

STRATEGY for the PREVENTION and CONTAINMENT  
of ANTIMICROBIAL RESISTANCE  
for ETHIOPIA

Second Edition, 2015 to 2020  
Addis Ababa  
October 2015



Ethiopian Food, Medicine and Healthcare  
Administration and Control Authority



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## FOREWORD

Antimicrobials are a scarce resource that is used every day to treat infectious diseases in humans and animals. Unfortunately, the actions (and inactions!) by human beings have resulted in antimicrobial resistance (AMR). AMR has been recognized as a global threat to society in terms of its impact on public health and risk to the economy. Infectious diseases and AMR have been spreading fast from one part of the globe to the other due to travel, globalization, and changes in the environment. AMR is becoming a growing threat to the effective prevention and treatment of a wide range of infectious diseases caused by bacteria, parasites, viruses, and fungi. It is feared that even simple and treatable infections and injuries in humans and animals may kill and the world will return to the pre-antibiotic era. This calls for action and coordination of efforts at the local, national, regional, and global levels and for multi-institutional and multidisciplinary approaches to the prevention and containment of not only infectious diseases but also AMR. Although we cannot eradicate AMR, we can contain it to a manageable level.

To understand the national situation, Ethiopia did a situation assessment, launched its first strategy in 2011, and took actions to contain AMR, as detailed in the blue boxes found throughout this strategy. This updated version of the strategy was in response to the revised health and medicines policies, health sector transformation plan, and the resolutions of the 68th World Health Assembly of May 2015 and so that Ethiopia's efforts could be coordinated with global initiatives in the prevention and containment of AMR.

In this strategy, only priority and urgent actions are indicated. Implementation of these priorities requires involvement and commitment of multiple stakeholders across sectors at local and national levels. These priorities must be linked to global efforts since the challenges posed by AMR involve more than one sector and are more than one country can tackle.

We would like to acknowledge the institutions and experts who have contributed, not only in bringing this strategy to this level, but also for their continued multifaceted interventions to contain AMR.

The Ethiopian Government is confident that this strategy will help respond to the threats of AMR. The Government supports and urges all stakeholders to develop their specific plans of action in their respective institutions and sectors and also coordinates with national efforts to prevent, slow down, and contain AMR, so that our people can enjoy the benefits and contributions of effective antimicrobials in containing infectious diseases.

**Yehulu Denekew, Director General**  
**Ethiopian Food, Medicines, and Healthcare Administration and Control Authority**

## ABBREVIATIONS AND ACRONYMS

AMR	antimicrobial resistance
BCC	behavior change communication
C&S	culture and sensitivity
FMHACA	Food, Medicines, Healthcare Administration and Control Authority
HIV	human immunodeficiency virus
IPC	infection prevention and control
MSH	Management Sciences for Health
NACARC	National Advisory Committee on Antimicrobial Resistance Prevention and Containment
SIAPS	Systems for Improved Access to Pharmaceuticals and Services
STG	standard treatment guideline
TB	Tuberculosis
USAID	United States Agency for International Development
WHA	World Health Assembly
WHO	World Health Organization

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## VISION AND SCOPE

### Vision

The vision is a society where antimicrobials are recognized and managed as a valuable and shared resource, maintaining their efficacy so that infections in humans and animals remain treatable and communities continue to benefit from the advances that antimicrobials enable.

### Scope

This strategy includes effective antimicrobial resistance (AMR) prevention and containment of the ever-increasing range of infectious threats caused by bacteria, parasites, viruses, and fungi in humans, animals, agriculture, and the environment. The multiple stakeholders across sectors and the whole of society will be coordinated for the prevention and containment of AMR.



## INTRODUCTION

### Background

During the past seven decades, antimicrobial medicines have saved millions of lives, substantially reduced the burden of diseases that were previously widespread, improved the quality of life, and helped increase life expectancy. However, in the recent past, the emergence and spread of AMR in several microorganisms has rendered the management of many infectious diseases difficult. The development of resistance to antimicrobials commonly used to treat malaria, TB, HIV, and others is of particular concern and is an impediment in achieving Millennium and Sustainable Development Goals.

“... Drugs that were once lifesavers are now worthless. Hospitals have become hotbeds for the transmission of highly resistant superbugs, increasing the risk that hospitals kill rather than heal. AMR is not a future threat looming on the horizon. It is here, right now, and the consequences are devastating.” (Dr. Margaret Chan, Director General of WHO, June 25, 2014, at the Ministerial Conference on AMR).

“... more and more first- and second-line antimicrobials failed ... post-antibiotic era in which common infections will once again kill...” (Dr. Margaret Chan, Director General of WHO, May 18, 2015, 68th WHA opening speech)

AMR is a natural biological phenomenon that can be amplified or accelerated by actions and inactions of human practices and a variety of other factors. The use of an antimicrobial for any infection, real or feared, in any dose and over any time period, forces microbes to either adapt or die in a phenomenon known as “selective pressure.” The microbes that adapt and survive carry genes for resistance, which can be passed on. When antimicrobials are used incorrectly, such as for too-short a time, at too-low a dose, or for the wrong disease; the likelihood that bacteria and other microbes will adapt and replicate rather than be killed is greatly enhanced. Much evidence supports the view that the total consumption of antimicrobials is the critical factor in selecting resistance. Paradoxically, underuse through lack of access, inadequate dosing, poor adherence, and substandard antimicrobials may play as important a role as overuse. The emergence of resistance is a result of use, overuse, and misuse in humans, animals, and the environment.

In Ethiopia, there are indications of misuse of antimicrobials by health care providers, unskilled practitioners, and animal husbandry and drug users. These, coupled with the rapid spread of resistant microbes and inadequate surveillance, have exacerbated the problem.

