): **Public**	**Facility Level** (Secondary, Tertiary, Primary):	**Administrator Name:**	
		Cell #:	
Total Staff: **# of clinicians:**	**# of non-clinicians:**	**# of Medical Doctors:**	

Total administrative staff:	**# of Physician Assistants:**	**# of Registered Nurses:**
# of Pharmacists:	**# of Microbiologist/Lab technicians:**	**# of midwives:**
# of Pharmacy technicians:	**# of Dispensers:**	**# of Cleaners/hygienists:**
Others:		

The tool will be used as an annual activity to review the national and healthcare facility AMR response. Responses will be gathered through interviews with members of the AMS Team, focus group discussions among stakeholders and from healthcare facility records. A verifier section has been provided to serve as a guide.

To complete the assessment tool, the user should provide one response per question based on the following options:

1. No (**0=Red**): The core element is not in place and is not a priority;
2. No, but a priority (**1=Orange**)- The core element is a priority but there is no plan in place to initiate it;
3. Planned but not started (**2=Yellow**)- The core element is planned but no action has taken place;
4. Partially implemented (**3=Light green**)-The core element is in place, but it is only partially implemented requiring further strengthening;
5. Fully implemented (**4=Green**)-The core element is in place and is fully implemented without requiring strengthening but needing to be sustained.

The component for the assessment is chosen either from 0, 1, 2, 3, 4 from the dropdown menu, when using excel or by ticking the appropriate box in the world document or circling the appropriate score that matches each answer of the current AMS activities.

*Mode of assessment (external interview: Self-Assessment). *National health authority also refers to National AMR TWG, One Health Platform, HCF Manager, Quality Management Team/AMS committee/AMS program assessor in the HCF.*

HEALTHCARE FACILITY CORE ELEMENTS FOR AMS PROGRAM						
Core Element 1: Leadership and Commitment						
Assessment Components: **0=No** **1=No, but a priority** **2=Planned but not started** **3=Partially implemented** **4=Fully implemented**	**Baseline**	**Period 1**	**Period 2**	**Period 3**	**Period 4**	**Verifiers**
HCE-1.1: Is antimicrobial Stewardship (AMS) identified as a priority by the healthcare facility management or leadership?	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	Interviews with HCF leadership
HCE-1.2: Are AMS activities included in healthcare facility annual plans with key performance indicators?	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	Annual plans of HCF with AMS performance indicators
HCE-1.3: Has the healthcare facility management allocated human and financial resources to initiate AMS activities?	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	Availability of personnel with AMS role in their job description
	☐No	☐No	☐No	☐No	☐No	

HCE-1.4: Is there a healthcare facility action plan in place that prioritizes AMS activities?	☐ No but a priority	☐ No but a priority	☐ No but a priority	☐ No but a priority	☐ No but a priority	HCF action plan and AMS progress report for last quarter
	☐Planned but not started	☐Planned but not started	☐Planned but not started	☐Planned but not started	☐Planned but not started	
	☐Partially implemented	☐Partially implemented	☐Partially implemented	☐Partially implemented	☐Partially implemented	
	☐Fully implemented	☐Fully implemented	☐Fully implemented	☐Fully implemented	☐Fully implemented	
HCE-1.5: Is there a mechanism to regularly monitor and measure the implementation of AMS activities?	☐No	☐No	☐No	☐No	☐No	Annual/ quarterly progress report on the implementation of HCF AMS action plan
	☐ No but a priority	☐ No but a priority	☐ No but a priority	☐ No but a priority	☐ No but a priority	
	☐Planned but not started	☐Planned but not started	☐Planned but not started	☐Planned but not started	☐Planned but not started	
	☐Partially implemented	☐Partially implemented	☐Partially implemented	☐Partially implemented	☐Partially implemented	
	☐Fully implemented	☐Fully implemented	☐Fully implemented	☐Fully implemented	☐Fully implemented	
HCE-1.6: Is there a dedicated financial support for the healthcare facility AMS action plan?	☐No	☐No	☐No	☐No	☐No	HCF budget line with dedicated funds for AMS
	☐ No but a priority	☐ No but a priority	☐ No but a priority	☐ No but a priority	☐ No but a priority	
	☐Planned but not started	☐Planned but not started	☐Planned but not started	☐Planned but not started	☐Planned but not started	
	☒Partially implemented	☐Partially implemented	☐Partially implemented	☐Partially implemented	☐Partially implemented	
	☐Fully implemented	☐Fully implemented	☐Fully implemented	☐Fully implemented	☐Fully implemented	
HCE-1.7. Has a budget (e.g. annual) for the implementation of the healthcare facility AMS action plan been developed?	☐No	☐No	☐No	☐No	☐No	Developed healthcare facility budget for AMS
	☐ No but a priority	☐ No but a priority	☐ No but a priority	☐ No but a priority	☐ No but a priority	
	☐Planned but not started	☐Planned but not started	☐Planned but not started	☐Planned but not started	☐Planned but not started	
	☐Partially implemented	☐Partially implemented	☐Partially implemented	☐Partially implemented	☐Partially implemented	
	☐Fully implemented	☐Fully implemented	☐Fully implemented	☐Fully implemented	☐Fully implemented	
Sub-total score	***/28***	***/28***	***/28***	***/28***	***/28***	