The prevention and containment of AMR has a common approach and requires integrated and well-coordinated efforts at the global, national, institutional, and individual levels. AMR is a biological, behavioral, technical, economic, regulatory, and educational problem and requires a comprehensive response strategy developed on the basis of evidence.

As AMR is a global and cross-border issue, the World Health Organization (WHO) published its first Global Strategy for Containment of Antimicrobial Resistance in 2001. This key document

provided an operational framework and a comprehensive set of AMR containment-related interventions that reflect AMR's multi-factorial nature. The 68th World Health Assembly (WHA) passed a resolution in May 2015 on the global action plan to contain AMR with five strategic objectives that member states can adapt and use. Some countries have also developed and revised their AMR containment strategies. Accordingly, relevant documents have been reviewed and used in the revision of this national strategy.

The five strategic objectives are:

- Raise awareness and understanding and improve education on antimicrobial use, resistance prevention, and containment through effective communication and training.
- Strengthen the knowledge and evidence on antimicrobial use and resistance through one-health surveillance and research.
- Improve infection prevention and contain the spread of resistant microorganisms across human and animal communities and health care settings through individual and environmental sanitation, hygiene, and infection prevention measures.
- Optimize the use of antimicrobials in human and animal health through effective stewardship practices.
- Strengthen and establish national alliances and partnerships, management and governance arrangements, and resource mobilizations for the prevention and containment of AMR at all levels.

### **Situational Analysis of Antimicrobials Use and Resistance in Ethiopia**

The 2009 national AMR baseline situation assessment (DACA 2009) documented the review of 10,000 culture and sensitivity (C&S) tests from across the country over a five-year period; about one-third of the tests contained one or more microorganisms. The assessment also documented that most microorganisms (bacteria) that are commonly involved in causing infections in human beings and animals showed a considerable degree of resistance to commonly used first-line antimicrobials (antibacterials) over the five-year period. Multiple AMR organisms were commonly identified.

The AMR baseline survey (DACA 2009) used 10 different tools to look into the curriculum of health professionals; reviewed research; assessed the knowledge, attitudes, and practices of health care providers and clients; and looked into service records. Following identification of gaps, the national strategy for AMR prevention and containment was developed (EFMHACA 2011), followed by a national plan of action that has cascaded to stakeholder institutions and interventions targeted at the identified gaps. This has helped streamline subsequent interventions.

There are diseases that are transmitted from animals to humans and vice versa. Humans acquire infection from animals during husbandry, health service delivery, leather manufacturing, food processing, and vaccine production; laboratories, from zoo keeping; and from consumption of foods of animal origin (milk and meat from cattle, sheep, goats, poultry, pigs, and fish) and eggs. In zoonosis, susceptible and resistant microorganisms are transmitted from animals to man and sometimes from man to animals. Antimicrobials used in both humans and animals are similar and can be overprescribed for therapeutic, prophylactic purposes and as feed additives. The emergence and prevalence of *Salmonella* and *S. aureus* with multiple resistances in food animals can seriously compromise public health.

Review of the course content at health training institutes (for both humans and animals) has shown that some improvement in education has occurred, including much more emphasis on the local context of antimicrobial use, resistance, and containment; counselling patients on and adherence to treatment with antimicrobials; adherence to treatment guidelines to prevent and contain AMR; and prophylaxis use. However, areas still lacking include rational prescribing and dispensing, standard treatment guidelines (STGs), principles and concepts of choosing antimicrobials and essential medicines (these are covered adequately in medicine and pharmacy classes); theory and practice in microbiology courses (less time is allowed); and key microbial resistance, nosocomial infections, and AMR mechanisms and containment.

Average availability of key antimicrobials in health facilities was 73%. Availability of treatment guidelines in health facilities was 61%. Medicines use education was given in only 27% of health facilities, but no education on the proper use of antimicrobials was given to clients in the health facilities.

Although the level and training type differs in aggregate, prescribers' knowledge of antimicrobials was, in certain categories, seriously compounded with the often empirical practices used during treatment. They had also reported that certain microorganisms did not respond to first-line antimicrobials.

Even if there was some awareness of nosocomial infections, little is done by facilities to prevent and contain it. In addition, the availability and utilization of C&S tests and awareness of the factors contributing to AMR and containment strategies was low, and key infection prevention supplies and materials were not readily available.

Clients' knowledge of prescribed antimicrobials, including routes, dosages, frequency of administration, duration of use, and the importance of continuing treatment even if they feel better, were less than the standard. Clients also believe that antimicrobials are used for illnesses like during watery diarrhoea and the common cold. Moreover, it was revealed that self-medication with antimicrobials was common. The sources of information for their self-medication were the pharmacy, leftover antimicrobials at home, and friends and relatives.

Antimicrobial prophylaxis was used in the majority of surgical procedures, including clean surgical procedures and in more doses and duration than is recommended. A number of wide spectrum and combination antimicrobials and those with a potential resistance and toxicity problems were also used.

Prescribing antimicrobials to inpatients was widespread. More than two-thirds had 1 or more antimicrobials prescribed with a maximum of 6 (with an average of 1.5). Average duration of stay in a hospital for medical inpatients with antimicrobials prescribed was 7.4 days. Rational prescribing as measured by the extent of adherence to the Ethiopian STG 2004 was strikingly low. For example, the antimicrobials chosen and the duration of therapy for pneumonia conformed with the STG was only 20%, meningitis 33%, typhoid 25%, urinary tract infection about 20%, and relapsing fever 14.8% only.

Reviews of outpatient prescription paper records showed that 23.0% of health facilities had not used standard prescription paper, often with incomplete information as regards the date of prescription, diagnosis, and prescriber's details. The outpatient prescriptions contained one or more antimicrobials in 62% of patient encounters.

### **Rationale for Revision of the Strategy**

The 2009 AMR baseline survey helped identify gaps and target interventions which were used as input to develop the first National Strategic Framework for the Prevention and Containment of Antimicrobials Resistance (EFMHACA 2011), which has been used for five years. These documents have helped to implement multifaceted interventions to prevent and contain AMR. Some of the results are described in boxes in this strategy.

The revised health policy and the 2015-2020 Health Sector Transformation Plan has drawn attention to the prevention and containment of AMR. However, the growing public health and economic threats and the global nature of AMR have necessitated the updating and revision of the 2011 strategic framework. The review process has involved the National Advisory Committee on Antimicrobial Resistance Prevention and Containment (NACARC) members and other multiple stakeholders' institutions. This strategy contained here is formulated to have five inter-related and inter-dependent objectives which will harness efforts in the fight against AMR.

Despite the Ethiopian Government's commitment and efforts to prevent and contain AMR, the challenge continues to escalate at the national and global levels, leaving limited choices to prevent and control not only infectious diseases, but also manage some non-communicable and chronic diseases and procedures, such as organ transplants, cancer treatment, rheumatoid arthritis, dialysis, and surgery. AMR also may threaten hard-won health development goals and risk the economy. Success in the prevention and containment of AMR necessitates the involvement of public and private bodies to coordinate their efforts in an integrated manner in human and animal health and the environment.

## GUIDING PRINCIPLES

These guiding principles describe the role of all stakeholders to follow a common approach that requires integrated and well-coordinated efforts at the national, institutional, and individual levels and that links with regional and global efforts. The principles, based on the approach of the 68th WHA, are as follows:

- Whole-of-society engagement, including a one-health approach. AMR affects everybody, regardless of where they live, their health, economic circumstances, lifestyle, or behavior. It will affect sectors beyond human health, such as animal health, agriculture, food security, environment, and economic development. Therefore, everybody—in all sectors and disciplines—should strive to preserve the effectiveness of antimicrobial medicines.
- Prevention first. Every infection prevented is one that needs no treatment. Prevention of infection can be cost-effective and implemented in all settings and sectors. This can slow the development and contain the spread of AMR infections.
- Ensure access and improve rational use of antimicrobials and infection prevention supplies.
- Understand the emergence and spread of AMR.
- Invest resources that will provide a return over time. Resources are required for the prevention of infection, surveillance, stewardship, operations and interventions research, and capacity building in the laboratory, human resources and systems, regulatory areas, and education and training.
- Institutionalize ownership. The core principle of stakeholders' and health institutions' ownership is that it empowers them to manage the AMR issue and problems that are specific to their institutions and enable them to take actions to combat AMR.
- Information sharing and networking to establish and strengthen global, national, and regional platforms to facilitate information sharing and networking against AMR.

The one-health approach and one-health response are coordinated, collaborative, multidisciplinary, and cross-sectoral actions to develop strategies for human and animal health and the environment, which are inextricably linked. Synergistic efforts of all the sectors involved are required.

## GOAL AND STRATEGIC OBJECTIVES

### Goal

The goal is to prevent, slow down, and contain the spread of AMR through the continuous availability of safe, effective, and quality-assured antimicrobials and their effective use thereof. This can only be achieved through the collaborative actions among partners in human health, agriculture, the food industry, teaching and research institutes, civil societies and associations, the pharmaceutical industry, and global stakeholders to synergize efforts and resources.

### Strategic Objectives

#### ***Strategic Objective One***

Raise awareness and understanding and improve education on antimicrobial use, resistance prevention, and containment through effective communication and training.

#### ***Strategic Objective Two***

Strengthen the knowledge and evidence on antimicrobial use and resistance through one-health surveillance and research.

#### ***Strategic Objective Three***

Improve infection prevention and contain the spread of resistant microorganisms across human and animal communities and health care settings through individual and environmental sanitation, hygiene, and infection prevention measures.

#### ***Strategic Objective Four***

Optimize the use of antimicrobials in human and animal health through effective stewardship practices.

#### ***Strategic Objective Five***

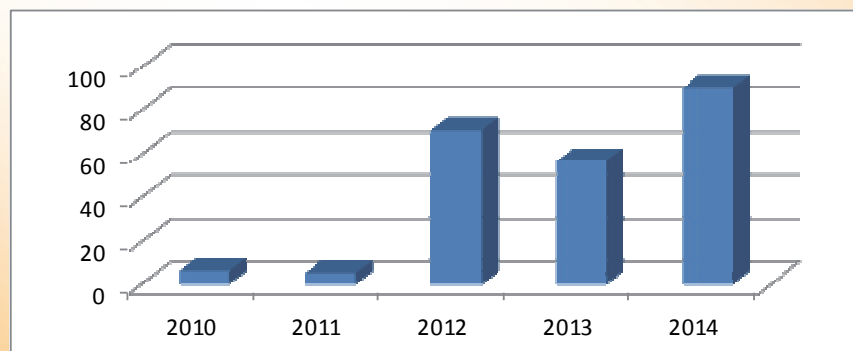
Strengthen and establish national alliances and partnerships, management and governance arrangements, and resource mobilizations for the prevention and containment of AMR at all levels.

## STRATEGIC OBJECTIVE ONE

**Raise awareness and understanding and improve education on antimicrobial use, resistance prevention, and containment through effective communication, education, and training.**

Education and empowerment of the whole society on antimicrobial use and resistance containment are needed to alleviate the standard practices (boxes below) observed in the use of antimicrobials. Pre- and in-service education of health professionals and continuing professional development are also focus areas. Mass media education and empowerment of the public and the whole society on antimicrobial use and resistance has been provided. However, there are still gaps in addressing the threats AMR has posed and continued scale-up of interventions needed to prevent and contain it. Education and empowerment still remains a key strategy to prevent and contain AMR.