Core Element 2: Accountability and Responsibility						
Assessment Components: **0=No** **1=No, but a priority** **2=Planned but not started** **3=Partially implemented** **4=Fully implemented**	**Baseline**	**Period 1**	**Period 2**	**Period 3**	**Period 4**	**Verifiers**
HCE-2.1: Is there a multidisciplinary AMS committee leadership in the healthcare facility with clear terms of reference?	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	AMS committee TOR
HCE-2.2: Does the AMS committee/ QMT/other relevant committee meet on a regular basis (minimum monthly or quarterly), with meetings and action points with responsible persons?	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	Minutes of last AMS committee meeting
HCE-2.3: Is there is a dedicated AMS leader/champion identified for the healthcare facility?	☐No ☐ No but a priority ☐Planned but not started	☐No ☐ No but a priority ☐Planned but not started	☐No ☐ No but a priority ☐Planned but not started	☐No ☐ No but a priority ☐Planned but not started	☐No ☐ No but a priority ☐Planned but not started	AMS champion identified

	☐Partially implemented	☐Partially implemented	☐Partially implemented	☐Partially implemented	☐Partially implemented	
	☐Fully implemented	☐Fully implemented	☐Fully implemented	☐Fully implemented	☐Fully implemented	
HCE-2.4: Does the team leader or champion have dedicated time for AMS activities in his/her TOR/job description?	☐No	☐No	☐No	☐No	☐No	TOR/job description includes AMS activities
	☐ No but a priority	☐ No but a priority	☐ No but a priority	☐ No but a priority	☐ No but a priority	
	☐Planned but not started	☐Planned but not started	☐Planned but not started	☐Planned but not started	☐Planned but not started	
	☐Partially implemented	☐Partially implemented	☐Partially implemented	☐Partially implemented	☐Partially implemented	
	☐Fully implemented	☐Fully implemented	☐Fully implemented	☐Fully implemented	☐Fully implemented	
HCE-2.5: Is there an AMS team with clear terms of reference?	☐No	☐No	☐No	☐No	☐No	AMS team TOR
	☐ No but a priority	☐ No but a priority	☐ No but a priority	☐ No but a priority	☐ No but a priority	
	☐Planned but not started	☐Planned but not started	☐Planned but not started	☐Planned but not started	☐Planned but not started	
	☐Partially implemented	☐Partially implemented	☐Partially implemented	☐Partially implemented	☐Partially implemented	
	☐Fully implemented	☐Fully implemented	☐Fully implemented	☐Fully implemented	☐Fully implemented	
HCE-2.6: Does the AMS team meet on a regular (monthly or quarterly) basis?	☐No	☐No	☐No	☐No	☐No	Last AMS team meeting minutes (minimum weekly)
	☐ No but a priority	☐ No but a priority	☐ No but a priority	☐ No but a priority	☐ No but a priority	
	☐Planned but not started	☐Planned but not started	☐Planned but not started	☐Planned but not started	☐Planned but not started	
	☐Partially implemented	☐Partially implemented	☐Partially implemented	☐Partially implemented	☐Partially implemented	
	☐Fully implemented	☐Fully implemented	☐Fully implemented	☐Fully implemented	☐Fully implemented	
HCE-2.7: Are other healthcare professionals, apart from	☐No	☐No	☐No	☐No	☐No	Evidence of involvement of other healthcare
	☐ No but a priority	☐ No but a priority	☐ No but a priority	☐ No but a priority	☐ No but a priority	
	☐Planned but not started	☐Planned but not started	☐Planned but not started	☐Planned but not started	☐Planned but not started	