Clients frequently believe that antibiotics will help them recover from all respiratory tract infections faster, although the most common pathogens are viral. And a significant percentage of clients did not finish their prescribed antibiotics or kept them for later use, all practices that encourage AMR. Clients also expect antibiotics for self-limiting infections (DACA 2009). Evidence on the benefits of educating clients about unnecessary antibiotic use is available. There have been efforts to increase awareness of the society on AMR prevention and containment through mass media and education of clients at health-facility waiting areas.



**Number of Antimicrobial and Medicine Use Broadcasts by Year**

## **Priority Actions**

### ***Improve Awareness and Understanding, Education, and Empowerment of Clients and the Community***

- Promote strong and sustainable whole-of-society engagement, awareness raising, education, and empowerment about antimicrobial use and resistance containment through effective use of the media
- Incorporate hygiene, sanitation, infection prevention, and antimicrobial use and resistance into school curricula to promote better understanding and awareness
- Educate clients and the public to not self-medicate, share, discontinue, or hoard antimicrobials and to not demand them from health care providers for self-limiting illnesses
- Support the media to accurately report relevant information and reinforce key messages about antimicrobial use and resistance
- Support the development of core communication materials and tools
- Advocate AMR as a national and global priority across all government ministries
- Promote and support the establishment of a one-health coalition to combat AMR
- Increase public engagement to promote key messages about antimicrobial use, with responsibility for appropriate use
- Promote open public discussion in the society and raise awareness about antimicrobials and ways to limit their use for low-risk and self-limiting infections to influence behavior change
- Ensure proper disposal of unfit-for-use antimicrobials to protect the environment

### ***Support Education and Training of Human and Animal Health Care Professionals***

- Support the incorporation and revision of course content for undergraduate and postgraduate health professionals (human and animal) to accommodate topics and allocate sufficient time to AMR prevention and containment
- Encourage AMR awareness and education on responsible prescribing, dispensing, and administration practices
- Strengthen effective prevention, management, and control of infection in undergraduate and postgraduate curricula for human medicine, nursing, pharmacy, dentistry, veterinary, and other professionals courses



- Facilitate the development of sector-specific prescribing guidelines and promote responsible-use practices, including effective dissemination of guidance
- Support health professionals in reinforcing adherence counseling and key messages and in providing resources for informed decision-making during patient counseling on AMR prevention and containment
- Encourage improved/targeted continuing professional education and development programs for human and animal health care professionals on antimicrobials and AMR
- Ensure that antimicrobial stewardship competencies are included in professional curricula and continuing professional development

The AMR baseline survey has shown that there are gaps in training and research of public health importance. Instructors of microbiology, pharmacology, and pharmacotherapy participated during the baseline survey, strategy, and plan of action preparation. They were also involved in the training of trainers programs and encouraged to review the course content and time allocation for AMR containment in their respective courses. Some of the faculties have made significant strides to include content and allocate time to AMR prevention and containment.

## STRATEGIC OBJECTIVE TWO

### **Strengthen the knowledge and evidence on antimicrobial use and resistance through one-health surveillance and research.**

Surveillance and research are essential in guiding management of infectious diseases and updating infection control policies and practices, antimicrobial use, medicines lists, and STGs. It is also critical to provide early warning of emerging and reemerging infectious diseases, monitoring changing patterns of resistance, and targeting and evaluating AMR prevention and containment measures. Inadequate surveillance and research means that resistance prevalence and trends are not known and that baseline data for evaluating potential interventions are unavailable.

The antimicrobial use, resistance, and containment baseline survey (DACA 2009) showed that empiric treatment with antimicrobials is widely practiced. Therefore, establishing and strengthening microbiology laboratories, encouraging microorganism culture and susceptibility testing, analyzing and periodic reporting, and sharing with health care providers and others are important. Standardizing methods and procedures for surveillance of antimicrobial use and AMR and ensuring data quality should also be given emphasis. Therefore, an effective network that generates and collates data on use, resistance, and use/consumption of antimicrobial medicines needs to be established or strengthened. There are experiences in the collection, analysis, interpretation, and use of such data in Ethiopia.

### **Priority Actions**

#### ***Support Surveillance of AMR Microorganisms***

- Establish/strengthen national, regional, and health facilities' surveillance systems to detect and report AMR and disseminate information to facilitate decision making on diagnoses and treatments in public health, veterinary practice, and food laboratories
- Ensure the establishment of networks to develop surveillance linkages, testing methods, and data sharing between human and veterinary sectors at national and regional levels
- Support C&S tests on targeted microorganisms
- Support the quality assurance and standardization of routine antimicrobial testing and interpretation of results to improve diagnoses and treatment of infections
- Support and conduct population-based, real-time surveillance to monitor AMR patterns to demonstrate the extent of the problem in both human and animal health
- Disseminate data to users, national and regional focal points, and stakeholders

- Encourage health care providers to utilize antimicrobial sensitivity tests and data in humans and animals health
- Extend alerts about new and emerging antibiotic resistance issues to a wide range of professionals
- Use the generated information to monitor trends, as an early warning system, and to determine risk factors and drivers of resistance
- Assess the magnitude of AMR microorganisms and infectious disease burden through networks of laboratories equipped with the capacity to perform quality assured antimicrobial susceptibility testing and estimate the impacts on public health and the economy
- Use the data generated to compare outcomes of interventions

### ***Support Surveillance of Antimicrobial Use***

- Support accessibility of the right antimicrobials
- Monitor prescribing, dispensing practices, client/community use, and consumption patterns in health care settings and in the community
- Support the assessment of non-therapeutic use of antimicrobials in veterinary and agriculture settings
- Support the identification of factors that influence prescribing, dispensing, and use by clients
- Strengthen the collection, consolidation, and publication of antimicrobials use to disseminate data and information to users, national and regional focal points, and stakeholders to facilitate decision making
- Support a series of population-based, real-time surveillance systems to monitor antimicrobial use to demonstrate the extent of the problem in both human and animal health
- Support studies on behavioral aspects about self-medication and adherence, and develop interventions to bring about behavior change
- Strengthen the premarket testing and post-marketing quality surveillance of antimicrobials and infection prevention supplies
- Monitor and evaluate the impact of pharmaceutical promotion on antimicrobial use
- Support generation of evidence in the promotion of antimicrobial use and containment of resistance

### ***Establish or Strengthen Capacity of National, Regional, and Health Facility Laboratories***

- Support standardization of laboratory methodologies and quality assurance techniques and improve availability and reliability of microbiology laboratory facilities and tests
- Support and conduct C&S tests on targeted microorganisms and antimicrobials that will help assess the impact of interventions in humans and animals

### ***Support Basic and Operational/Intervention Research***

Research on AMR provides knowledge necessary to develop appropriate responses for tackling the emergence and spread of AMR. The types of research needed in Ethiopian settings are those that show the extent and trend in resistance, practices causing resistance, and the driving factors, antimicrobial use pattern, and strategies that can be applied to prevent and contain resistance. Initiating and encouraging research in these areas should be considered seriously, and the capacity of research institutes and academia should be boosted. Work is also needed to translate research findings and recommendations into useful practices.

- Identify and prioritize antimicrobial use and resistance research needs
- Encourage research to understand the factors that facilitate development of resistance and transmission pathways between the environment, humans, animals, and the food supply
- Encourage the development of alternative treatments for infections that do not rely on antimicrobials; this has to be complemented with combination therapy and optimal dosing
- Promote research to identify high-risk strains, their resistance mechanisms, and their spread
- Promote the biopharmaceutical incubator consortium to promote innovation for new antimicrobials, vaccines, and therapies development
- Support genomic technologies and sequencing that have the potential to improve appropriate, prompt, early, tailored treatment, benefitting patients and conserving antimicrobials
- Explore the possibility of developing an “AMR index” to communicate gaps in antimicrobial effectiveness and help aggregate data on resistance to assess trends over time and across locations
- Support research on the economic impact of AMR and its interventions

## STRATEGIC OBJECTIVE THREE

### **Improve infection prevention and contain the spread of resistant microorganisms across human and animal communities and health care settings through individual and environmental sanitation, hygiene, and infection prevention measures.**

Infection prevention and control (IPC) measures in health facilities and the community reduces the risk of transmission of infections and minimizes the need for and use of antimicrobials. This prevents subsequent emergence of resistant strains. Furthermore, IPC measures contain the spread of resistant microbes once resistance has emerged. These measures include individual and environmental hygiene; promoting vaccination; use of personal protective equipment; maintaining a clean environment; appropriate use of appropriate antiseptics and disinfectants; decontamination, cleansing, and sterilization (or high-level disinfection) of instruments; improving safety in risky areas of the health facilities for humans and animals; safe use and disposal of sharps; appropriate waste disposal; and isolation of patients infected by highly contagious microorganisms, when required. Partners in many sectors of society and the general public will need to be involved in these efforts.

Infection prevention and patient safety (IPPS) measures have been emphasized in Ethiopia; training manuals for health care providers and managers have been prepared, training on IPPS given, quantities of infection prevention commodities and supplies required per level of care have been listed, and infection prevention IEC/BCC materials developed and put to use. IPPS has also been given high priority by high-level government authorities in the follow-up of referral hospitals in Addis Ababa. However, there remains a lot to be done on IPPS.

### **Priority Actions**

#### ***Strengthen Infection Prevention and Control Programs***

- Expand IPC systems at national, regional, health facility, and community levels both for humans and animals
- Strengthen vaccination programs in human and animal health to prevent infections
- Establish/enhance infection prevention standards
- Develop/revise, disseminate/implement, monitor, and evaluate infection prevention guidelines and codes of professional practice; set minimum accreditation standards (e.g., infrastructure of health facilities) and other relevant resources to promote IPC
- Launch IPC need-based education and training programs to target audiences in human and animal health

- Limit the emergence and spread of multidrug resistant organisms in humans and animals through multi-sectoral and international collaboration
- Encourage dissemination, implementation, and monitoring of best practices
- Support better use of data and diagnostics
- Ensure the availability and adopt the use of evidence-based IPC practices and tools in human and animal health care settings
- Support initiatives and mobilize adequate human and material resources and supplies for IPC

### ***Strengthen Infection Prevention and Control Practices in Health Facilities***

- Establish IPC practices and create an enabling environment
- Develop and avail IPC guidelines to develop relevant standard operating procedures and monitor their implementation
- Standardize and promote the proper use of antiseptics and disinfectants
- Ensure availability and proper use of infection prevention materials and supplies
- Establish/strengthen a functional Infection Prevention and Control Committee in each health facility
- Conduct regular pre-service and in-service trainings on IPC
- Monitor and evaluate all IPC practices in health facilities
- Expand availability and use of diagnostics to improve treatment of AMR infections, enhance infection control, and facilitate outbreak detection and response in health care and community settings
- Encourage timely diagnosis and treatment of drug-resistant microorganisms

### ***Promote Infection Prevention and Control Practices in Communities***

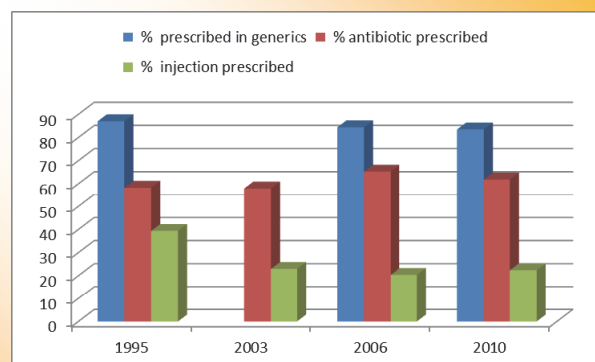
- Develop tools for information, education, and communication/behavior change communication (IEC/BCC) on IPC in communities, including schools and public gathering areas
- Conduct need-based health education on IPC and AMR
- Implement, monitor, and evaluate sustainable infection prevention, health/antimicrobial use education
- Promote hygiene, sanitation, and infection prevention