AMS team involved in AMS activities and plans?	☐Partially implemented ☐Fully implemented	☐Partially implemented ☐Fully implemented	☐Partially implemented ☐Fully implemented	☐Partially implemented ☐Fully implemented	☐Partially implemented ☐Fully implemented	professionals in AMS activities
HCE-2.8: Does the AMS committee/team collaborate with the IPC team at the healthcare facility-if the team is separate?	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	Evidence to show collaboration or joint meetings
HCE-2.9: Is the AMS activity report regularly (monthly or quarterly) produced and disseminated to the facility management and other healthcare facility team members?*	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	Latest AMS activity report
Sub-total score	**/36**	**/36**	**/36**	**/36**	**/36**	

Core Element 3: Antimicrobial Stewardship Action						
Assessment Components: **0=No** **1=No, but a priority** **2=Planned but not started** **3=Partially implemented** **4=Fully implemented**	**Baseline**	**Period 1**	**Period 2**	**Period 3**	**Period 4**	**Verifiers**
HCE-3.1: Is there an updated standard treatment guideline (STG) at the healthcare facility?	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	HCF standard treatment guideline including IPC and management guidelines
HCE-3.2. Are the standard treatment guidelines reviewed and updated periodically based on the availability of new evidence?	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	Document of guideline review processes
HCE-3.3: Is there a regular review/audit of specified antibiotic therapy or clinical conditions at the healthcare facility?	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	AMS audit report
HCE-3.4:	☐No	☐No	☐No	☐No	☐No	

Is the advice/feedback from AMS teams accessible/ available to prescribers?	☐ No but a priority	☐ No but a priority	☐ No but a priority	☐ No but a priority	☐ No but a priority	Feedback report from AMS team
	☐Planned but not started	☐Planned but not started	☐Planned but not started	☐Planned but not started	☐Planned but not started	
	☐Partially implemented	☐Partially implemented	☐Partially implemented	☐Partially implemented	☐Partially implemented	
	☐Fully implemented	☐Fully implemented	☐Fully implemented	☐Fully implemented	☐Fully implemented	
HCE-3.5: Does the AMS team conduct regular ward rounds and other AMS interventions in selected departments in the healthcare facility?	☐No	☐No	☐No	☐No	☐No	Ward round reports
	☐ No but a priority	☐ No but a priority	☐ No but a priority	☐ No but a priority	☐ No but a priority	
	☐Planned but not started	☐Planned but not started	☐Planned but not started	☐Planned but not started	☐Planned but not started	
	☐Partially implemented	☐Partially implemented	☐Partially implemented	☐Partially implemented	☐Partially implemented	
	☐Fully implemented	☐Fully implemented	☐Fully implemented	☐Fully implemented	☐Fully implemented	
HCE-3.6: Does the healthcare facility have a formulary/ list of approved antibiotics for use based on the national formulary?	☐No	☐No	☐No	☐No	☐No	HCF formulary/ drug bulleting report
	☐ No but a priority	☐ No but a priority	☐ No but a priority	☐ No but a priority	☐ No but a priority	
	☐Planned but not started	☐Planned but not started	☐Planned but not started	☐Planned but not started	☐Planned but not started	
	☐Partially implemented	☐Partially implemented	☐Partially implemented	☐Partially implemented	☐Partially implemented	
	☐Fully implemented	☐Fully implemented	☐Fully implemented	☐Fully implemented	☐Fully implemented	
HCE-3.7: Does the healthcare facility formulary specify lists of restricted antibiotics that require approval by a designated team or person (pre-authorization)?*	☐No	☐No	☐No	☐No	☐No	HCF formulary with restrictions
	☐ No but a priority	☐ No but a priority	☐ No but a priority	☐ No but a priority	☐ No but a priority	
	☐Planned but not started	☐Planned but not started	☐Planned but not started	☐Planned but not started	☐Planned but not started	
	☐Partially implemented	☐Partially implemented	☐Partially implemented	☐Partially implemented	☐Partially implemented	
	☐Fully implemented	☐Fully implemented	☒Fully implemented	☐Fully implemented	☐Fully implemented	
HCE-3.8:	☐No	☐No	☐No	☐No	☐No	Sample laboratory report
	☐ No but a priority	☐ No but a priority	☐ No but a priority	☐ No but a priority	☐ No but a priority	