## STRATEGIC OBJECTIVE FOUR

### Optimize the use of antimicrobials in human and animal health through effective stewardship practices.

When microbes are exposed to antimicrobials, susceptible organisms are eradicated while resistant ones persist, passing on their resistant genes to off-spring by replication or to other species through horizontal gene transfer. There is sufficient evidence that the higher the use of antimicrobials, the greater is the resistance to them and vice versa. Countries, regions, or health care facilities with higher antimicrobial use are associated with higher incidence of resistance. Poor infection prevention and control practices; inadequate training and capacity to diagnose and manage infectious diseases; overuse and misuse of antimicrobials; poor prescribing and dispensing practices; demand by uninformed patients and lack of adherence to treatments; substandard medicines and not up-to-date and biased medicine information; poor access to antimicrobials, leading to inadequate dosage regimens; and insufficient duration of therapy are important contributors to AMR. Therefore, judicious use of antimicrobials in human and veterinary settings is an important strategy to reduce the emergence of resistance. Achieving this strategy involves strengthening technical and regulatory requirements and bringing about a change in the behavior of prescribers, dispensers, and clients. Policies and regulations that encourage more appropriate and rational use of antimicrobials are key long-term interventions for the containment of AMR.

There are indications for the existence of high-level antimicrobial use (Andualem 1995, MOH 2003, FMHACA 2006, DACA 2009, FMHACA 2010). To overcome these practices, there have been many initiatives, such as the establishment of functioning infection prevention, drug and therapeutic, and antimicrobials stewardship committees in health facilities. These multidisciplinary teams are involved in the review of infection prevention practices, medicines use reviews and evaluations, and providing feedback to their respective staffs for improved health outcomes. Exemplary health facilities are engaged in such practices, but they must be scaled up at other facilities. To facilitate these practices, STGs, formularies, and medicine prescribing and dispensing manuals have been put into use.



**Medicine Prescribing Indicators in Health Facilities in Ethiopia**

Source: Andualem 1995, MOH 2003, FMHACA 2006, DACA 2009, FMHACA 2010

## Priority Actions

### ***Promote Optimal Prescribing and Dispensing of Antimicrobials***

- Ensure accessibility of essential antimicrobials at all health facilities
- Ensure the availability and monitor the use of and adherence to evidence-based guidelines and job aids, such as STGs, antimicrobial use policies, lists of essential or formulary medicines, good prescribing and dispensing manuals, and standard prescription forms
- Ensure and support the availability of evidence-based best approaches for responsible prescribing, dispensing, and administering principles for antimicrobials
- Strengthen or establish microbiologic diagnostic facilities and conduct regular antimicrobial sensitivity tests
- Promote proper prescribing and dispensing practices and minimize empiric treatment of infectious diseases
- Develop and disseminate guidelines for proper prophylactic use of antimicrobials
- Design and utilize locally feasible labeling, dispensing, and adherence aids
- Promote sustainable communication among prescribers, dispensers, and other health care providers
- Establish or strengthen proper functioning of drug and therapeutics and/or antimicrobial stewardship committees
- Support the development of antimicrobial stewardship working manuals and procedures
- Provide up-to-date and unbiased medicine information services to health providers, clients, and the community
- Assure that information provided by pharmaceutical companies is based on evidence and is in line with the policy and guidelines of the country
- Organize and conduct regular, need-based, pre-service and in-service continuing education and training to prescribers, dispensers, and other health care providers
- Work collaboratively to strengthen the available evidence base to benchmark current levels of resistance and antimicrobial consumption and develop or improve early warning systems



### ***Promote Adherence to Treatment and Proper Use by Clients and the Public***

- Support empowerment of the public and organizations on appropriate use of antimicrobials, as they are shared resources
- Support and provide simple, targeted information to clients and the public
- Support the design and the implementation of antimicrobial use and resistance containment education programs to clients and the public
- Empower clients to provide information to and get information from health care providers about their health, diseases they have had, and their antimicrobial use (prescribed and self-medicated) history
- Encourage and support antimicrobial use adherence by clients and the public
- Regulate over-the-counter availability of and self-medication with antimicrobial medicines

Clients and the public's empowerment and knowledge about health and disease in general and of the medicines they are using in particular are of vital importance, not only in the prevention of medicine-related problems and AMR, but are also major factors that influence treatment adherence and good health outcomes. Patients who were provided the right information and counseling knew more about their medicines and how to use them. Evaluation of patients' knowledge may be used to educate the clients themselves and providers about problem areas to influence behavior change.

### ***Rational Antimicrobial Use in Animal Health and Food Production***

- Ensure access to essential antimicrobials for therapeutic use and vaccines to prevent diseases and minimize the use of antimicrobials
- Work closely with industries involved in animal husbandry and restrict non-therapeutic use of antimicrobials
- Eliminate the use of human health care antimicrobials as growth promoters and feed additives in animals
- Strengthen regulations for the food industry, including reviewing standards for animal products and setting clear specifications
- Ensure the availability and monitoring the use of and adherence to evidence-based guidelines and job aids, such as STGs, antimicrobial use policies, lists of veterinary medicines, and standard prescription forms

- Ensure and support the availability of evidence-based approaches to adherence for responsible prescribing, dispensing, and administration principles
- Conduct regular pre-service and in-service trainings for practitioners in animal health and production on the proper use of antimicrobials, resistance prevention, and containment
- Prevent over-the-counter availability of and discourage self-medication with antimicrobials
- Conduct regular antimicrobial C&S tests for prescribing and dispensing decisions
- Empower those involved in animal husbandry to get information about antimicrobials from veterinary professionals
- Foster antimicrobial stewardship programs in animal health care settings
- Support collaborative work to strengthen the available evidence base, benchmark current levels of resistance and antimicrobial consumption, and improve early warning systems
- Encourage exploration of options for the collection and analysis of veterinary medicine prescription and use data, including local audit information
- Explore the possibility of developing an “AMR index” to communicate gaps in antibiotic effectiveness and help aggregate data on resistance to assess trends over time and across locations.
- Initiate the inclusion of AMR prevention and containment in the respective plans of stakeholders

Evidence from the field and published reports indicates the irrational use of antimicrobials in livestock production, either for treatment or prevention of animal diseases. Also, published and unpublished reports indicate that microorganisms isolated from animals are resistant to common antimicrobials in use. The Ethiopian Veterinary Drugs and Feed Additives Control Authority has tried to provide information, guidelines, and training on rational use of antimicrobials in agricultural practices and livestock production, including product quality and proper use, hoping to strengthen partnerships in AMR prevention and

## STRATEGIC OBJECTIVE FIVE

### **Strengthen and establish national alliances and partnerships, management and governance arrangements, and resource mobilizations for the prevention and containment of AMR at all levels.**

AMR is a global threat, with limited tools to deal with it. The increasing movements of people, animals, food and other products, and medical tourism have facilitated transmission of resistant microorganisms. Local action alone will not be sufficient to bring about desired change. Concerted and coordinated national and international efforts are needed to bring together various stakeholders to influence opinion, obtain support, mobilize action, harness expertise and resources available in different sectors, and improve governance. These efforts have to be complemented with international partnerships and collaborations. Resistant strains in one part of the globe have to be rapidly detected, diagnosed, and contained. All sectors must collaborate on innovations; enhance stewardship practices; address the threats of AMR, and move the issue of AMR to the political level.

#### **Priority Actions**

##### ***Strengthen or Establish a National Alliance for the Prevention and Containment of AMR***

- Establish a team or focal points at different levels of the health care system for coordinating national activities and sharing information with all stakeholders
- Establish or strengthen a multi-institution and multidisciplinary advisory committee at different levels to advise, advocate, and educate on national efforts and to take assignments in their own institutions
- Promote public and private partnerships
- Develop networks and platforms for regular and formal interactions to facilitate experience and information exchange

A multidisciplinary and multi-institution NACARC was established to advise, guide, and harness the fight against the challenges of AMR in Ethiopia. The advisory committee has also participated in reviewing the baseline survey and the AMR containment strategy, co-organized symposiums and workshops, and advocated and catalyzed AMR containment in their respective institutions.

## Resource Mobilization

- Mobilize or secure adequate resources to implement the strategy for the prevention and containment of AMR in all respective sectors and institutions

### ***Strengthen National and International Networks and Collaborations***

- Support and coordinate national and international activities related to AMR
- Strengthen the capacity to implement effective AMR containment and prevention strategies
- Develop linkages with all stakeholders
- Promote regular and formal interactions
- Encourage development partners in capacity building
- Collaborate with mass media to create awareness and empower the public
- Collaborate with professional associations to enhance information sharing and incorporate AMR as an important element of continuing education

### ***Governance and Partnerships***

- Develop a mechanism for international communication of critical events that may signify new resistance trends with global public and animal health implications
- Collaborate in the development and consistent use of international standards for determining resistance, identify evidence-based interventions, adapt these strategies to new settings, and evaluate their effectiveness in the prevention and containment of AMR
- Partner with other nations to promote quality, safety, and efficacy of antimicrobials and strengthen country pharmaceutical supply chains
- Form sustainable coalitions, management, and governance arrangements at all levels to bring together different sectors and stakeholders and own the implementation of this strategy
- Strengthen international collaborations to improve knowledge and understanding and gather information on drivers of AMR
- Strengthen conservation and stewardship of existing antimicrobials
- Encourage and facilitate development of new antimicrobials, vaccines, diagnostics, and novel therapies
- Demonstrate leadership in building political support for action
- Coordinate regulatory approaches by collaborating with regional and international organizations, such as Africa Union and WHO, to harmonize international data submission and risk assessment and guidelines related to the licensure and/or approval of antimicrobial products, including vaccines and diagnostics

## IMPLEMENTATION, MONITORING, AND EVALUATION

This second Strategy for the Prevention and Containment of Antimicrobials Resistance in Ethiopia provides direction to guide actions and coordinate efforts across stakeholders. It will be implemented in accordance with the forthcoming and revised detailed plan of action and milestones for achieving the strategy's goals and objectives, along with metrics for measuring progress. An implementation action plan that provides details of activities, responsibilities of stakeholders, time frames, and budgets will follow and will be printed as a separate document. This strategy recognizes the need for a wide range of activities and a wide variety of players to support the prevention and containment of AMR. The strategy also recognizes the need for action by many organizations and individuals. The implementation may address the following issues:

- Obtaining national commitments to prevent and contain AMR
- Establishing a focal point in Ethiopia with the responsibility for coordinating the national alliance for implementation of evidence-based decisions of AMR and IPC programs and activities
- Strengthening the NACARC
- Strengthening antimicrobial stewardship programs
- Developing public IEC/BCC empowerment campaigns or activities and programs
- Establishing a national surveillance with mandatory reporting through efficient and quality laboratory networks and existing surveillance systems
- Developing and making available various national standards and guidelines for surveillance and strengthening regulatory support for their implementation
- Organizing continuing education that includes AMR containment and IPC courses for professionals and all health care workers through health-related institutions and professional bodies
- Collating research findings to develop actions
- Collaborating with international agencies for coordinated technical support and sharing current information and resources
- Identifying or consolidating AMR containment indicators
- Pool required data and information in one place to support policy making
- Using the surveillance system to feed into the monitoring and evaluation system and determining what resources are required to support it
- Reviewing, assessing, and modifying action plans with stakeholders on a regular basis
- Establishing a strong monitoring and evaluation mechanism
- Reviewing data generated on a regular basis to assess the performance and effects of interventions
- Assessing performance at different levels and organizing a review meeting for this purpose as one monitoring mechanism

## MEASURES OF SUCCESS

Given the complexity of the AMR threat and the response, it is essential that every stakeholder is clear about its contribution in combating AMR, both within its own mandate as well as others that have a bearing on activities of other sectors. Ownership of the strategy by all stakeholders is critical to move forward and yield the desired results. This strategic document is important in presenting what needs to be done in Ethiopia to prevent the emergence, re-emergence, and contain the spread of AMR and how Ethiopia fits into regional and global efforts to combat resistance.