Does the healthcare have access to laboratory and imaging services (on-site or off-site) that can be used to support AMS interventions?*	☐Planned but not started ☐Partially implemented ☐Fully implemented	☐Planned but not started ☐Partially implemented ☐Fully implemented	☐Planned but not started ☐Partially implemented ☐Fully implemented	☐Planned but not started ☐Partially implemented ☐Fully implemented	☐Planned but not started ☐Partially implemented ☐Fully implemented	
HCE-3.9: Are there information technology services, tally cards/sheets or other inventory control tools available that can be used to support data gathering to support AMS activities?	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	Availability of functional IT services, inventory control tools
HCE-3.10: Is there a standardized prescription charts, medical records/patient folders and transfer notes to support treatment and AMS activities?	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	Availability of prescription charts and medical records
HCE3.11: Does the healthcare facility have a written policy that requires prescribers to document the indication and antibiotics prescribed in a prescription chart/medical records?	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	Policies on prescribing
Sub-total score	***/44***	***/44***	***/44***	***/44***	***/44***	

Core Element 4: Education and Training						
Assessment Components **0=No** **1=No, but a priority** **2=Planned but not started** **3=Partially implemented** **4=Fully implemented**	**Baseline**	**Period 1**	**Period 2**	**Period 3**	**Period 4**	**Verifiers**
HCE-4.1: Does the healthcare facility include AMS program such as optimizing antibiotic prescribing, dispensing and administration in the staff induction training?	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	Induction training manuals
HCE-4.2: Does the healthcare facility offer continue in-service training or continuous professional development on AMS, IPC to staff?	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	In-service training manuals/ CPD/ continuous medical education
HCE-4.3: Does the healthcare facility ensure training for AMS team on antimicrobial stewardship/ IPC?	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	Training reports, interviews with staff
Sub-total score	**/12**	**/12**	**/12**	**/12**	**/12**	

Core Elements 5: Monitoring and Surveillance						
Assessment Components: **0=No** **1=No, but a priority** **2=Planned but not started** **3=Partially implemented** **4=Fully implemented**	**Baseline**	**Period 1**	**Period 2**	**Period 3**	**Period 4**	**Verifiers**
HCE-5.1: Are regular prescription audits, point prevalence surveys to assess the appropriateness of antibiotic prescribing undertaking at the HCF by AMS committee or relevant team?	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	Number of audits conducted with report
HCE-5.2: Does the healthcare facility regularly monitor the quantity and types of antibiotic use (purchased/prescribed/dispensed)?	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	Antimicrobial consumption report
HCE-5.3: Does the healthcare facility regularly monitor shortages/stock-outs of essential antimicrobials?	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	Stock-out report