The strategy considers the following are some of the measures as potential indicators of success:

- Political commitment and strong leadership, governance, and stewardship to support implementation of this strategy
- Strengthened and full commitment of the multi-institutional and multidisciplinary NACARC
- Establishment of a functional taskforce on the one-health approach
- Stakeholders that have developed, revised, and implemented their action plans and contributed to the overall implementation of the strategy
- Functional surveillance that collects, reports, interprets, and monitors changes in antimicrobial use and resistance trends in humans, animals, the food industry, and the environment and that is shared with those involved in these areas; this information should be used to compare the outcomes of interventions with the baseline
- Achievement of desired changes in infection prevention and antimicrobial use practices and behaviors
- Collection of antimicrobial use data by specific categories, such as human health, animal health, and the food industry, and the data is used for decision making
- Collection of data on resistant and re-emerging microorganisms of public health importance; data are generated and disseminated and appropriate actions are taken
- Generation of target indicators of progress and data sources for measuring success
- Regular follow-up and report by high-level government bodies
- Evaluation of the outcomes of the interventions for each strategic objective and generation of evidence for success (or lack of success)
- Use successful interventions as a basis for scaling up other interventions

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## ANNEX 1: NATIONAL ADVISORY COMMITTEE FOR ANTIMICROBIAL RESISTANCE PREVENTION AND CONTAINMENT

All served as members of the committee unless otherwise noted.

#	Institution	Name
1	Food, Medicines, Healthcare Administration and Control Authority – Chair	Heran Gerba
2	Ethiopian Veterinary Drugs and Feed Additives Control Authority - Co-chair	Dr. Hassen Kebede
3	Federal Ministry of Health	Nigatu Taddese
4	Federal Ministry of Agriculture	Dr. Elias Walelign
5	Ethiopian Health and Nutrition Research Institute	Surafel Fentaw
6	National Animal Health Diagnostic and Investigation Centre	Dr. Solomon Gebre
7	Addis Ababa University – School of Medicine	
8	Addis Ababa University – School of Pharmacy	Dr. Teshome Nedie
9	School of Veterinary Medicine	
10	World Health Organization Ethiopia country office	Abraham G. Giorgis
11	US Centers for Disease Control Ethiopia	Dr. Yared Tedla
12	US Agency for International Development	Dessaegn Tesfaye
13	Management Sciences for Health	Dr. Negussu Mekonnen
14	Ethiopian Pharmaceuticals Association	Dr. Teferi Gedif
15	Ethiopian Medical Association	
16	Ethiopian Veterinary Association	Dr. Nega Tewolde
17	Ethiopian Public Health Association	Dr. Aster Tsegaye
18	Ethiopian Medical/Clinical Laboratory Association	Teklil Biza
19	Representative of the US Government universities in Ethiopia	
20	Ethiopia Nurses Association	
21	Armour Hansen Research Institute	Dr. Mekonnen Teferi
22	Food, Medicines, Healthcare Administration and Control Authority	Asnakech Alemu
23	SIAPS – Member and Secretary	Tenaw Andualem

**ANNEX 2: PARTICIPANTS OF THE WORKSHOP TO REVISE THE STRATEGY FOR THE PREVENTION AND CONTAINMENT OF AMR IN ETHIOPIA**

<b>S. no</b>	<b>Name of participant</b>	<b>Occupation/title</b>	<b>Organization</b>
1	Dr Hassen Kebede	Pharmacist/veterinarian	Veterinary Drugs and Feed Additives Control Authority
2	Dr. Yohannes Tsegaye	Veterinarian	
3	Kassu Desta	Microbiologist	Ethiopian Medical/Clinical Laboratory Association/AAU
4	Rajiha Abubeker	Researcher	Ethiopian Public Health institute
5	Dr. Teshome Nedi	Pharmacologist	Addis Ababa University, School of Pharmacy (AAU/SOP)
6	Dawit Dikaso	Policy Advisor	FMHACA/UNFPA
7	Abrehet Ghidey	Lawyer	FMHACA      WHO
8	Baharu Zewdie	Pharmacist	
9	Mahlet Dejene		
10	Teshita Shute		
11	Asnakech Alemu		
12	Abraham G/Giorgis		
13	Amanuel Abebe		
14	Gebremedhin B/Mariam	Pharmacist	Ethiopian Pharmaceutical Association
15	Derese Tefera	HALS	Centers for Disease Control
16	Kefylaw Chirkem	Veterinarian	Ministry of Agriculture
17	Dr.Mulugeta Tsegaye	General Practitioner	Alert Hospital
18	Dr. Solomon Gebre	Senior Researcher	National Animal Health Diagnostic and Investigation Centre
19	Dr.Nega Tewolde	Vet Epidemiologist	Ethiopian Veterinary Association
20	Biruk Yeshitela	Microbiologist	Armour Hansen Research Institute
21	Nigatu Taddese	Pharmacist	Ministry of Health
22	Heran Gerba	Pharmaceutical Analyst	FMHACA
23	Edmealem Ejiegu	Pharmacist	SIAPS
24	Tenaw Andualem	Pharmacologist	SIAPS





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Administration and Control Authority