HCE-5.4: Is there a mechanism to report substandard and falsified medicines and diagnostics at the healthcare facility?	☐No	☐No	☐No	☐No	☐No	Reports of substandard/falsified antimicrobials and diagnostics
	☐ No but a priority	☐ No but a priority	☐ No but a priority	☐ No but a priority	☐ No but a priority	
	☐Planned but not started	☐Planned but not started	☐Planned but not started	☐Planned but not started	☐Planned but not started	
	☐Partially implemented	☐Partially implemented	☐Partially implemented	☐Partially implemented	☐Partially implemented	
	☐Fully implemented	☐Fully implemented	☐Fully implemented	☐Fully implemented	☐Fully implemented	
HCE-5.5: Does the AMS team regularly monitor antibiotic susceptibility and resistance rate for a range of key indicator bacteria?	☐No	☐No	☐No	☐No	☐No	Antimicrobial surveillance report
	☐ No but a priority	☐ No but a priority	☐ No but a priority	☐ No but a priority	☐ No but a priority	
	☐Planned but not started	☐Planned but not started	☐Planned but not started	☐Planned but not started	☐Planned but not started	
	☐Partially implemented	☐Partially implemented	☐Partially implemented	☐Partially implemented	☐Partially implemented	
	☐Fully implemented	☐Fully implemented	☐Fully implemented	☐Fully implemented	☐Fully implemented	
HCE-5.6: Does the AMS team monitor compliance with at least one specific AMS intervention (e.g. indication captured in medical records for patients) at the healthcare facility?	☐No	☐No	☐No	☐No	☐No	AMS intervention report
	☐ No but a priority	☐ No but a priority	☐ No but a priority	☐ No but a priority	☐ No but a priority	
	☐Planned but not started	☐Planned but not started	☐Planned but not started	☐Planned but not started	☐Planned but not started	
	☐Partially implemented	☐Partially implemented	☐Partially implemented	☐Partially implemented	☐Partially implemented	
	☐Fully implemented	☐Fully implemented	☐Fully implemented	☐Fully implemented	☐Fully implemented	
Sub-total score	**/24**	**/24**	**/24**	**/24**	**/24**	

Core Elements 6: Reporting/Feedback						
Assessment Components: **0=No** **1=No, but a priority** **2=Planned but not started** **3=Partially implemented** **4=Fully implemented**	**Baseline**	**Period 1**	**Period 2**	**Period 3**	**Period 4**	**Verifiers**
HCE-6.1: Does the AMS committee/ relevant team analyze and report on the quantities of antibiotics purchased/ prescribed/dispensed to prescribers and HCF management?	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	Antimicrobial consumption report
HCE-6.2: Does the AMS committee/ relevant team review, analyze and report on antibiotic susceptibility rates and key findings shared with prescribers?	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	Evidence of dissemination of susceptibility report
HCE-6.3: Does the AMS team communicate findings from audits/ reviews of the quality/ appropriateness of antibiotic use to prescribers along with specific action points?	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	Reports to prescribers with action points

HCE-6.4. Does the healthcare facility develop and aggregate antibiogram and regularly update it? *Please see Annex VIII on page 71 of WHO AMS toolkit*	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	☐No ☐ No but a priority ☐Planned but not started ☐Partially implemented ☐Fully implemented	Report of the facility's antibiogram
Sub-total score	***/16***	***/16***	***/16***	***/16***	***/16***	

Asterisk (*) represent advanced core elements, while those without asterisks are the basics or foundational elements

A three-step process interpretation/classification of scores

1. Add up the points for each core element for the HCF

CORE ELEMENT	SCORE/SUB-SCORES
1. Leadership and commitment	
2. Accountability and responsibility	
3. AMS actions	
4. Education and training	
5. Monitoring and evaluation	
6. Reporting feedback	
Final Total Score	

2. Determine the assigned core element level" in the facility using the total score from Step 1

Range of Scores	AMS Core Elements Level
0-41	**Inadequate**
42-82	**Basic**
83-131	**Intermediate**
132-164	**Advanced**

3. Review the core elements results and develop an improvement or action plan.

Review the areas identified by this evaluation as requiring improvement and develop an action plan to address the gaps.

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